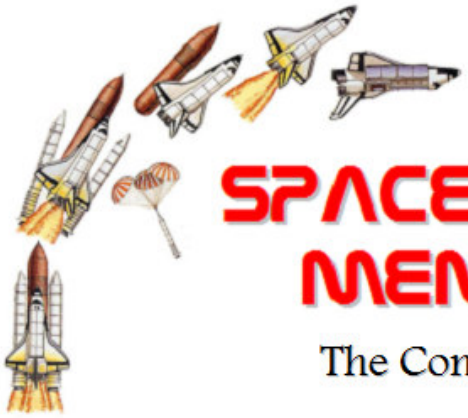
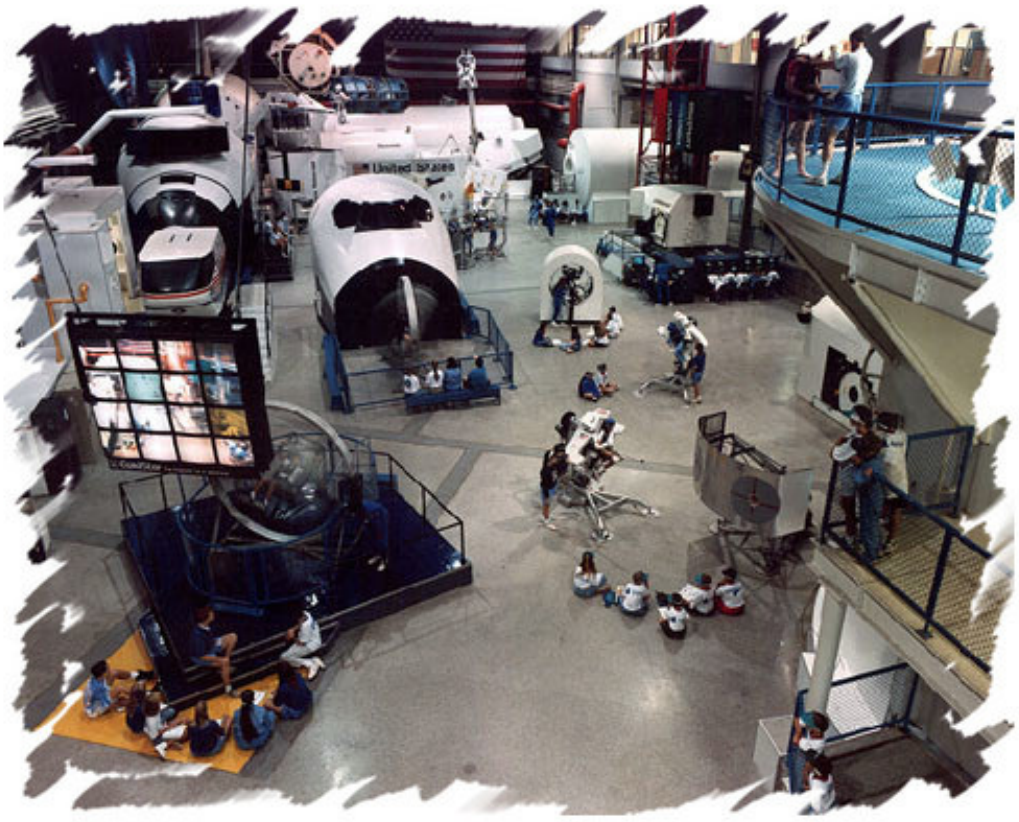


SPACE CAMP MEMORIES

The Complete Missions



RICHARD G RUSSO

"Space Camp Memories -- Reflections of Life" is a journal collection depicting real-life events. Names, places, and events are real and have not been fabricated.

Editions:

1.0: September 1995
2.0: January 1996
3.0: August 1996
3.2: April 1997
4.0: June 16, 1999 (10th Anniversary Edition)
5.0: June 16, 2002 (Space Camp 20th Anniversary Edition)
6.0: June 21, 2012

Version: 6.0

THROUGH THESE DOORS

WALK THE FUTURE

ASTRONAUTS, SCIENTISTS,

ENGINEERS, AND LEADERS

OF THE UNITED STATES.

acknowledgements

Space Camp Memories could not have been made possible without a select few, those individuals who had the insight to provide this wonderful experience for me. First, I wish to say thank you to those corporations (below) who sponsor and help keep the Space Camp/Space Academy programs funded and running. Without their support, my dream may not have been realized. I would also like to bow to the ingenuity and creativity of the U.S. Space & Rocket Center for their programs and museum. A special mark must go to Werner Von Braun (Rocket Scientist) and Edward O'Buckbee (Museum Director) who saw the insight to create a Space Camp in the first place. And, last but not least, I would like to thank my parents, Jennet and Ralph Merriam, and my grandparents, Dick and Betty Walters, for not only sending me to Space Camp once, but also allowing me to experience my dream a second time. The experiences are with me for the rest of my life. Thank you.

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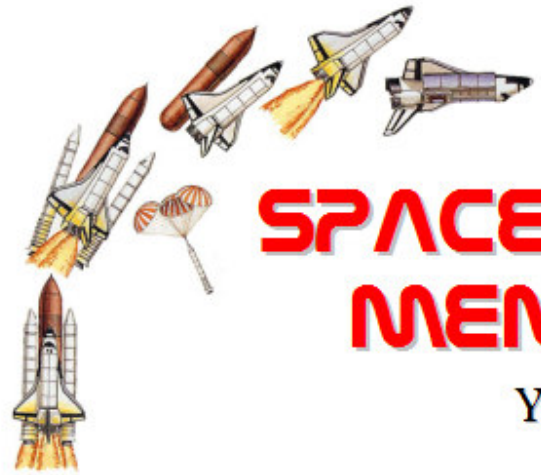


SPACE CAMP MEMORIES

Youth Programs

prologue

Imagine having a dream so different that it is hailed as "the first of its kind in the world."

In 1950, when Dr. Werner von Braun arrived in Huntsville, the tiny Alabama town that called itself the "Watercress Capital of the World," it boasted a population of just 15,000 souls. Over fifty years later, it is forged forever in history as the place where America's space program began, where the rockets were developed that put the first U.S. satellite into orbit, sent men to the moon, and power the Space Shuttle, all thanks to the ambitions of Dr. von Braun and his team.

It was during his tenure as Director of Marshall Space Flight Center when Dr. von Braun approached the Alabama Legislature with the idea of creating a museum jointly with the US Army Missile Command and the National Aeronautics and Space Administration. After the state's lawmakers and citizens voted in 1968 to finance construction, the US Army donated land on its Redstone Arsenal. Two years later, the U.S. Space & Rocket Center was dedicated: *"By the citizens of Alabama to those Americans who have made it possible for man to walk on the moon and to explore the universe, and to the youth of America who will use the technology of space for the benefit of mankind."*

But Huntsville is known for more than just being a Rocket City.

Von Braun also believed that young people had a lot to offer. He cultivated the idea to expose young people to science and math, using the space program as the focal point of such a course of study. If the country had baseball and football camps, why couldn't science have a camp to encourage interest in the space program? In the mid 1970s, he began to work on the Space Camp idea with then US Space & Rocket Center Director Ed O'Buckbee, who saw the idea through to fruition. In 1982, U.S. Space Camp opened its doors to its first cadet group and hasn't looked back since.

* * *

Space Camp Memories as a book is a product of my experiences at the US Space & Rocket Center's youth programs: Space Camp (for 4th, 5th and 6th graders) and Space Academy Level I (for 7th, 8th and 9th graders). In the past, an attempt to write a memoirs about my Space Camp experiences was discussed, but the project never seemed to progress beyond a few scribbled notes in a steno pad and a loose plan. But I knew that I would eventually have to organize those notes into some kind of final form or lose those memories forever. The journey from there to here began in the summer of 1991, after completing my Space Academy experience. On a blistering hot summer day, I decided to make a recording – the "Dream Tape" – to not only stand as testimony to some of the dreams I had before my first Space Camp experiences, but to define some of the events that had just transpired.

The recording was short – about 30 minutes or less – but invaluable in noting some of the more pressing events that took place at Space Academy, Level I.

Three years later, in 1994, during the week of June 11 through June 21, of what you will come to know as the "Space Camp/Academy Awareness Weeks", I would again put my voice to a recording for a tape called "Space Camp Memories". This turned out to be a rather bold step in this process as it would provide, for the very first time, the means for me to discuss whatever I remembered about both programs, to dig deeper and provide a more in-depth analysis of some of my most treasured memories of Space Camp and then have it saved for posterity. Little did I know how instrumental both tapes would become in the creation of the *Space Camp Memories* book.

But that isn't what you're going to read; not exactly. Let me explain.

Even with all the past work I had done, the dream of a "complete" "Memories" book was still not solid. Through writing things out on paper, minute details I thought I had long forgotten began to surface and that helped. I was astonished that these details were kept, locked in the various passages of my brain, but there too time had reared its ugly head. It was a relentless enemy and though I tried to keep the stories that unfolded from that exercise in the order of their actual occurrence, much of what unfolded there was woefully inadequate. But by the end of the summer of 1995 I was ready and the first version of *Space Camp Memories* was released. Over the years since, up through 2002, a number of updates have come to the text bringing with them more clarity in both pictorial form and memory recollection. But that still wasn't enough.

What I had written was disconnected from the experience, told well after the fact in distant third person form. What I really wanted was to be able to re-live the experience – from the jittery first day of orientation to the accomplishment and sadness of graduation – placing me, and the reader, in the midst of the action; however, much like during the gestation of the first edition, the redux project never seemed to progress beyond a few outlines and a number of well intended notes. By then, though, I had returned to Space Camp as an adult – twice – and thought of writing about those experiences instead. But if I did, what would become of the original experiences? And how would I tie the two together?

In the 10 years between the last version and this I've had time to hone a flurry of outlines, to write scores of pages of notes, and mull over what I should and shouldn't do with the material at hand. Sadly, no matter what I did (or do), some of the memories I have of Space Camp and Space Academy are lost completely. So what I have done here is completely re-imagine the experiences as a series of entries in a journal, presented (with a smidgen of artistic license) as if they had been written at the moment the experiences were occurring. I have in effect placed myself (and you as the reader) in the midst of the action so as to get a piece of it. An act I had originally intended all along. So I hope you enjoy this new look into my Space Camp experiences, as much as I did crafting, remembering and re-writing…

U.S. Space Camp
Session 31
June 11 – 16, 1989

Day Zero – ORIENTATION DAY
SUNDAY | JUNE 11, 1989

Hi there.

We're at the end of our day now and we've been given about an hour or so to prepare for lights-out, our bedtime. During this time we should shower if we're going to shower (there will be time in the morning but availability might not be there), to brush our teeth and do whatever else we need to do in order to get ready to sleep. We're heading off a bit early because they're going to wake us up early in the morning too! Followed by calisthenics, bed making inspections and who knows what else before we even get the opportunity to eat breakfast.

Where am I, Space Camp or the Military?

I'm feeling a bit out of sorts. I'm not sure I want to be here, at Space Camp. Strange as it may seem, but I think this might be a mistake. Yes, coming here has been a dream of mine. Yes, being here now is a fulfillment of that dream. But I don't like it already. We're shuffled from place to place, we eat when they tell us, go to the bathroom when they tell us. Even go to bed when they tell us. We can't even wander around the Museum or Rocket Park unless we're scheduled to do so. It all seems so strict! I don't know anyone here. It's cold in here. I'm so uncomfortable.

And to think I was so excited to get here...

ORIENTATION ///

In 1950, when Dr. Werner von Braun arrived in Huntsville, the city boasted a population of only 15,000. More than thirty years later it has been forever forged into the history books as *the* place where America's space program began, where the rockets were developed that put the first US satellites into orbit, that sent men to the moon, and went on to power the Space Shuttle.

As Director of the NASA Marshall Space Flight Center, Dr. Braun cultivated the idea to expose young people to science and math using the space program as the focal point of a course of study. If the country had baseball and football camps, why couldn't science have a camp to encourage interest in the space program?

In the mid 1970s, he began to work on the Space Camp idea with US Space & Rocket Center Director Ed O'Buckbee, who saw the idea through to fruition in 1982. That first year was much like space travel, a step into the unknown. But 747 students signed up to find out about the excitement of space exploration. The following year that number rose to 1,400. The next year it was over 2,000. Then 3,000. 5,000. In 1986, with the release of the movie "SpaceCamp", which was filmed on location at U.S. Space Camp in Huntsville, Alabama, attendance shot to over 12,000. The word was out.

That's how I found out about SpaceCamp, through the movie.

SpaceCamp: The Movie is a thrilling contemporary adventure about a group of teenagers whose summer at a camp for future astronauts turns into an unexpected space shuttle voyage. The film stars Kate Capshaw as Andie, a camp instructor and astronaut who has not yet fulfilled her dream of space-flight; Lea Thompson as Kathryn, a serious-minded young lady who is determined to become the first female shuttle commander; Tate Donovan in his feature film debut as the brash but likable Kevin, who discovers the spirit of team-work; Kelly Preston as Tish, a lady with a photographic memory and a passion for the fashions of Cindi Lauper and Madonna, who proves to be less frivolous than she first appears; Larry B. Scott as Rudy, a young man for whom Space Camp provides the key to self-confidence; Tom Skerritt as Zach, a former astronaut and head of Space Camp; and screen newcomer Leaf Phoenix as Max, a star-struck youngster whose dreams of space adventure come true in a way that exceeds his wildest expectations.

I was hooked. Already a self-described "space nut", and just beginning to reach for the stars, this was a fantastic adventure to watch. It quickly became my all-time favorite film! (Even surpassing "WarGames"). And when I found out that Space Camp was a real place – I wanted to go!

Space Camp, a five-day adventure for kids in the 4th, 5th and 6th grades, would provide the opportunity for enthusiasts to take part in the building of their own model rocket (which would be launched later in the week), tour the Rocket Park, take off-campus trips to the Marshall Space Flight Center, and see amazing IMAX films such as "To Fly", "Hail Columbia", and "The Dreams is Alive". The week long adventure would also be full of training, in which cadets would learn to use such equipment as the Moon Walker (simulating the sensation of walking on the moon), the Centrifuge (simulating the 3 G's the Shuttle astronauts experience at lift-off), the Space Shuttle Liner and the 5DF (Five Degrees of Freedom) Chair. The week also has trainees take part in a practice splashdown rescue operation (for emergency egress purposes) and tests teamwork skills. All of which is to prepare the cadets for the grand finale: a two-hour Space Shuttle simulation mission, which will use all the techniques and skills learned throughout the week.

The first to attend a session occurred in the summer of 1988, and we had everything planned out. The first choice in dates was June 12-17 with the second choice being June 19-24. Unfortunately, though, my parents felt I was a bit too young to appreciate the experience; thus it was decided the Summer of 1988 was a no-go for launch. Breaking my ankle in the Spring probably didn't help matters either, but that's a story for another time. Therefore, the next chance came the following year – this year. On November 19, 1988, Session 31 running from June 11 through 16 was confirmed with a string of numbers (HC31137TH), and I was undeniably excited. The jubilation was short-lived, though, because when we received the confirmation letter we discovered they spelled my name wrong – Rouffo (instead of Russo). Other hurdles had to be cleared as well – like a physical. By mid-January 1989 I was set and ready to go...

ARRIVAL ///

After many weeks and months waiting for the beginning of this adventure, the day my grandparents and I would leave for Huntsville finally arrived – June 9, 1989, a Friday. I'd been packed for days preparing for our departure; everything I would need was checked off and packed in my Space Camp duffel bag (graciously purchased by my parents a few months before this fateful day). All that was left for me to do once morning arrived was to get myself up, dress, and ready for travel. And with everything in order, me and the Winnebago pulled out of our driveway and onto the road – the adventure had begun! By 9:00am we were out on the open road following just one other stop: our traditional part-for-the summer breakfast at McDonalds (every summer my grandparents take me in their Winnebago to places I've never been before, without my parents accompanying. The first time was in 1984 and we went up the East Coast along I-95, visiting Savannah, Colonial Williamsburg, Washington DC and the like. In 1985, it was along I-75 and places slightly further afield, like the US Space & Rocket Center. In 1986, it was along the Mississippi to places like Mobile, Alabama, the St. Louis Arch, and through the Ozarks. You get my drift).

- √ - Combination Lock
- √ - Comb
- √ - Shorts (in good taste)
- √ - Sleepwear
- √ - Shirts
- √ - Swimwear
- √ - Any needed medication
- √ - Wrist Watch
- √ - Walking Shoes
- √ - Blue Jeans
- √ - Toothbrush / Toothpaste
- √ - Rain Coat
- √ - Soap
- √ - Notebook and Pen
- √ - Suntan Lotion
- √ - Clothes Hangers
- √ - Bug Repellant

The first day's travel took us all the way up U.S. 27 to the Georgia/Alabama border, a new route for us. Usually we'd take U.S. 27

to the Florida Turnpike and catch that until it merges onto Interstate 75. Then we'd take I-75 up to the Florida border.
For this trip, however, I devised the route that would take us to Georgia must faster (of course, this wasn't really the case since it was a lot of stop and go, but it looked closer on the map!). We stopped once in Williston for lunch (Krystal hamburgers – yum!) and moved into Tallahassee, Florida for supper (around 5:30pm) at a rest area. With our tummies full, we continued on our U.S. 27 route into the state of Georgia and drove until we reached Columbus, crossing the Georgia/Alabama line as well as the Eastern/Central Time Zone border. With the "extra hour", we pushed into Phenix City, Alabama and our travels for the night ended. We found a nice cozy K-Mart parking lot to park the Winnebago in and went to sleep.

On the morning of the 10th, we woke and headed out to McDonalds for breakfast (yes again) before trekking up to Huntsville, arriving around 5:00pm. We made just one stop on our way – in Opelika, Alabama, for lunch. Arriving at the Space and Rocket Center a few minutes after that, we confirmed our space center camp ground reservations (it was confirmed but our spot was not ready; we were a day early, so being the traveling people we are, we found a nice cozy Wal-Mart parking lot to stay the night.

Sleep was fitful.

REGISTRATION ///

That brings us up to today.

This morning came bright and early. I was so excited to have this day arrive I could hardly contain myself. I wanted to get over to the space center immediately, so we had a quick breakfast and shot out to the Rocket Center in a flash. We got here so quickly that the campground wasn't yet open so my grandparents couldn't check in. So you know what we did instead? We parked next to the Habitat and went shopping! I still needed to get my Flight Suit – I couldn't go through Space Camp without a flight suit! – And who could pass up a chance to browse around one of the bigger stores dedicated to space memorabilia around? Not me, that's for sure.

After posing for a few shots of me in my new flight suit, we packed it up and got in line for Camp Registration, which began around 1:00pm in the atrium of the Habitat structure.

The Habitat; it was as if I stepped onto the starship Enterprise. As a space fanatic, I just stood in awe of this structures size and style. If the creators wanted to make you feel that you were really on a space station then their mission was a complete success because what I saw was simply amazing – four floors of themed bays, struts and supports hanging in the lobby and futuristic labels, doors and other space station-like trappings that for a self described “space nut”, there was nothing left to do but stand in awe. And I get to sleep here night after night?

Sure enough, but first we’d have to navigate registration for my team name and room assignment – Space Camp on one end, Space Academy on the other – and the chaotic lines that followed both. Once successfully navigated I’d officially be part of Space Camp! During our wait I made my first friend here: his name is Andy Murphy from somewhere in Virginia. He was a great distraction... and made the passage of time go quickly! Before I knew it, I was next up in line.

"Hi, what's your name?" the nice lady asked of me. Upon question, I divulged my name and she immediately took to searching a computer database. Moments later, she said, "Ahh, there you are..." and handed me a single white envelope.

I looked at it briefly, puzzled, and wondered; the only thing it had printed on it were the characters "MART" and below that, the expression "HL 3-10". Inquisitive, and very confused, I turned back to the lady to ask, "What does 'MART' mean?"

Her explanation was short and to the point: MART stood for Martin Marietta - my team name. So with that solved I took to the second line.

"Habitat Level 3, room 10" she spouted back, knowing that was to be my next question.

Thanking her, I grabbed my stuff and began the next leg of my journey – the linen closet! Registration and Check-in was but the first top in a multi-step process of checking in, gathering the things you’d need and getting settled in your room; whodathunk? After getting my team and room assignments (the envelope), the next step was to pick up the blankets and sheets you’d use throughout the week.

Fortunately Space Camp furnishes this stuff, and they loaded me up with a lot: 2 towels, 2 sheets, 1 pillow, 1 bath cloth, 1 blanket, and 1 pillow case. With my arms now full of fluff, my grandmother and I headed upstairs to get the first glimpse of my home away from home for the next few days: my room.

Three flights of stairs later (phew) and we finally arrived at the door (excuse me, hatch) to my room, quickly escorting ourselves inside. As soon as the door—sorry, hatch-opened I peeked in and saw a set of lockers and a bunk bed above them. Stepping further in, I could see more of the room, which angled to the left, with more bunks and another set of lockers. I counted a total of six lockers and I quickly assumed there were a total of six bunks per room – I was right! By the time we arrived, most of the bunks had already been taken, so I took the farthest one from the door and to the right of forward motion (bunk 10-05). It's right above the second set of lockers and would prove to be the hardest bunk to get into!

As we were starting to get settled in – clothes put up and locker squared away – we were interrupted by a new "roommate", a girl. Say what? Mixed dorm rooms? Not to be so, though. Obviously a mix-up at registration, the girl's mother quickly retreated and went downstairs to see what could have possibly happened – I never saw them again. After no further interruptions I finally got packed into my locker and my grandmother left me to sit in solitary.

She didn't just leave me there though; I was waiting for Andy.

Before he and I departed from the registration line, the two of us decided we'd go shopping together (or more so, I'd join him and his mom). I provided them my room number and when they were settled in (Andy was in Habitat II), they would come get me. At least, that was the plan. I sat and waited a number of long minutes for them; when they didn't show after a considerable amount of time, I went out looking for them. I made it down the stairs, onto the atrium of Habitat I, through the connecting tunnel into Habitat II before being stopped by a counselor who pointed me toward an Orientation - even though I told them I was looking for someone, they just ushered me right in like I hadn't asked a question at all. Seeing that I wasn't going to get anywhere talking to the counselor, I went inside and took a seat. Big mistake. Once I took a look around, I found that I didn't know any of the people there and decided to leave in search of my new friend.

Besides, it was boring.

I made it all the way into the Museum and began a systematic search there. But, after searching around the exhibits, I returned back to my habitat room empty handed, sat down and waited some more. After a few more minutes passed in silence (hoping they'd come by and look for me), I went back down to Orientation just to see if he happened to be there; he was not. Once again I returned to my vacant room and what do you know? That's right... still no Andy! This time, though, I decided to wait it out in my own room while everyone else sat in the boring Orientation lecture. After another sitting spell, I finally gave up hope of ever seeing Andy again, so I decided to go back to the Museum. But, before I did so I made one last round at the room. When I opened my door there stood Andy, and his mother Kate. They had already done their shopping!

"Hey! I thought you were going to come get me," I exclaimed, after seeing the packages.

"We did," Kate said, "but you weren't there."

Doh! Wouldn't you know they came while I was out searching for them? I guess I should have stayed put in the first place!

Orientation turned out to be nothing more than a waste of time and moreover, I missed the shopping opportunity with my newfound friend, Andy. Even so, a new treat was at hand - I was going to be meeting my roommates soon! By the time I got back from wandering around the Habitat, learning its strange vernacular, one by one, my roommates began to return. Up until that point I had not met them, let alone seen them. (Although I'm sure I would have had I attended Orientation like I was supposed to.) They were:

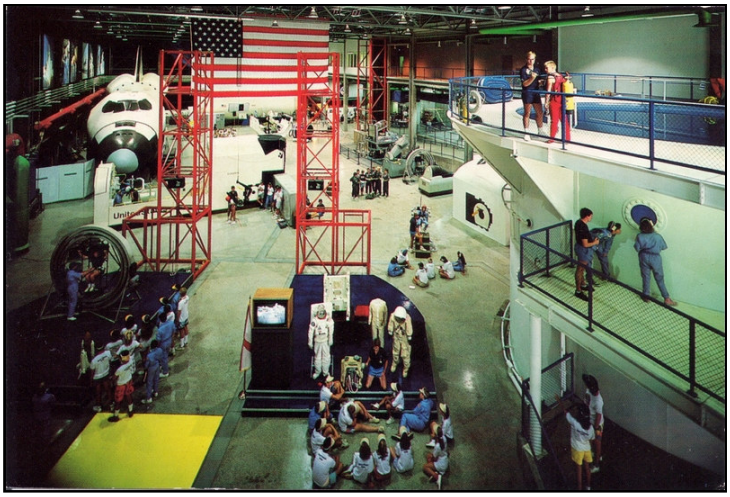
Clark ***Farren*** ***Jeff*** ***Chris***

First impressions?

Clark: a chunky kid; seems shy and enjoys snacking a lot. He's occupying the bunk opposite mine (the one over the lockers nearest the door). Farren: Californian cool; a dirty-blonde haired kid with a cool Californian look and feel. He appears to be very outgoing and is genuinely nice. He's taken the bunk nearest the door, over one of the workbenches. Jeff: he's a dark-haired kid, rather meek, and somewhat shy, but not nearly as shy as Clark. Jeff isn't on our team (he's on Lockheed's team); he'll be sleeping to my right on the top bunk of a double bunk-bed setup. And then there's Chris: your average normal looking American kid with freckles and all. He's a little more enigmatic; not nearly as outgoing as Farren but nice enough. He'll be sleeping below Jeff. It looks as if we'll be getting along just fine.

With introductions out of the way we returned to the Habitat's atrium at an appointed time to meet the rest of our team, find out what our schedules might be and how the rest of the week would progress. We met our two counselors as well: Michele (our day counselor – scheduled to come in around 7:30am and stay with us until 5:00pm or so) and Nat Brand (our night-time counselor – who would stay with us from 5:00pm through the night, and take us to breakfast the following morning). And we were advised of all the rules and regulations we'd have to follow as new Space Camp cadets.

A quick tour of the Training Center came next, where we'd be training for the rest of the week, followed by an opportunity for each of us to don (that's put on) a space suit mock-up and have our pictures taken. Kind of like a welcome to Space Camp activity. We got a mini-lecture on the Space Station concepts and the hardware being developed for it right there on the floor, then went to dinner.

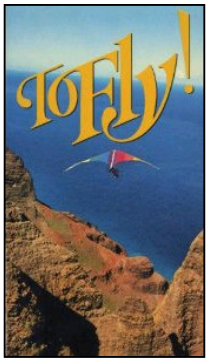


The Training Center and adjoining cafeteria are more recent editions – added in 1988 as an expansion to the Space Camp program. This new facility has its equipment laid out similar in style to that used by real astronauts, such as John Young, Sally Ride, Joe Allen and Kathy Sullivan during their astronaut training. The Training Center was completed at a cost of $4.5 million dollars we're told, to duplicate the functions of equipment and training at the Astronaut Training Center at NASA-Houston. This facility contains some 70,000 square feet, some five times larger than the area previously devoted to Space Camp activities.

After dinner we were escorted to the Museum's Space Dome OMNI-MAX Theater, a 67-foot hemispherical screen that provides viewers with breathtaking panoramas of space as experienced by shuttle astronauts, or various other scenes taken by the photographer. When you sit back in your seat, the action explodes all around you.

IMAX increases the resolution of the image by using a much larger film frame. To achieve this, 65 mm film stock passes horizontally through the cameras. Traditional cameras pass film vertically. 65 mm film has an image area that is 48.5 × 22.1 mm (1.91 × 0.87 in), in IMAX the image is 69.6 × 48.5 mm (2.74 × 1.91 in) tall. In order to match standard film speed of 24 frames per second, three times the length of film moves through the camera.

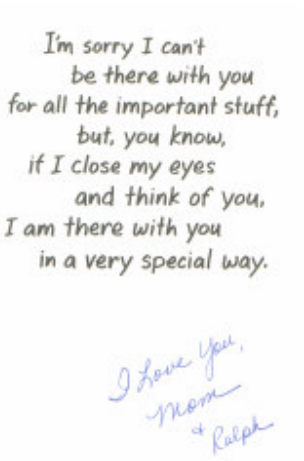
IMAX uses "ESTAR" (Kodak's trade name for PET film) base. The reason is for precision more than strength. Developing chemicals do not change the size or shape of ESTAR, and IMAX's pin registration (especially the cam mechanism) does not tolerate either sprocket-hole or film-thickness variations. The IMAX format is generically called "15/70" film, the name referring to the 15 sprocket holes per frame. The film's bulk requires platters rather than conventional film reels.[10] IMAX platters range from 1.2 to 1.83 meters (3.9 to 6.0 ft) diameter to accommodate 1 to 2.75 hours of film. Platters with a 2.5-hour feature film weigh 250 kilograms (550 lb). An IMAX projector weighs up to 1.8 t (2.0 short tons) and is over 178 cm (70 in) tall and 195 cm (77 in) long.



Tonight's movie was called "To Fly" and it follows the history of flight, from the first hot air balloons in the 19th century to 20th century manned space missions. It was filmed in 1976 for performance at the National Air and Space Museum's IMAX Theater in Washington, D.C., and acts as a wonderful introduction to the types of things we'll be studying here at Camp. Other films we'll likely see this week are "Hail Columbia" and "The Dream is Alive", both really good films in their own right.

And after the film we were escorted over to the Habitat where we called it a night.

* * *



So maybe it's not that bad after all. I'll probably stick it out. I've been up to the fourth floor of the Habitat already (about 8:40 CT) – it's really hot up there, not to mention deserted – and stopped by to see my newfound friend Andy (I feel more comfortable being with him than anyone here), and my mom gave me a kick in the pants earlier on the phone – there's a pay phone just down the hallway on our floor here, I found – and our chat was nice. It was good to hear her voice, though she picked up on my homesickness. During our conversation she told me she packed something special with my stuff – a card – something she told me that would help me possibly cope with any feelings of fright and uneasiness. Once we hung up I came back here to look for it, finding it amongst my books.

To hear those words, even if in print, has made me feel a little better. It feels good to know that my mom is thinking of me, which I knew she would be, but it's still nice.

Yeah, as I look over at my roommates preparing to go to sleep, I think it'll be okay. There's Clark over there, eating some candy that his mother packed with him and clutching a cow plushie in his left arm. It seems he's a bit insecure about being here too. Farren's in bed already; Chris settled in too; and Jeff getting used to his new sleeping arrangements, I think it'll be okay.

I'm going to head off too. I guess I'll need to be ready for just about anything come morning.

Goodnight, Houston.

TO: KGB COMMANDER

FROM: VLADIMIR BORIS

REASON: “Shuttle Launch Sequence”

КГБ-3

СССР
КОМИТЕТ
ГОСУДАРСТВЕННОЙ БЕЗОПАСНОСТИ
при СОВЕТЕ МИНИСТРОВ СССР

Comrade, in addition to have been lectured today about the Space Shuttle, we also received information pertaining to the Space Shuttle launch sequence, including holds to countdown. This information should prove invaluable to our scientists in helping Buran.

T-43 hours and counting

- The Shuttle Test Director performs the traditional call to stations and the countdown clock is activated.
- Begin final vehicle and facility close-outs for launch
- Check out backup flight systems
- Review flight software stored in mass memory units and display systems
- Load backup flight system software into the orbiter's general purpose computers
- Remove middeck and flight deck platforms
- Activate and test navigational systems
- Complete preparation to load power reactant storage and distribution system
- Complete flight deck preliminary inspections

T-27 hours and holding

This is the first built-in hold and typically lasts four hours.

- Clear launch pad of all non-essential personnel
- Begin loading cryogenic propellants into orbiter's power reactant storage and distribution (PRSD) system

T-27 hours and counting

- Begin operations to load cryogenic reactants into the orbiter's fuel cell storage tanks

T-19 hours and holding

This built-in hold typically lasts four hours, but may be extended if PRSD offload is required.

- Demate the orbiter's midbody umbilical unit
- Clean and vacuum crew module
- External tank nosecone purge

T-19 hours and counting

- Begin final preparations of the orbiter's three main engines for main propellant tanking and flight
- Fill launch pad sound suppression system water tank
- Resume orbiter and ground support equipment close-outs
- Close out the tail service masts on the mobile launcher platform

T-11 hours and holding

This built-in hold varies between 13 to 14 hours.

- Weather and engineering briefings
- Pad debris inspection and closeout
- Flight crew equipment late stow
- Move rotating service structure to "park" position
- Activate the orbiter's inertial measurement units and communications systems
- Perform ascent switch list

T-11 hours and counting

- Activate the orbiter's fuel cells
- Clear the blast danger area of all nonessential personnel
- Switch the orbiter's purge air to gaseous nitrogen

T-6 hours and holding

This built-in hold typically lasts two hours, or one hour for a 24- or 48-hour scrub.

- Mission Management Team and launch director receive weather update
- Launch team verifies no violations of launch commit criteria before loading the external tank with propellants
- Clear pad of all personnel
- Chill-down of propellant transfer lines
- Begin loading the external tank with about 500,000 gallons of cryogenic propellants

T-6 hours and counting

- Finish filling the external tank with its flight load of liquid hydrogen and liquid oxygen propellants

T-3 hours and holding

This built-in hold typically lasts two-and-a-half hours.

- External tank loading enters stable replenish
- Perform inertial measurement unit preflight calibration
- Align Merritt Island Launch Area (MILA) tracking antennas
- Final Inspection Team proceeds to the launch pad to conduct a detailed analysis of the vehicle as the team walks up and down the entire launch tower
- Closeout Crew proceeds to the launch pad to configure the crew module for countdown and launch and assist the astronauts with entry into the orbiter
- Televised weather briefing
- Flight crew weather briefing
- Astronaut Support Person enters crew module and begins comm checks

T-3 hours and counting

- Crew departs for the launch pad and, upon arriving at the pad, begins entry into the orbiter via the White Room
- Complete close-out preparations in the launch pad's White Room
- Check cockpit switch configurations
- Astronauts perform air-to-ground voice checks with Launch Control (Kennedy Space Center) and Mission Control (Johnson Space Center)

- Close the orbiter's crew hatch and check for leaks
- Complete White Room close-out
- Close-out crew retreats to fallback area

T-20 minutes and holding

This built-in hold typically lasts 10 minutes.

- NASA Test Director conducts final launch team briefings
- Complete inertial measurement unit preflight alignments

T-20 minutes and counting

- Transition the orbiter's onboard computers to launch configuration
- Start fuel cell thermal conditioning
- Close orbiter cabin vent valves
- Transition backup flight system to launch configuration

T-9 minutes and holding

This is the final built-in hold, and varies in length depending on the mission.

- Final launch window determination
- Activate flight recorders
- Final "go/no-go" launch polls conducted by NASA Test Director, Mission Management Team and launch director

T-9 minutes and counting

- Start automatic ground launch sequencer
- Retract orbiter access arm (T-7 minutes, 30 seconds)
- Start auxiliary power units (T-5 minutes, 0 seconds)
- Arm solid rocket booster range safety safe and arm devices (T-5 minutes, 0 seconds)
- Start orbiter aerosurface profile test, followed by main engine gimbal profile test (T-3 minutes, 55 seconds)
- Retract gaseous oxygen vent arm, or "beanie cap" (T-2 minutes, 55 seconds)
- Crew members close and lock their visors (T-2 minutes, 0 seconds)
- Orbiter transfers from ground to internal power (T-50 seconds)
- Ground launch sequencer is go for auto sequence start (T-31 seconds)
- Activate launch pad sound suppression system (T-16 seconds)
- Activate main engine hydrogen burnoff system (T-10 seconds)
- Main engine start (T-6.6 seconds)

T-0

- Solid rocket booster ignition and liftoff!

END OF REPORT.
#####+&

Day One – ASTRONAUT TRAINING DAY
MONDAY | JUNE 12, 1989

Houston, Atlantis. We've achieved orbit.

Boy don't I wish; wouldn't that be great? To be floating snuggly inside the Space Shuttle as it tumbles endlessly around the Earth, watching the continents and oceans flying by out your window at more than 17,000 miles-per-hour tonight?

"Whoa, is that India we're coming up on?"
(Tish, SpaceCamp: The Movie)

Yeah, that's an adventure to me. I hope Space Camp can take me there someday. Wouldn't that be something?

In some ways it already has. The Habitat Complex we're all bunked down in (Habitat I) is a simulated Space Station environment, built to house up to 800 Space Camp and Space Academy (the next level of Camp) trainees during these weeklong adventures. This unique structure, an addition to the Space & Rocket Center grounds earlier this year, features individual compartments for six persons with built-in sleep stations, computer work areas and storage compartments (lockers). Habitat I has a towering four floors, which opens up to a central atrium that is used for registration and various assemblies throughout the week. Down in the atrium is where our registration was yesterday and we met there earlier this morning before marching off to breakfast.

Designers incorporated many aerospace concepts in this four million, 328-foot Space Habitat. For example, it has hatches for doors; ports instead of windows; and benches instead of chairs (which, of course, would float in space. These items extend the atmosphere of living and working in a weightless environment, which I totally love. Structurally, the Habitat's exterior is comprised of over 45 curved metal panels, which give the building its cylindrical appearance. The "tubes" of the Habitat are longer than a football field and are divided up into 66 bays, which are our rooms.

Ten corporations, each of which contributed at least $100,000 toward construction of the $3.65 million Habitat I building, receive special recognition. At least one section of the habitat is named for them: Lockheed, Wyle Laboratories, Rockwell International, The Coca-Cola Co., Teledyne Brown Engineering, Morton Thiokol, Grumman, The BDM Co., Boeing and Martin Marietta.

Mine is located in Habitat I, Level 3, Room 10 - or HL 3-10 for short – which apparently is in the "Grumman" section of the habitat, but strangely enough, none of the occupants here are from that team. Go figure. Andy, the kid I met yesterday at registration, is bunked in Habitat II, which is just next-door to Habitat I. Hab II, as it's called for short, is more of an Earth-based environment: large bays filled with bunk beds and various assembly rooms. Yesterday's botched orientation was held over there (remember) and Sick Bay (that's what it's called) is also located there. The two, Space Station (Habitat I) and Earth Station (Habitat II) make up the 64,000 square foot Habitat Complex. It's too cool!

The sleeping quarters are "cool", the inside is "awesome" and the whole structure sees to radiate a feeling that you really are in a space station environment! It really is a whole different world here! And in keeping with its Space Station design, facilities within the two habitats have names that are "out of this world", such as:

Original	Became
Bathroom	Waste Management
Heating and Air	Life Support System
Maintenance Room	Enviro Control
Window	Earth Study
Elevator	Transport
Water Fountain	H20 Dispenser
Emergency Exit Plan	Emergency Egress
Hospital	Sick Bay
Snack Room	Galley
Room	Bays

To think yesterday I had such a hard time assimilating here at Space Camp – tonight I have an entirely different perspective. I'm beginning to love it! Last night at lights-out, which is quite a shocker let me tell you; the counselors come right into the room and practically yell at us to go to bed, then just turn out the lights, slam the door and later, another counselor comes by and takes attendance, but I digress. Last night at lights-out I was in a bad way. I cried on the phone with my mom, I wanted to go home, everything about Camp was wrong, wrong, wrong and I didn't want to be here. Today I got a totally opposite reaction, and I don't really know what's changed. Perhaps I've just accepted the situation, accepted what's going on and how hard it's going to be (not to mention rewarding) and had to come to terms with the fact that this is where I really wanted to be. I'm here. I'm fulfilling a dream. So with that in mind, I guess, everything changed.

And I like it. Thank goodness. Now maybe I can have some fun!

I think so too... Although the guys in my room are a lot of fun (I got to know them a little bit last night, of course. How can you not when you room with them?), but today I had a chance to interact more with the members of my team and you'll never guess who I met (or actually where they're from.) Two guys from East Tennessee! But more on that later...

MOON STAR BUGGY ///

"Okay guys, it's time to get up!"

Space Camp started off with a bang this morning, literally. Not the bang of a gun, a canon, or of a drum... but the bang of a door, our door to be exact, and the doors of everyone else on our floor.

Around 6:00am the bangs began and we were rudely awakened by the ominous sound of our hatch (door) being flung open with such force that it slammed into the side of the habitat wall – BOOM! It was enough of a thing to actually startle us out of sleep (for those who did not already hear the other trainees being rudely awakened in this manner, like I did.) If you weren't up and at 'em by the sound of the door then the second phase of the counselor's dastardly plans certainly would: they'd just turn on the lights and yell!

"Okay guys, it's time to get up!"

And like the booming of the hatch door, the light burst onto the scene without warning. Then, as if to complete some kind of militaristic ritual, the counselor turned around and left the room, slamming the door behind them, mercilessly. The five of us looked at each other like deer in headlights. What the hell? Oh man, you've got to be kidding me! But it worked; we were up.

And thus began our morning routine – showers, dressing, grooming and preparing. Our goal was to be completely done and ready for inspection – yeah, inspection! – before assembly at 7:30am in the Habitat's atrium. And if we weren't there... we might miss out on breakfast.

Why? Because we weren't allowed to go anywhere without our team / counselor and if we weren't at assembly, we weren't going to the cafeteria with our team! Thankfully that didn't happen this morning. We were clean, our beds were made, our personal items were locked up in our lockers, and our clothes folded neatly or hung neatly within those lockers.

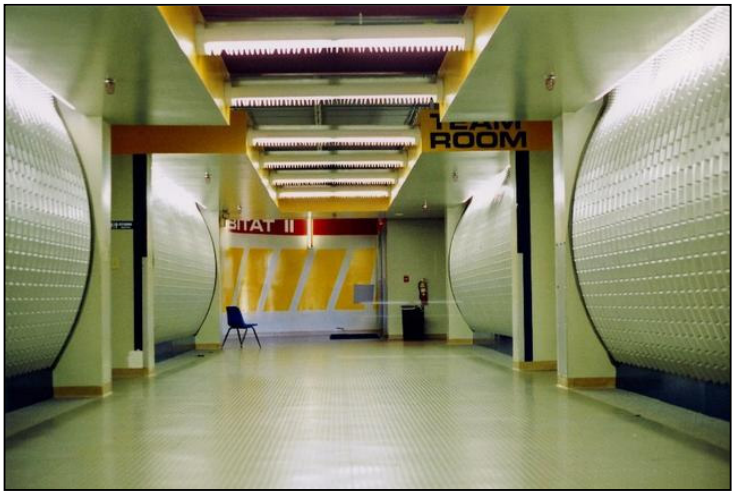
And we passed inspection before meeting the rest of our team in the atrium.

I assume discipline is what they're trying to teach us here, and responsibility. Being an astronaut not only means following orders but being there for others, to be thinking about others, and to be punctual. Any discrepancies found or sloppy work in space could spell certain disaster for you, your team, your vehicle, or your mission. But here on the ground any discovery meant just heavy embarrassment: you'd be called in to fix anything they might find. And not just the offender personally, the entire compliment of your room! Luckily, as I said, nothing wrong found here today and the five of us were allowed to join our team and prepare for a little morning calisthenics – oh yeah, why god why? Who makes kids do jumping jacks at seven in the morning?! Apparently Space Camp counselors do! And they give no mercy for those dressed in flight suits, as I was this morning. And though that turned out to be a cool idea (who doesn't want to wear a space suit at Space Camp?) it turned into a bad mistake around, oh, lunchtime. (Can I say it's been a hot day? But I'm getting ahead of myself here...)

It was during morning exercises I hooked up with Zig Staruk and Matt Ownby, good eggs and newfound pals. Zig and Matt are from Tennessee as I mentioned earlier; Zig from Knoxville and Matt from Sevierville, two towns I know very well, as my grandparents have taken me to Douglas Dam (near both) every summer since 1984 (at least for part of it) and that's where we're headed after Camp, can you believe that? Zig (whose real name is Henry) is the more intellectual of the two; he and I have a lot in common. We are both very smart, sophisticated individuals for our ages and appear generally alike. While I have green eyes, he has brown. While I have brownish hair, he has black spiked hair. We share freckled skin (though I'm a bit more... round) and a fandom of Star Trek and Battlestar Galactica, among other Space related things. We've been goofing off all day – pretending to be Russian spies here on orders from the Kremlin to infiltrate the US Space Program and report back. It's been great!

Matt Ownby is more the oddball of our budding trio. He is from Sevierville, Tennessee, which is a tiny town in the eastern-half of the state. While a historic, old community, it is not known for its adaptation of technology. The town didn't receive electricity until the mid 1940's and has that "good country town" feel to it. That being said, Matt is a good person, a lot of fun and a very pleasant person to be around. I had a feeling then we'd become good friends during the week; little did I know we'd be goofing off throughout the rest of the day!

"Okay guys, it's time to get up!" – blah.



After calisthenics we marched through Hab II, out underneath Pathfinder across the Shuttle Park and into the cafeteria where utter chaos reigned. Kids were everywhere! But we found a table where we all could sit at as a team and then headed for food. It's standard school-cafeteria food - powdered scrambled eggs, imitation bacon, soggy toast and tater-tots – so it will do, but it isn't inspiring. I didn't know at the time, but, there's a cereal station – one of the girls on our team pointed it out to me after-the-fact. Although they have a cereal I've never tried before (Lucky Charms), I'm game. So I think I'll give that a try tomorrow morning.

Following breakfast we were handed our Space Camp manuals (a.k.a. "Log Books") and given our first task – to design and draw a Moon Rover. The exercise, called "Moon Buggy Design," was a simple instruction, but not to someone who does not draw (even in the slightest degree); it was a nightmare of an assignment and I just about died. Although I had to start the procedure over on more than one occasion, and my final design wasn't anything more than a two-dimensional "stick figure" drawing, I at least did it. I designated the design "Moon Star Buggy", as an homage to the television movie "Earth*Star Voyager," which was broadcast as part of the Disney Family Movie on ABC in 1988. It featured a rover with a satellite dish, headlights, a weird communications antenna constellation and door-opening controls. The "rover" was also depicted driving on a series of highways constructed on the lunar surface, complete with futuristic road signs and illumination (you know, for the dark side).

While this all sounds interesting, take my word for it, it was not. The design is so crappy I'm embarrassed to even show anyone! It's going to be tucked away in my folders forever, never to be seen again!

LITTLE DARLING, MSFC ///

After the Moon Buggy Design debacle, and a few minutes to let breakfast settle, the entire Camp compliment was ushered outside through the Museum's front doors to the bus tour loading docks. From there we would take a ride over to nearby Marshall Space Flight Center, part of Redstone Arsenal.

The Marshall Space Flight Center (MSFC), named in honor of General of the Army George Catlet Marshall, was formed in 1960 to build the giant rockets an infant NASA would need to break the bonds of gravity and explore space. MSFC quickly established itself as the free world's leader in rocket propulsion systems research and development. The center's launch vehicles continue to provide the nation with assured access to space, but today's programs at Marshall encompass far more than just rocket engines. Included in some of its management are components for Space Station Freedom! The Marshall Spaceflight Center is sitting on 1,800 acres with more than 3,000 employee's right in the middle of the Redstone Arsenal. One of the many things we learned about the center during our tour was how prominent it really was during America's Space Race.

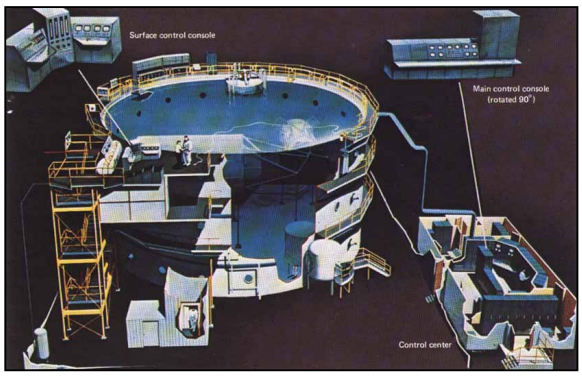
The history of the space-race is fascinating, and told in detail on the tour.

Suffice it to say, Doctor Wernher von Braun and his team developed rockets for the Army Ballistic Missile Agency (ABMA) through the 1950's. It wasn't until 1958 that they developed the Jupiter-C rocket, which in its Juno 1 configuration (with an extra stage) launched the first United States satellite into orbit - Explorer 1. All in all the Redstone Arsenal presented NASA with rockets to send Alan Sheppard, the first American astronaut, into space and even help them get to the moon. During the moon program, MSFC provided NASA with around 32 Saturn V rockets, six of which equipped to land on the moon. They even developed the moon buggy used in the last three lunar missions.

During the moon program, MSFC provided NASA with around 32 Saturn V rockets, six of which equipped to land on the moon. By the 1970's Marshall thrust forward with America's first and only space station to date: Skylab. It also had its hand in the Apollo-Soyuz Test Project (ASTP) mission, which linked an Apollo capsule with a Soviet Soyuz spacecraft for the very first time. Marshall also managed certain aspects of Space Shuttle development. It tested the structure of the Space Shuttle using the orbiters Enterprise and Pathfinder, and designed and tested the Solid Rocket Boosters, External Tank and Main Engines currently used in the Shuttle program.

Much of this history are the highlights of the center's tour, such as: part of a Solid Rocket Booster and test versions of SSMEs, mock-ups of upcoming Space Station Freedom modules, Redstone Test Stand, Propulsion and Structural Test Facility, Saturn V dynamic Test Stand, and Neutral Buoyancy Simulator.

The Redstone Test Stand was used during the 1950's in early development of the Redstone missile propulsion system. This was the test stand where the modified Redstone missile that launched the first American into space, Alan Shepard, was static tested as the last step before the flight occurred. Propulsion and Structural Test Facility The Propulsion and Structural Test facility, developed in support of Jupiter missile development, was modified and used for testing on the first clustered engine stage in the American space program, the S-IB stage of the Saturn I launch vehicle. It was also used as the primary test stand for the development of the F–1 engine, the largest liquid rocket engine ever developed. The F–1 generated 1.5 million pounds of thrust.



The Neutral Buoyancy Simulator was designed to provide a simulated weightless environment needed to perform engineering tests in preparation or space missions. The extra-vehicular activity protocols for the Skylab rescue and Apollo Telescope Mount film retrieval were developed in the facility. And sometimes current astronauts come to train here; if you're lucky you might see one! (We were not). The simulator is approximately 70 ft. in diameter and has a depth of 40 ft. It takes about 1.25 million gallons of water to fill these dimensions.

And the Saturn V Dynamic Test Stand was used in 1966–67 for ground vibration testing of the Saturn V launch vehicle and the Apollo spacecraft. Completion of this program was the final step prior to the launch of Apollo 11, the first manned lunar landing mission. In 1972–73 the stand was used for tests involving the Skylab Space Station, and in 1978–79 for ground vibration testing of the complete Space Shuttle vehicle.

Cool stuff to see, and touch!

But, regardless of all the history and mystique of the place, there will always be just one memory of the place I will always take with me.

During a visit to the Space & Rocket Center the year before (in 1988), my grandparents and I also took the bus tour of Marshall Space Flight Center. It was on that tour I would pick up a nickname that would live on a year later - "little darling." How the name came into being is quite simple. The tour group was about to enter the building housing the Solid Rocket Booster and as we pulled up to the building, our bus driver announced that we had to wait for the previous tour group to exit before we could go in. And in his words, he called the previous tour group (who were Space Camp cadets at the time – “Little Darlings.” In fact, I believe he said, "We have to wait for the little darlings to come out first." Well, since my grandparents knew I wanted to go to Space Camp, they started calling me their little darling in reference.

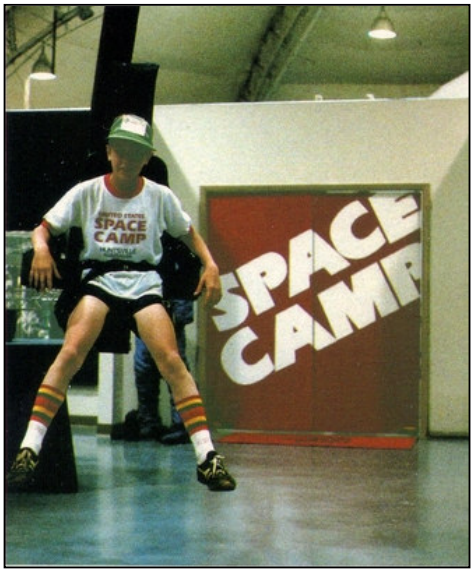
At first, it felt good to be associated with those lucky Space Campers, but it did get old after a while - and oh so embarrassing! And to this day my grandfather will sometimes let slip "little darling" all because of the Marshall Space Flight Center tour. I couldn't help but think of it as I toured about during my own Space Camp experience today.

“WHICH WAY DID HE GO GEORGE?” ///

Lunch followed our return to the US Space & Rocket Center and then all hell broke loose – we were run ragged!

First up was a lecture on the Training Center Floor about the Space Transportation System (STS), more commonly known as the Space Shuttle System, to compliment what we learned out at MSFC. You know... the Orbiter, its Main Engines, the Solid Rocket Boosters (SRBs) and the External Tank (ET), which I won’t bore you with.

Then it was out onto the Training Center Floor to take part in the 1/6th Gravity Chair exercise. The 1/6 Chair, usually referred to as the Moonwalk trainer, is modeled after one the Apollo astronauts used for moonwalk training. The simulator is called the 1/6 chair because it is designed to simulate the Moon’s gravitational pull, which is 1/6th that of Earth’s. For example, a person who weighs 150 pounds on Earth would weigh 25 pounds on the Moon.

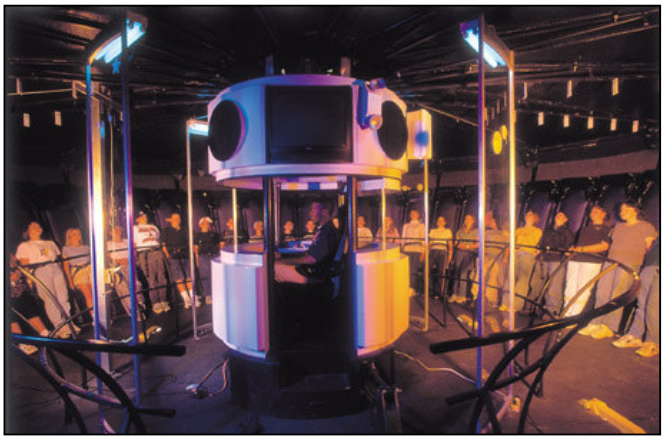


Hence, the chair gives trainees a realistic feeling of walking in the reduced gravity of the moon. It is suspended on a long bungee like cord; upon sitting in the chair, your weight is balanced against the tension of the bungee cord. Once properly balanced you're set off on your task. If you step too hard, you'll end up in the ceiling, so for the most part the counselors keep a hold of you. Once strapped in you're asked to do a variety of things. First it's a side-to-side walk, then a bunny hop, and on to whatever other steps you think might propel you across the floor (like a slow motion jog). After about three or four walks around you're done! And now I know what walking on the moon felt like!

Next it was a trip to the Centrifuge out in the Rocket Park. This simulation, more like a ride really, allows you to face the effects of G-Forces similar to those experienced by Space Shuttle astronauts during lift-off. This is achieved by putting you in rotation around a fixed axis, applying a force perpendicular to that axis. This force, called centripetal acceleration, pushes you away from the axis at ever increasing gravitational pull. During launch and landing, astronauts within the Space Shuttle are exposed to 3 G's, which the Centrifuge helps demonstrate. And it does this by having its test pilots (us) stand against a number of padded panels lining the inside wall, which are angled back. As the simulator rotates, centrifugal force is exerted against the pads by the rider, removing the rider from the floor, propelled up along a track to the top of the contraption.

In the mean time to keep your mind off of your squashed body, there is a television display in the center that explains exactly what is happening and what your body is experiencing (much of what I explained to you above). Then as the Centrifuge begins to slow, the force begins to lessen and the "cart" you are standing against begins to fall and you're brought back down to earth, so to speak.

A very unique experience having your body squished up against something like that, I must say. It's hard to explain, but neat! (Although there is a ride at our local fair called "The Gravitron", which is quite similar).
It made Ziggy dizzy and he flopped around exclaiming "which way did he go George, which way did he go?" over and over and over again. It was too funny!

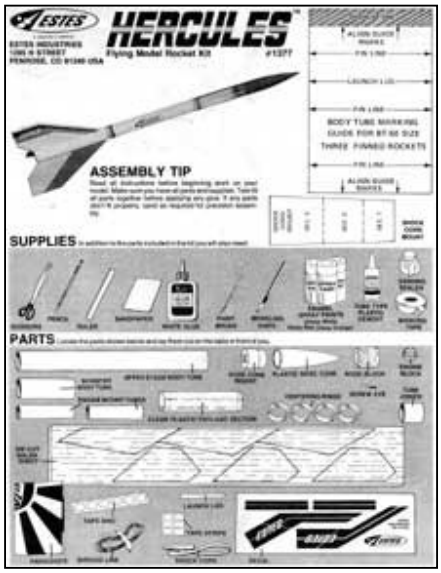


It was there actually we received our first assignments for the shuttle mission by way of a test. The small test would determine what positions we would get - ground assignments in mission control or go on to become Shuttle Commanders, Pilots, and Mission Specialists. Here, test your knowledge and see how you do against the questions we were asked:

1. What are the parts of the shuttle?
2. What are the two ways of exiting the shuttle after the shuttle has landed.
3. What emergency egress system is used when the shuttle is in the atmosphere?
4. What keeps the astronauts in the UAT (Underwater Astronaut Training Tank) from rising and sinking?
5. How is Neutral Buoyancy Achieved?
6. How do you jettison the hatch?

Ready? Here's the answers: #1) External Tank, Solid Rocket Boosters, Orbiter, and Main Engines; #2) Emergency Egress Slide and Repelling Mode; #3) Bail-Out Mode; #4) Neutral Buoyancy; #5) Level the Air Pressure; #6) Release the T-Lever. So how did you do? Get them all right? I must admit that some of these answers I didn't agree with, which probably accounts for me getting only 3.5 of them correct!

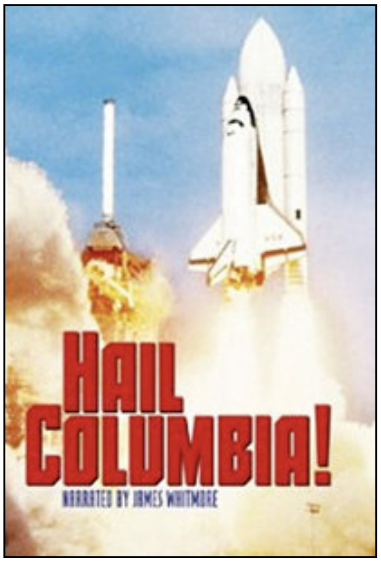
I was assigned Orbital Systems Officer, a Mission Control position (man, I'm bummed!) and we began rehearsing for our mission, which will take place on Wednesday evening, around 6:00pm.



And then it was back over to HAB II's Team Room to begin the assembly of our own model rockets, pre-cut all-wood kits from ESTES. I couldn't wait to do this part, to be honest, because although I have one already, I wanted my own Camp Rocket. You see, back when my grandparents and I were here last year, we stayed at the Space & Rocket Center's campground (where my grandparents are now waiting for me) and during our stay a crew of "little darlings" from Space Camp came over and launched their rockets. Although most launched without incident, one of them seemed to malfunction and fell within a few feet of our Winnebago (behind the launch stand, for reference). Although some of the kids came through the camp ground to look for it, they never found it, and so I kept it!

Also somewhere in there we ate dinner, an inspiring school-cafeteria type pizza, and saw a movie: “Hail Columbia”.

HAIL, COLUMBIA! ///



Board the mighty shuttle Columbia for its maiden voyage. Experience one of humankind's crowning achievements: the inaugural voyage of the world's first space shuttle. “Hail Columbia!” goes behind the scenes with astronauts John Young and Robert Crippen as they prepare for their historic launch. Feel the thunderous liftoff and our heroes' awe as Columbia achieves orbit for the first time. Join the celebrations as the shuttle triumphantly touches down, mission accomplished.

The first launch of the Space Shuttle occurred on 12 April 1981, exactly 20 years after the first manned space flight, when the orbiter Columbia, with two crew members, astronauts John W. Young, commander, and Robert L. Crippen, pilot, lifted off from Pad A, Launch Complex 39, at the Kennedy Space Center. This was the first of 24 launches from Pad A. The launch took place at precisely 7 a.m. EST. A launch attempt two days earlier was scrubbed because of a timing problem in one of Columbia’s general-purpose computers.

Not only was this the first launch of the Space Shuttle, but it marked the first time that solid-fuel rockets were used for a NASA manned launch (although all of the Mercury and Apollo astronauts had relied on a solid-fuel motor in their escape towers.) STS-1 was also the first U.S. manned space vehicle launched without an unmanned powered test flight.

The STS-1 orbiter, Columbia, also holds the record for the amount of time spent in the Orbiter Processing Facility (OPF) before launch – 610 days, the time needed for the replacement of many of its heat shield tiles.

The primary mission objectives of the maiden flight were to perform a general check out of the Space Shuttle system, accomplish a safe ascent into orbit and to return to Earth for a safe landing. The only payload carried on the mission was a Development Flight Instrumentation (DFI) package, which contained sensors and measuring devices to record the orbiter's performance and the stresses that occurred during launch, ascent, orbital flight, descent and landing. All of these objectives were met successfully, and the orbiter's space-worthiness was verified.

During flight day 2, the astronauts received a phone call from Vice President George H. W. Bush. President Ronald Reagan originally intended to visit the Mission Control Center during the mission, but at the time was still recovering from an assassination attempt which had taken place two weeks before the launch. Columbia reached an orbital altitude of 166 nautical miles (307 km). The 37-orbit, 1,074,567-mile (1,729,348 km)-long flight lasted 2 days, 6 hours, 20 minutes and 53 seconds. Landing occurred on Runway 23 at Edwards Air Force Base, California, at 10:21 am PST, 14 April 1981. Columbia was returned to Kennedy Space Center from California on 28 April atop the Shuttle Carrier Aircraft.

And it was all captured in glorious IMAX.

STS-1 was the first test flight of what was at the time the most complex spacecraft ever built. There were numerous problems – 'anomalies' in NASA parlance – on the flight, as many systems could not be adequately tested on the ground or independently. Some of the most significant are listed below:

- A tile next to the right-hand External Tank (ET) door on the underside of the shuttle was incorrectly installed, leading to excessive re-entry heating and the melting of part of the ET door latch.

- The astronauts' on-orbit visual inspection showed significant damage to the thermal protection tiles on the OMS/RCS pods at the orbiter's aft end.

- John Young reported that two tiles on the nose looked like someone had taken 'big bites out of them'. Post-flight inspection of Columbia's heat shield revealed that an overpressure wave from the Solid Rocket Booster (SRB)'s ignition had resulted in the loss of 16 tiles and damage to 148 others.

- The same overpressure wave pushed the body flap below the main engines at the rear of the shuttle well past the point where damage to the hydraulic system would be expected, which would have made a safe re-entry impossible. The crew was unaware of this until after the flight. John Young reportedly said that if they had been aware of the potential damage at the time, they would have flown the shuttle up to a safe altitude and ejected, causing Columbia to have been lost on the first flight.

- Bob Crippen reported that, throughout the first stage of the launch up to SRB separation, he saw 'white stuff' coming off the External Tank and splattering the windows, which was probably the white paint covering the ET's thermal foam.

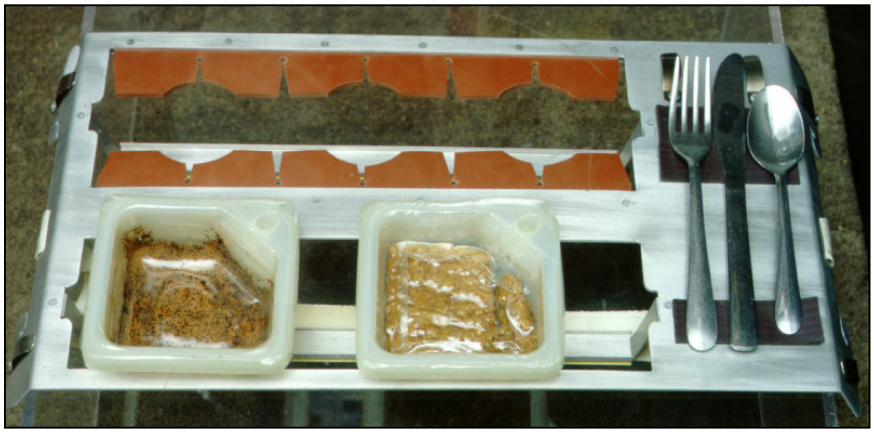
- Columbia's aerodynamics at high Mach numbers were found to differ significantly in some respects from those estimated in pre-flight testing. A mis-prediction of the location of the center of pressure (due to using an ideal gas model instead of a real gas model) caused the computer to extend the body flap by sixteen degrees rather than the expected eight or nine, and side-slip during the first bank reversal maneuver was twice as high as predicted.

Despite these problems, STS-1 was a successful test, and in most respects Columbia came through with flying colors. After some modifications to the shuttle and to the launch and re-entry procedures, Columbia would fly the next four Shuttle missions. On some of those missions, Columbia astronauts would get first-hand experience with NASA’s re-engineered Space Food System and we as cadets got a first-hand lecture on it.

There are several classifications for food that is sent into space: Beverages (B) are various rehydratable drinks; Fresh Foods (FF) are foods that spoil quickly so they need to be eaten within the first couple of days of flight to prevent spoilage; Irradiated Meat (I), which is beef steak that is sterilized with ionizing radiation to keep it from spoiling; Intermediate Moisture (IM) type foods which are those that have some moisture in them but not enough to cause immediate spoilage; Natural Form (NF) foods, which are mostly unprocessed forms such as nuts, cookies and granola bars; Rehydratalbe Foods (R), which are foods that have been dehydrated and allowed to rehydrate in hot water prior to consumption; and Thermostabilized (T) foods, that which has been processed with heat to destroy microorganisms and enzymes that may cause spoilage.

“Just add water and it’ll be fine,” the lecturer said, while showing us packaged contents of freeze-dried foods. Somehow I doubt that, but she made a convincing case. Though the lecture itself was somewhat boring, we all perked up during the show-and-guess game she prepared. Our mission: could we guess the food from the package she showed? This turned into a whole new nightmare; a whole new level of hell. “Is this beef?” she asked, showing us a container and nodding her head up and down. When we agreed with her a long drawn-out “nooooooooo” followed. “Is this bacon?” she asked again, and again nodding up and down as if to say, yes, this is indeed bacon. “Noooooooooo!”

On about the tenth time it was about all we could take!



* * *

We relished getting off to bed – and I out of this space suit - then, where you’ll now find us for the evening.

Except Clark. He apparently has gotten ill sometime during the day (and with lunch and dinner as uninspiring as it was it wouldn't take much let me tell you), so he's now in sickbay. With all the candy he was eating last night it doesn't surprise me to be honest. I've never seen a person put away candy like Clark did, but I guess we cope with new situations differently. I got surly; he snacked. Hopefully he'll be okay. As my roommates and I have said, "I guess he had his cow."

And we've got a new roomie. His name is Mark, he comes from the United Technologies (UTC) team, and already I know I don't like him. I have the impression he was somewhat of a troublemaker on that team (they shadow us throughout most of the evening, as Nat, our nighttime counselor, takes on both teams then. So that makes us rivals. We're the better, mellower group while UTC is a more rowdy bunch, causing a ruckus wherever they go.)

I don't know what possessed me to pipe up and say we have an extra bunk in our room to house him but I did, and now it seems I'm going to pay for it. What's so bad about him? Besides just causing trouble and picking on other kids, his attitude is very poor. Oh, he doesn't pick on me – I've not run into any of that here – but he doesn't want to be here, he talks down about Space Camp constantly (calling it dumb and yet he's here), trashes the movie, and generally sucks down those around him. This is not why I came to Camp and it's not what I want out of my Camp experience, so hopefully he'll shut up soon!

I certainly hope he's not going to be too much trouble on our team, or in our room. I'm really beginning to get a feel for this now and his presence is what I don't need. That being said I'm trying to not let it bother me. He just seems to be unhappy. Who knows why, really? Maybe he's having a hard time coping too, but I doubt it. Troublemakers do as troublemakers are. Let's hope he doesn't bring the team down with him should he decide to lose it. He's Kevin from the movie: the idiot guy who doesn't want to be there, who doesn't pay attention to anything and generally goofs off, but ultimately helps save the day.

Let's hope.

In any case, I can hear the counselors coming down the hall telling everyone it's time for lights-out. Since they'll be here soon I'm going to close out. Before I do, though, I've been contemplating today asking Michelle or Nat whether or not I can borrow their copies of the Space Camp Manual, to check my answers and to fill-in where I can. It doesn't hurt to have all the information! But we'll see.

Additionally I may not wear my flight suit tomorrow. As I said it was a mistake to wear it today; it's been very, very hot! Of course that wouldn't have been such a huge deal – Michelle did suggest I take it off on more than one occasion – except I didn't wear any clothes under it (except underwear, come on...) so there was no way to get relief!

Yeah, won't be making that mistake again.

Okay – goodnight Earth!

TO: KGB COMMANDER

FROM: VLADIMIR BORIS

REASON: “Marshall Space Flight Center”

Comrade, we tour Marshall Flight Center today and I have learned the secrets of center’s creation. Document attached was stolen from right under their capitalist noses and can tell story better than I.

# # # # #

After the end of the war with Germany in May 1945, a program was initiated to bring to the United States a number of scientist and engineers who had been at the center of Germany's advanced military technologies. The largest and best-known activity was called Operation Paperclip. Under this in August 1945, 127 missile specialists led by Wernher von Braun signed work contracts with the U.S. Army's Ordinance Corps. Most of them had worked on the V-2 missile development under von Braun at Peenemünde. Von Braun and the other Germans were sent to Fort Bliss, Texas, joining the Army's newly formed Research and Development Division Sub-office (Rocket).

For the next five years, von Braun and the German scientists and engineers were primarily engaged in adapting and improving the V-2 missile for U.S. applications; testing was conducted at nearby White Sands Proving Grounds, New Mexico. Von Braun had long had a great interest in rocketry for space science and exploration. Toward this, he was allowed to use a Wac Corporal rocket as a second stage for a V-2; the combination, called Bumper, reached a record-breaking 250 miles (400 km) altitude.

During World War II, the production and storage of ordnance shells was conducted by three arsenals nearby to Huntsville, Alabama. After the war, these were mainly closed, and the three areas were combined to form Redstone Arsenal. In October 1948, the Chief of Ordnance designated Redstone Arsenal as the center of research and development activities in free-flight rockets and related items, and the following June, the Ordnance Rocket Center was opened. A year later, the Secretary of the Army approved the transfer of the rocket research and development activities from Fort Bliss to the new center at Redstone Arsenal. Beginning in April 1950, about 1,000 persons were involved in the transfer, including von Braun's group. At this time, R&D responsibility for guided missiles was added, and studies began on a medium-range guided missile that eventually became the Redstone rocket.

Over the next decade, the missile development on Redstone Arsenal greatly expanded. Many small free-flight and guided rockets were developed, and work on the Redstone rocket got underway. Although this rocket was primarily intended for military purposes, von Braun kept space firmly in his mind, and published a widely read article on this subject. In mid-1952, the Germans who had initially worked under individual contracts were converted to Civil Service employees, and in 1954-55, most became U.S. citizens. Von Braun was appointed Chief of the Guided Missile Development Division.

In September 1954, von Braun, proposed using the Redstone rocket as the main booster of a multi-stage rocket for launching artificial satellites. A year later, a study for Project Orbiter was completed, detailing plans and schedules for a series of scientific satellites. The Army's official role in the U.S. space satellite program was delayed, however, after higher authorities elected to use the Vanguard rocket then being developed by the Naval Research Laboratory (NRL).

In February 1956, the Army Ballistic Missile Agency (ABMA) was established; von Braun was the director of the Development Operations Division. One of the primary programs was a 1,500-mile (2,400 km), single-stage missile that was started the previous year; intended for both the U.S. Army and U.S. Navy, this was designated the PGM-19 Jupiter. It was first launched in August 1956, and was eventually taken over by the U.S. Air Force. In this same time period, the ABMA developed the Jupiter C sounding rocket, composed of a Redstone rocket first stage and two upper stages. This was first flown in September 1956, traveling 3,355 miles (5,399 km) and attaining an altitude of 682 miles (1,098 km). The Jupiter C capability was such that it could have placed a fourth stage into orbit, but that mission had been assigned to the NRL.

The Soviet Union launched Sputnik 1, the first man-made earth satellite, on October 4, 1957. This was followed on November 3 with the second satellite, Sputnik 2. The United States attempted a satellite launch on December 6, using the NRL's Vanguard rocket, but it barely struggled off the ground, then fell back and exploded. On January 31, 1958, after finally receiving permission to proceed, von Braun and the ABMA space development team used a Jupiter C in a Juno I configuration (addition of a fourth stage) to successfully place Explorer 1, the first American satellite, into orbit around the earth.

Effective at the end of March 1958, the U.S. Army Ordnance Missile Command (AOMC), was established at Redstone Arsenal. This encompassed the ABMA and its newly operational space programs. In August, AOMC and Advanced Research Projects Agency (ARPA, a Department of Defense organization) jointly initiated a program managed by ABMA to develop a large space booster of approximately 1.5-million-pounds thrust using a cluster of available rocket engines. In early 1959, this vehicle was designated Saturn.

On April 2, President Dwight D. Eisenhower recommended to Congress that a civilian agency be established to direct nonmilitary space activities, and on July 29, the President signed the National Aeronautics and Space Act, creating the National Aeronautics and Space Administration (NASA). The nucleus for forming NASA was the National Advisory Committee for Aeronautics (NACA), with its 7,500 employees and Ames Research Center (ARC), Langley Research Center (LaRC), and Lewis Flight Propulsion Laboratory (later LRC) becoming the initial operations of NASA.

Although there was then an official space agency, the Army continued with certain far-reaching space programs. In June 1959, a secret study on Project Horizon was completed by ABMA, detailing plans for using the Saturn booster in establishing a manned Army outpost on the moon. Project Horizon, however, was rejected, and the Saturn program was transferred to NASA.

U.S. manned satellite space program, using the Redstone as a booster, was officially named Project Mercury on November 26, 1958. With a future goal of manned flight, monkeys Able and Baker were the first living creatures recovered from outer space on May 28, 1959. They had been carried in the nose cone on a Jupiter missile to an altitude of 300 miles (480 km) and a distance of 1,500 miles (2,400 km), successfully withstanding 38 times the normal pull of gravity. Their survival during speeds over 10,000 miles per hour was America's first biological step toward putting a man into space.

On October 21, 1959, President Eisenhower approved the transfer of all Army space-related activities to NASA. This was accomplished effective July 1, 1960, when 4,670 civilian employees, about $100 million worth of buildings and equipment, and 1,840 acres (7.4 km2) of land transferred from AOMC/ABMA to NASA's George C. Marshall Space Flight Center. MSFC officially opened at Redstone Arsenal on this same date, and was then dedicated on September 8 by President Eisenhower in person. The Center was named in honor of General of the Army George C. Marshall, Army Chief of Staff during World War II, United States Secretary of State, and the third Secretary of Defense. Once noted as the "organizer of victory" by Winston Churchill for his leadership of the Allied victory in World War II, Marshall served as the United States Army Chief of Staff during the war and as the chief military adviser to President Franklin D. Roosevelt. As Secretary of State, his name was given to the Marshall Plan, the large-scale American program to aid Europe where the United States gave monetary support to help rebuild European economies after the end of World War II in order to combat the spread of Soviet communism, for which he was awarded the Nobel Peace Prize in 1953.

Not long after the Marshall Center officially opened for business, the United States sent its first astronaut into space. In the wake of Shepard's successful flight, President Kennedy presented the nation with an even greater challenge. He committed the United States to "achieving the goal, before this decade is out, of landing a man on the Moon and returning him safely to Earth". The Marshall Center's role in meeting that challenge was absolutely vital. The Center was assigned the task of building the Saturn V rocket that would launch the astronauts on their way to the moon. Engineers, scientists, administrators, and contractors worked night and day to develop the technology powerful enough to lift the 363-foot tall, 6.2-million pound Saturn V rocket into space. Some estimates stated that the Saturn V engines produced as much power as 85 Hoover Dams. Saturn components and rocket engines were tested at various sites, including Huntsville.

Three launch vehicles were developed in the Saturn program. The Saturn I was primarily used as a research and development vehicle. The Saturn IB as used for orbital missions with Apollo spacecraft. Its first stage was powered by eight H–1 engines generating a total thrust of 1.6 million pounds. The Saturn V, used for the Apollo manned lunar landing missions, depended on a first stage powered by five F–1 engines, each generating 1.5 million pounds of thrust. Saturns also orbited the Skylab and later the Apollo spacecraft into the historic linkup with the Russian-Soyuz spacecraft in 1975. In all, Marshall provided NASA with 32 Saturn rockets, including six used to land astronauts on the moon.

Marshall's contribution to the Apollo lunar landing program also included development of the Lunar Roving Vehicle for transporting astronauts on the lunar surface. It was an open-space vehicle about 10 feet long with large mesh wheels, antenna appendages, tool caddies, and cameras. Powered by two 36-volt batteries, it had four 1/4-hp drive motors, one for each wheel.

The unique vehicle was collapsible until needed when it could be unfolded by hand. Its speed limit was about 9 miles per hour. A lunar rover was used on each of the last three Apollo missions in 1971 and 1972 to permit the crew to travel several miles from the landing craft. Outbound they carried a load of experiments to be set up on the moon; on the return trip, they carried more than 200 pounds of lunar rock and soil samples.

Marshall Space Flight Center's activities broadened in the 1970's with the development of Skylab. Skylab was the United States' first crewed orbiting space station and the first American space program wholly dedicated to scientific research. Skylab operated in orbit from May 1973 through February 1974. Three astronaut crews spent a total of 171 days conducting scientific research in space. Marshall supplied the Skylab workshop itself, plus the four Saturn launch vehicles, the solar observatory and many of the scientific experiments for each mission. Skylab results included significant discoveries in all the experiment disciplines and far more data than anticipated. It opened the era of comprehensive scientific research in space.

The focus was also on science for other Marshall-managed space missions in the 1970's. These included the Laser Geodynamics Satellite. Laser beams from the ground were bounced off the prismatic mirrors on the satellite to track movements in the Earth's crust. Another scientific project, Gravity Probe-A, was also called the Redshift Experiment. It used an extremely precise clock to confirm part of Einstein's general theory of relativity.

On January 5, 1972, President Richard M. Nixon announced plans to develop the Space Shuttle for routine access to space. As part of that program, Marshall designed the shuttle's main engines, its solid rocket boosters, and its external tank as well as a variety of scientific payloads. Marshall also received responsibility for Spacelab, a versatile laboratory carried within the Shuttle's cargo bay. Other Center assignments included the upper stage boosters that would lift Shuttle payloads into higher orbits and on interplanetary voyages. One of Marshall's prime responsibilities included developing the Hubble Space Telescope, an optical observatory that will return unprecedented views of the universe. The first Space Shuttle main engine was test fired in 1975, followed by the first test firing of its solid rocket motor in 1977. That same year, tests on the huge external tank began at the Marshall Center. In March 1978, throngs of employees and citizens greeted the Orbiter Enterprise upon its arrival at the Marshall Center for testing. The orbiter was hoisted into a modified Dynamic Test Stand originally built for the Saturn V. It was then mated to an external tank, and subjected to vibration frequencies comparable to those expected during launch and ascent.

END OF REPORT.
#####+&

Day Two – MICROGRAVITY DAY
TUESDAY | JUNE 13, 1989

Houston, Daedalus, we've got a man down! Man down!

Hahahaha, oh man, it's been quite the evening here in HL-310, with fellow teammate Farren flipping head-over-feet, and hurting a little more than his pride, while fooling around in the room tonight – he fell on his ass!

Remember I mentioned earlier that designers incorporated many aerospace concepts within the Habitat so that we would accept the atmosphere of living and working in a weightless environment? One of those concepts is modular construction. It'd work on orbit but not in Huntsville. Farren found out pretty quickly we are not in a weightless environment tonight.

The outer walls of the Habitat are circular in nature (tubular, really), in keeping with the space station modular theme. Our rooms are built inside these long modules, giving a similar circular wall to each one. Earlier this morning (and last morning and evening) Farren took to running up and down this circular portion of the wall to burn off a little excess energy. Since he got himself ready quicker than the rest of us, he had nothing else to do but run up and down the wall. (Hey, it's fun! I joined him last night!) He did so again tonight for similar reasons (which I'll get to in a moment), but had a little extra something in his hands: a portable Walkman and plastic cassette holder.

You can probably see where this is going...

After making a few successful trips up and back down the wall, something unexpected happened - he slipped. In one quick motion, Farren threw everything he had in his arms up into the air, and when he came crashing down, he landed butt first onto the floor – the room filling with a loud, snapping sound. At the sound of the commotion, I peeked over my bunk bed here and found his distorted face staring back at me, and for a moment I wondered if he was okay. It was then Farren erupted into one of the most colorful stanzas of cursing I've ever heard!

One word right after another (mostly words with “f’s” and “s’s” in them)... and it didn’t stop for almost 3 minutes!

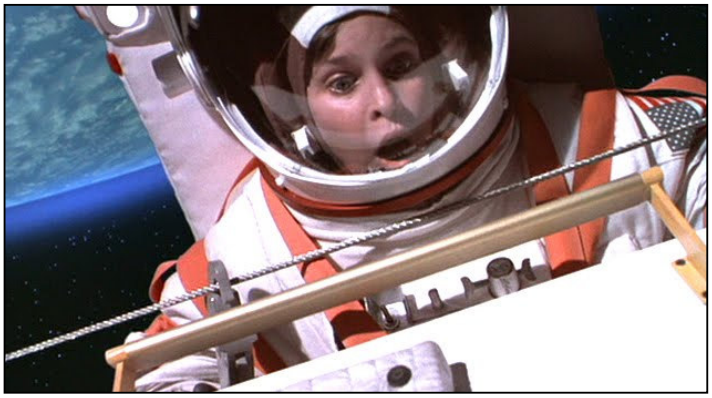
After spending another few minutes squirming around on the floor, he finally got up and provided us a first glimpse of ground zero. Come to find out, Farren landed right on top of his plastic tape holder – breaking it (that was the loud snapping sound). But he cracked it in just the wrong place; the weight of his body and its momentum tore off a shard of plastic and effectively buried it in his ass. That begat the second course of cursing and squirming, of course, ending as soon as he managed to pull the shard out. And would he let us take him to sickbay? Hell no! He didn’t want to be pulled from our upcoming mission (tomorrow evening); he crawled up into his bunk instead and pulled the cover over his eyes – where he is right now!

Ooooh, man. We’re going to tease him good the rest of the week now. That’s for sure!

Needless to say that’s put an end to tonight’s festivities.

How it started is just as funny, though. And it’s given us all a little excess energy to spend tonight. We’ve been flirting with the girls next door. Or, rather, they with us!

It must have something to do with the heat (yeah, it’s still hot in here – the reason why will become clear in a bit; I can’t tell it all at once!)



The first real clue that there were girls next door to us came with last night’s attendance call. The counselor walked in for lights out and check-off – they’re really brutal; they just come right in and turn off the lights! In either case, this unnamed counselor came in last night, turned off the lights, and started rattling off a few names. As she did so, I looked up in puzzlement. The first name she called wasn’t even assigned to our room. I saw Farren’s head jerk up at the second name – it was a girl’s name. By the third name (no one answered and I’m sure she was getting a little perturbed), we spoke up and alerted the counselor that she had the check-off sheet for the wrong room.

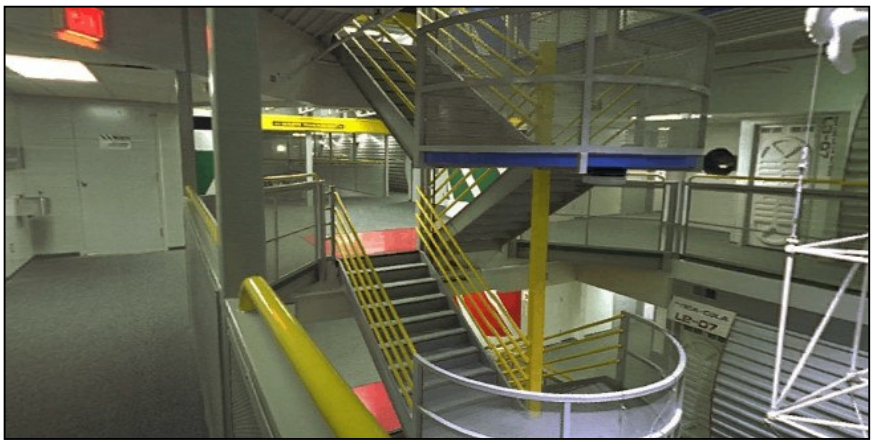
> “Oh, sorry,” she said. “That was the room next door.”
> *Arroo?*

She shuffled a few papers then started calling off our names, to which we happily answered. But the damage had been done. We didn’t pay much attention to our neighbors the day we arrived, or last night really, but we made sure to be doubly aware of what (and who) was going on/in next door.

So tonight we scoped out HL 3-08 and HL 3-12 as we made our preparations for bed. Although our time was limited, the lack of air conditioning in the rooms tonight made everyone a bit antsy. I've not seen so many people out and about for "night prep" before! Anyway, our surveillance didn't go without reward – we caught a glimpse of a girl leaving the room ahead of us (HL 3-08) and returning there.

Farren and I took it upon ourselves to check further – leaving our room and walking slowly by theirs. The door was open and the whole room was filled.

There be girls here!



Acknowledged and discovery of our bounty shared, we returned to our rooms to figure out how we could go about introducing ourselves. None of us wanted to be that first guinea pig so we resorted to pressing ourselves up against the inside portion of our adjacent walls to hear what was going on. Eventually, Farren became restless and took one for the team, going over and returning a few moments later. After a few moments over there (much to our chagrin), he returned no worse for wear. But a few moments after his return – and our subsequent debriefing - we heard a knock at our door, and the sound of paper sliding underneath it. Could you believe that we received a note? Farren was the first to pick it up and he read it out loud to all of us. "To the guys in 310, you are hot. We love you!" Our room erupted in nervous laughter. Could something come of this?

Farren took to the wall and it looked as if it might turn into great fun. We returned their note with one of our own and that continued – back and forth – until Farren's slip-up. It's been relatively quiet since, but, it's almost lights-out time, so who knows if we'll hear from them again tonight.

There's never a dull moment around here, I tell ya. Although the first night was a bit rocky, I'm so happy to be here now. We had so much fun today too, and a little conflict, but what would Space Camp be without fun and conflict? After all, there was plenty of conflict in the movie...

AMPHIBIOUS EGRESS PREPARATION? ///

Our morning began roughly the same as the previous one – the “get out of the bed” routine by the counselors was repeated just the same, much to our horror. Lights on. Get up boys. Door slam. Grumble.

After spending a few moments groaning into the light, the lot of us jumped into action, getting ourselves groomed, dressed and presentable for the day’s activities. After assembly down in the Habitat’s atrium with the rest of our team and we all marched over to the cafeteria for breakfast, which was virtually the same as yesterdays: eggs, bacon, biscuits and potatoes; however, for me it was vastly different: I found the cereal! (Lucky Charms, they really are magically delicious – who knew?)

And following breakfast we were advised to return to our rooms and change into swim-trunks: we were going to the University of Alabama at Huntsville campus to take part in the “Amphibious Egress Preparation” training, which is really a complicated name for: swimming!!

Although we would get a chance to swim around in their large Olympic-sized pool, we really were there for training. For what? We’d all take part in an emergency capsule escape and rescue (much like the Mercury, Gemini and Apollo astronauts went through after plummeting through the Earth’s atmosphere and landing in one of the oceans), and then perform other underwater tasks that might mimic an Extra-Vehicular Activity (EVA) in space some day. So we boarded the Space Camp busses and off we went!

When we arrived, they lined us up and checked us off (where else were we going to go?) Once present and accounted for, the rules of the pool were explained to us and we were released to go inside the facility. Inside, we huddled with our team groups (Jeff had to go off with his team: Lockheed; and I stayed with Zig and Matt); Michelle then explained our mission further.

“You'll be doing certain things throughout the day, as will the other teams so there will be a lot of waiting.”

“What are we going to do?" one of my teammates asked.

“Well,” she began. “First, we're going to put together a puzzle underwater. Then, we're going to break you into a group of three and set you off to the deep end of the pool for the egress net.”

“What's that?” I asked.

The egress net was a yellow apparatus that was lowered to an astronaut for him to climb into during the heady days of Mercury, Gemini and Apollo - when spacecraft actually landed in the ocean instead of landing on a runway.

The yellow net was then lowered down to the astronauts and one-by-one they were hoisted up to a helicopter that came to their rescue. When it became our turn, we would simulate this rescue – though how we would do that wouldn't be made clear to us until it was our turn. [Picture right is a representation of this exercise] True to form, the Martin Marietta team was scheduled to wait while others went before us. That allowed us time to splish-spash around in the pool. The only catch? If we got in, we had to stay in. If we got out, we had to stay out. And we had to stay in the shallow end. The entire team, sans a few of the girls, decided playing in the pool was more appealing than staying out of it, so Zig, Matt and I decided to join the rest of the trainees and began to swim around too.It wasn't long until we were pulled to perform our first task: the underwater puzzle.

This simulation – completing a 3-D cube of latticework framework underwater – would not only test our communication skills but also our skills in team working. If we could work together to put the cube together, we would be able to team-up for our Space Station project, our mission and beyond. Really, we'd be able to accomplish anything as a team; the sky would be the limit! Therefore, with all the pieces of the puzzle submerged, we also submerged and began our task of construction. Unfortunately, with an aversion to opening up my eyes underwater, I wasn't much help, though I contributed in ways only I could – by using my feet to feel around. And, watching the construction from above helped immensely. Don't worry about my involvement... we passed the test within the allotted time!

With the cube finally constructed, having demonstrated that our team working skills were valid, we dispersed and waited for the chance to take part in the emergency escape exercise. As I said before we were divided into three-man teams, and Zig, Matt and I were lucky enough to be selected as trio for this exercise. And when it was our turn to go, we left the shallow end and reported to the deep end at the diving board, as instructed. "What, are we going to have to dive?" I asked Ziggy. He just shook his head, not knowing the answer to my question. He couldn't know my apprehension: I didn't know how to dive. Fortunately that didn't matter. We weren't supposed to dive in anyway.

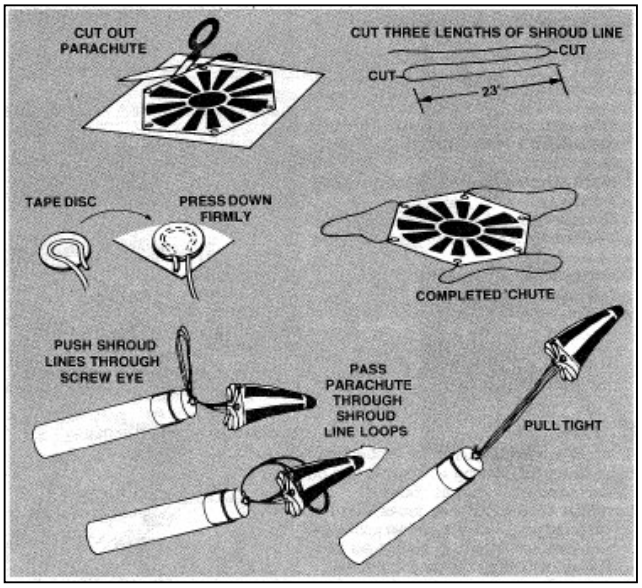
As we gave the counselor our unswerving attention, our task here became clear: "To simulate an astronaut rescue after a capsule splashdown, like those performed in the Mercury, Gemini and Apollo programs, you three are going to be the ones needing rescue. What you must do is this: one by one, jump off the diving board and into the water. Second, you must make your way to this inflatable raft" - he pointed to a black rubberized raft, which looked as if it could barely fit three people, floating in the middle of the pool. "Once all three of you are securely in the raft, we will lower the net and - one at a time - hop in the net and you will be pulled to safety (the wall of the pool). Are there any questions?"

Zig, Matt and I shook are heads to indicate we had no questions, and the exercise began. Matt went first, then Zig. I was the last to jump into the water. As such Matt was the first to be hoisted back to poolside through the yellow net; Zig went second. As I jumped into the net I couldn't help but wonder what went through the astronauts minds as they were being hoisted to safety. Did they relish the moment of a job well done? Did they hate to see it come because that signified the last piece of their mission? I wouldn't know that day, but it was an interesting experience to have been able to take part of, even in a simple mock up such as this. Why? It was something real astronauts trained for, again and again and again, and then performed. And thus I took it somewhat more seriously, even if my other two friends did not. Ahh, but no worries there... it all went well.

Now that the three of us were sufficiently rescued, we returned to the shallow end where we once again had to wait for the rest of the trainees to attempt their exercise. Since all our tasks for the pool were accomplished (and we were sufficiently pruned), the three of us took to horseplay. And I wish I could say that everything went well for us there (it was against the rules). Apparently our splashing about caught the attention of the counselors and Matt was pulled away from us, out of the pool. Sorry Matt!

Eventually, and boy did it seem like a long time, we rejoined Matt in the locker rooms, changed, and made our way to the buses – exhausted. The entire compliment returned to the Space & Rocket Center about 20 minutes later squeaky clean and pruned to the max!

BACK AT THE USSRC ///

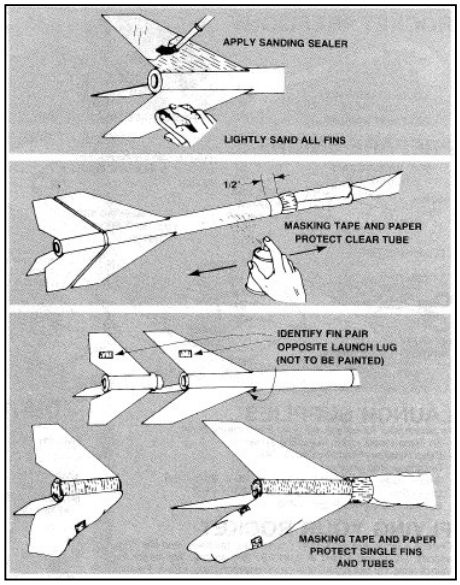


There was no rest for the weary.

As soon as we got back we were on point to accomplish a laundry list of tasks: from finishing up our model rockets, practicing our mission (using the script, rather than the equipment), browsing around the Shuttle Park and taking a ride in the Shuttle Liner, familiarizing ourselves with Mission Control and the Shuttle for our upcoming mission, see a movie, and somewhere in there catch a couple of lectures and attempt to sit down and hash out our Space Station project.

But thankfully before all that there was lunch.

Following, we assembled back at the Team Room in Hab II to complete our model rockets, which for me meant attaching the parachute. The rest of the rocket's structure had cured overnight, giving the glued wooden pieces a nice strong build. Although we'd have to leave it unpainted (the rocket I collected from around the camp ground during my visit last year was painted completely red), we'd get the opportunity to launch our rockets if we could get them completed in the allotted time. With hundreds of other kids vying for the chance to complete theirs you can imagine our time here was short.



But true to form, Farren made it fun. As a previous Camper (of at least two other times from what I can gather), his skills at assembling the model rocket were vast; he had his completely assembled the first day. Me? I needed a little more time working out how I'd attach the parachute. (How were you supposed to glue strings onto a flimsy plastic bag? Alas, tape!) And how to fold it so it properly released upon re-entry. Since Farren hadn't much of anything to do, he thought it would be fun to toss around a packet of ketchup. It was all well and good until it burst open – some of us were covered in ketchup! Thankfully I escaped the brunt to the explosion (a small speck got on my shirt, but that's okay).

Getting kicked out of the Team Room by another team wishing to assemble their rockets, we assembled underneath Pathfinder out at the Shuttle Park. Pathfinder, consequently, is the only full-size "mock-up" of the Space Shuttle on display anywhere in the world. And it has a rich and interesting history. Though not a shuttle destined to fly, it did help create the systems and backbone of support that would ultimately be used by the Shuttle program. I intercepted another of Vladimir Boris' reports to the KGB (it is attached) about Pathfinder if you are interested in reading more about it.

While there we took our turn in the Shuttle Liner, which simulates a Space Shuttle mission from launch to landing inside a moving apparatus that seats about two dozen astronauts candidates. The gallery is similar to an airplane passenger cabin and, in fact, it and the Centrifuge have been constructed from the stage separators from the Saturn V rocket that is on display in the Rocket Park, so it makes it unique.

As passengers aboard the Shuttle Liner, we feel the bumps, tilts and shakes of a real shuttle launch, coupled with the deafening roar of the shuttle's engines at lift-off. Once in orbit, a docking simulation with the space station is shown, then we undock and return to earth. After the shuttle lands, the movie gave us a brief explanation about the refurbishment and preparation of Space Shuttles for the next flight (inspecting, removing and replacing the tiles, refurbishing the Solid Rocket Boosters and the general cabin clean-up that must be done). Then everything is concluded and we passengers are given clearance to disembark. In all fairness the Space Shuttle liner is a good learning tool, but as a ride or a simulator? It falls flat.

Even our mission practice, which we did today out at the picnic tables across from the Space Walker and Training Center Building wasn't a fun time. Not only did we disagree about its purpose (couldn't we really take this more serious, guys? Some of us really care about Space Camp you know...), but mostly people goofed off – including Mark. I'm not sure what to make of him yet but he's really getting on my nerves. He thinks he's so special, so important – more important than the rest of us that he's just making a mockery of Space Camp. Really, if you don't want to be here why did you come?

[Picture above: A shot of me on the Space Camp Training Center floor in a space suit, taken by day counselor Michelle.]

Luckily the movie of the evening was much more exciting – one of my favorite IMAX space films ever: *The Dream is Alive*. Released in 1985 and narrated by Walter Cronkite (of CBS News fame), it's all about NASA's Space Shuttle program. The movie includes scenes from numerous shuttle missions, beginning with footage of a de-orbiting Discovery (STS-51-A; the mission where astronaut Dale Gardner holds up a "For Sale" sign, referring to the Palapa B-2 and Westar 6 satellites that it captured) on its approach to Cape Canaveral, complete with sonic boom.

THE DREAM IS ALIVE ///

Mission STS-41-C, the 11th for the shuttle program and the fifth for Challenger is featured most heavily, beginning with the deployment of the Long Duration Exposure Facility (LDEF) satellite. The capture and repair of the Solar Max satellite also receives a great deal of coverage, including a detailed overview of training for the mission in the Underwater Astronaut Training tank, a large pool at NASA. This particular mission is of interest, as the first attempt at capturing the satellite failed, and a second attempt almost 12 hours later had to be made. That portion of the mission was a success, with the satellite being brought to the payload bay on the next attempt, and was repaired quickly by astronauts James van Hoften and George Nelson. Other STS 41-C mission activities included a student experiment located in a mid-deck locker to determine how honeybees make honeycomb cells in a micro-gravity environment.

Other shuttle missions are interspersed during the feature with the STS-41-C footage. Highlights include:

- The first launch of Discovery (STS-41-D), with footage of liftoff, the deployment of two of the three satellites on this mission, and special attention given to the novelty of the experimental OAST-1 solar array, which we hope will be used in the upcoming Space Station Freedom concept. Footage is also shown of Discovery's landing and transport from its landing site at Edwards Air Force Base to Kennedy Space Center on the back of the Shuttle Carrier Aircraft.

- The sixth flight of Challenger (STS-41-G), notable as the largest crew aboard the shuttle, the first time two women flew together on the shuttle, and the first space-walk by an American woman, Kathy Sullivan.

- Additionally, a small amount of time is also dedicated to other aspects of the shuttle program, including: other crew that work on the shuttle; the work of inspecting and replacing the shuttle's heat tiles; training the astronauts must complete to prepare for missions; what the astronauts eat on space-flights; and how astronauts would bail out if an emergency occurred on the launch pad (the stomach wrenching part!)

It's a fantastic movie; I could watch that every night and not tire of it. Naturally Ziggy, Matt and I goofed off. We pretended to be "space babies" – a take-off of the Muppet Babies cartoon, somehow personified by reversing our camp hats and putting them on over our faces like bibs – and generally had a good time yuckin' it up before the movie started.

But what happened after the movie would almost be our undoing.

OPERATION: SPACE STATION ///

What started out to be an exercise in teamwork quickly turned into a heated argument. The other day it was explained to us that we, as a team, would have to design a Space Station concept as part of our "class work" here at Space Camp. Our limitations were: that we could only use the Space Shuttle so many times, it had to house so many people, and be of a design capable of existing eighty years in the future (so it had to last a really long time). All we had to work with was specially designed block pieces (from RAMAGON, a toy company), our imaginations, and each other. Working with ourselves was going to be a greater challenge. More so than the pool or practicing for tomorrow's mission.

Michelle seated us on the ground floor of Habitat I, against the wall in the open atrium. We were given our assignments then and set about our way. All we had to do was come up with a design on paper, and then build it with the blocks. Seemed easy enough, right?

At first we started talking about the assignment and wondered how we should get started. I began then by breaking away from the conversation and began drawing on the page designated for Operation: Space Station in our Space Camp manuals. It was a simple design, something modular that could be built upon. You know, like the ringed space stations depicted in "2001: A Space Odyssey"? It wasn't meant to be the whole station in its entirety, just the core – the foundation. However, not everyone liked the idea of building from a "core" platform. Nor could we immediately agree on what the station should be, what its function was, or how to go about constructing the ideas that came up. So I reiterated the base concept – mine was circular but you could build one from a standard linear structure if you wanted – but was largely ignored.

Except from the guys.

Most of the guys agreed that there was a need for a base design to start building from, whether it was circular, triangular, linear, or square. The girls, however, did not see it this way. Nor could they comprehend the reason for even doing so. And after bickering about it further, would you know the girls decided to just take over the entire operation and build it however they wanted? Naturally that created even more bickering within the team; after various tries to get things under control I completely gave up on the exercise.

“I quit,” I said to them. “I’m going on strike.”

I couldn’t be part of this nonsense any longer! So I went over a little, sitting away from the group, and joined a girl who also happened to be sitting out this exercise. Her and I began talking and she too didn’t see the need for such bickering, and for a time little happened.

It also didn’t help matters that our competitors – UTC – were seated right across the atrium from us, and could see that we were not progressing at all. Although an exercise in teamwork, it’s also a competition. The team with the best design would win an award and we were fighting for last place. Even though I had become disgusted with the whole works of this exercise, I still wanted my team to do well, so I decided to attempt to spy on UTC with a camera the girl I sat next to had on her. Only, I couldn't zoom in enough to see what kind of design they might be building, and had to give up. I got bored rather quickly just sitting there, so after a while I decided to jump back in the fray and see whether or not all the bickering between the boys and girls had done any good. They were still arguing over the design, who would take charge in building it and where it would be kept once completed! OY!

So I returned to the wall. Zig and Matt joined me, fed up as well, and little by little other guys decided to join us, having given up on the exercise too, and asking the three of us to try and intervene. We gave it a good go... and since this was my strike, I was elected to speak for us: “Not unless you restructure your design; it’s not going to work. It’s going to collapse under its own weight.”

Unfortunately the girls did not agree. “Then unless we can compromise…” but there were to be NO compromises, Krystine (the ring leader) said. Thus my three-man strike team remained where they were. A few minutes later two more of the guys joined us and before long, the entire male population of our team “went on strike”, leaving the entire project to the girls.

Though the girls thought this was the greatest thing that could have happened to them up to this point, there were problems coming: when they sat down to build upon their ideas, they had no idea how to design it, how to use the building blocks to construct a working piece, nor did they really have a clue on what to build in the first place.

So they begged us to come back.

“Why should we?” I said in defiance. “After the way you took control. You wanted to do it all, now you have it.”

But not all of the guys were on my side. You guessed it – Mark. If it wasn’t obvious before, it’s totally obvious now: Mark has the hots for Krystine and since she was the ringleader of this mess, so became Mark. Arguments continued to flair even as time was running out; nothing getting accomplished. We were supposed to be working as a team; instead this assignment only tore us apart. Was there any relief in sight?

Fortunately yes. Michelle finally intervened and asked us what the problem was and why we were all still arguing when the other team was quietly working away. Once we explained it to her she told us that we better get it together and find a way to work together because this was the only night there was to do the Space Station and then there was the mission coming up – how could we perform if we weren’t a team? This didn’t seem to settle into the girl’s heads because after Michelle left, they were right back at it – bicker, bicker, and bicker.

It didn’t matter, though; we had run out of time.

We had to pack it up and head back to the Training Center Floor for a lecture – this time on the Space Shuttle Tile System [I’m sure Boris will report on this too at some point]. The speech was rather interesting and made us forget about the problems with the Space Station concept, but the project still loomed. After the speech I made up my mind to completely have nothing to do with the project going forward. Zig and Matt agreed with my reasons for doing so, and when we returned to the operation following the lecture, our involvements in it ended. What was also pretty funny was that even a couple of the girls acted put off by Krystine’s bossiness and quit her little group to join us. Once her troops began to diminish, she became frustrated enough and called me over. It appeared I was the newly elected leader of the strike team.

Krystine and I got together and finally worked out a compromise. We, meaning the guys, would build our base design and the girls could then put whatever they wanted on top of that as long as everyone – guys and girls alike – agreed that it was “better” for the design of the station. Which, really, was all we had in mind when we started in the first place!

The compromise couldn't have come at a better time and everything went smoothly after. The assignment that was to help bring us together only served to break us apart, testing our tolerance of each other and almost destroyed the team. If it weren’t for the compromise, Space Campo wouldn’t have worked. It’s all based on teamwork, and without that, why even continue? Even though our tolerance was tested to the limits, we seem no worse for the wear.

Mark and I are at least on talking terms (he is one of my roommates after all) and everyone seems back to normal. What's important is that in the end we all came together to see this project through – eventually. Though our space station may not win any awards for design, we will get something out of our effort: our confidence in our team work. And we're going to need that in the days ahead.

* * *

It's almost time for lights out – I can hear the counselors coming down the hall telling people to go to bed, so I will conclude here. Tomorrow is going to be a busy day as well. There's our group picture to take, our mission to perform and who knows what other training apparatuses or lectures we'll attend.

Oh, and I hope it cools down in here soon! It's still really hot!

Houston, Atlantis... G'nite!

TO: KGB COMMANDER

FROM: VLADIMIR BORIS

REASON: “Space Shuttle Tile System”

КГБ-3

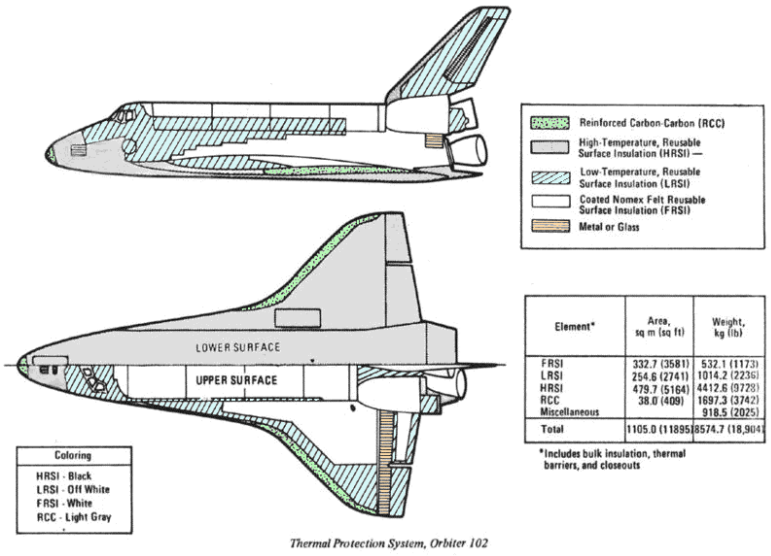
СССР

КОМИТЕТ
ГОСУДАРСТВЕННОЙ БЕЗОПАСНОСТИ
при СОВЕТЕ МИНИСТРОВ СССР

Comrade, we had an extensive hands-on lecture on the Space Shuttle tile system tonight; my report on system follows. Very impressive and similar to our Buran craft. Note that NASA switched from LSRI to FIB after Columbia was delivered.

# # # #

The Space Shuttle thermal protection system (TPS) is the barrier that protects the Space Shuttle Orbiter during the searing 1,650 °C (3,000 °F) heat of atmospheric reentry. A secondary goal is to protect from the heat and cold of space while on orbit.



Thermal Protection System, Orbiter 102

The TPS covers essentially the entire orbiter surface, and consists of seven different materials in varying locations based on amount of required heat protection:

- Reinforced carbon-carbon (RCC), used in the nose cap and wing leading edges. Used where reentry temperature exceeds 1,260 °C (2,300 °F). [Details Follow]
- High-temperature reusable surface insulation (HRSI) tiles, used on the orbiter underside. Made of coated LI-900 Silica ceramics. Used where reentry temperature is below 1260 °C. [Details Follow]
- Fibrous refractory composite insulation (FRCI) tiles, used to provide improved strength, durability, resistance to coating cracking and weight reduction.
- Flexible Insulation Blankets (FIB), a quilted, flexible blanket-like surface insulation. Used where reentry temperature is below 649 °C (1,200 °F).
- Low-temperature Reusable Surface Insulation (LRSI) tiles, formerly used on the upper fuselage, but now mostly replaced by FIB. Used in temperature ranges roughly similar to FIB. [Details Follow]
- Felt reusable surface insulation (FRSI). White Nomex felt blankets on the upper payload bay doors, portions of the midfuselage and aft fuselage sides, portions of the upper wing surface and a portion of the OMS/RCS pods. Used where temperatures stay below 371 °C (700 °F).

Each type of TPS has specific heat protection, impact resistance, and weight characteristics, which determine the locations where it is used and the amount used.

The shuttle TPS has three key characteristics that distinguish it from the TPS used on previous spacecraft:

- Reusable. Previous spacecraft generally used ablative heat shields which burned off during reentry and so couldn't be reused. This insulation was robust and reliable, and the single-use nature was appropriate for a single-use vehicle. By contrast, the reusable shuttle required a reusable thermal protection system.
- Lightweight. Previous ablative heat shields were very heavy. For example the ablative heat shield on the Apollo Command Module comprised about 1/3 of the vehicle weight. The winged shuttle had much more surface area than previous spacecraft, so a lightweight TPS was crucial.
- Fragile. The only known technology in the early 1970s with the required thermal and weight characteristics was also so fragile, due to the very low density, that one could easily crush a TPS tile by hand.

The TPS is a system of different protection types, not just silica tiles. They are in two basic categories: tile TPS and non-tile TPS. The main selection criterion is using the lightest weight protection capable of handling the heat in a given area. However in some cases a heavier type is used if additional impact resistance is needed. The FIB blankets were primarily adopted for reduced maintenance, not for thermal or weight reasons.

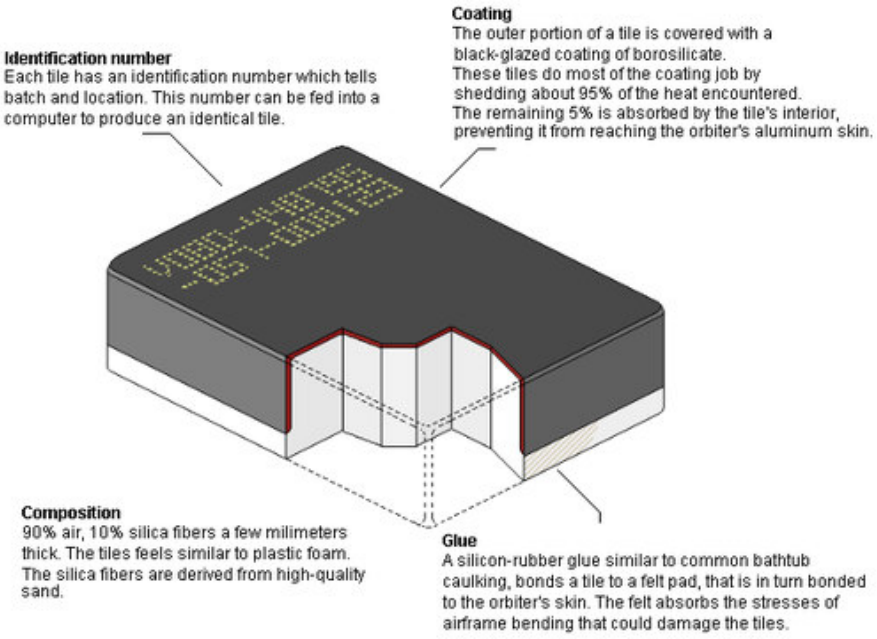
Much of the shuttle is covered with LI-900 silica tiles, made from essentially very pure quartz sand. The insulation prevents heat transfer to the underlying orbiter aluminum skin and structure. These tiles are such poor heat conductors that one can hold one while it is still red hot. There are about 24,300 unique tiles individually fitted on the vehicle, for which the Orbiter has been called "the flying brickyard".

The tiles are not mechanically fastened to the vehicle, but glued. Since the brittle tiles cannot flex with the underlying vehicle skin, they are glued to Nomex felt Strain Isolation Pads (SIPs) with RTV silicone adhesive, which are in turn glued to the orbiter skin. These isolate the tiles from the orbiter's structural deflections and expansions.

High-temperature reusable surface insulation (HRSI)

HRSI tiles (black in color) provide protection against temperatures up to 1,260 °C (2,300 °F). There are 20,548 HRSI tiles, which cover the landing gear doors, external tank umbilical connection doors, and the rest of the orbiter's under surfaces. They are used in areas on the upper forward fuselage, parts of the orbital maneuvering system pods, vertical stabilizer leading edge, elevon trailing edges, and upper body flap surface as well. They vary in thickness from 1 to 5 inches (2.5 to 13 cm), depending upon the heat load encountered during reentry.
Except for closeout areas, these tiles are normally 6 by 6 inches (15 by 15 cm) squares. The HRSI tile is composed of high purity silica fibers. Ninety percent of the volume of the tile is empty space giving it a very low density (9 lb/cu ft, 140 kg/m3) making it light enough for spaceflight. The uncoated tiles are bright white in appearance and look more like a solid ceramic than the foam-like material that they are.

The black coating on the tiles is Reaction Cured Glass (RCG) of which tetrasilicide and borosilicate glass are some of several ingredients. RCG is applied to all but one side of the tile to protect the porous silica and to increase the heat sink properties. The coating actually is also absent from a small margin of the sides adjacent to the uncoated (bottom) side. To waterproof the tile dimethylethoxysilane is injected into the tiles by syringe. Densifying the tile with tetraethyl orthosilicate (TEOS) also helps to protect the silica and waterproof.



An uncoated HRSI tile held in the hand feels like very light foam, less dense than Styrofoam, and the delicate, friable material must be handled with extreme care to prevent damage. The coating feels like a thin, hard shell and encapsulates the white insulating ceramic to resolve its friability, except on the uncoated side. Even a coated tile feels very light, lighter than a same-sized block of Styrofoam. As expected for silica, they are odorless and inert.

HRSI is used in conjunction with stronger, waterproof materials in the Space Shuttle heat shielding to give a balance of strength and resistance to the high re-entry temperatures experienced in Earth's upper atmosphere. HRSI is primarily designed to withstand transition from areas of extremely low temperature (the void of space, about −270 °C / −454 °F) to the high temperatures of re-entry (caused by interaction, mostly compression at the hypersonic shock, between the gases of the upper atmosphere & the hull of the Space Shuttle, typically around 1,600 °C / 2,910 °F).

Low-temperature reusable surface insulation (LRSI)

White in color, these cover the upper wing near the leading edge. They are also used in selected areas of the forward, mid, and aft fuselage, vertical tail, and the OMS/RCS pods. These tiles protect areas where reentry temperatures are below 1,200 °F (649 °C). The LRSI tiles are manufactured in the same manner as the HRSI tiles, except that the tiles are 8 by 8 inches (20 by 20 cm) squares and have a white RCG coating made of silica compounds with shiny aluminum oxide. The white color is by design and helps to manage heat on orbit when the orbiter is exposed to direct sunlight.

These tiles are reusable for up to 100 missions with refurbishment (100 missions is also the design lifetime of each orbiter). They are carefully inspected in the Orbiter Processing Facility after each mission, and damaged or worn tiles are immediately replaced before the next mission. Fabric sheets known as gap fillers are also inserted between tiles where necessary. These allow for a snug fit between tiles, preventing excess plasma from penetrating between them, yet allow for thermal expansion and flexing of the underlying vehicle skin.

Prior to the introduction of FIB blankets, LRSI tiles occupied all of the areas now covered by the blankets, including the upper fuselage and the whole surface of the OMS pods.

Reinforced Carbon-Carbon (RCC)

The light gray material which withstands reentry temperatures up to 1,510 °C (2,750 °F) protects the wing leading edges and nose cap. Each of the Orbiters' wings has 22 RCC panels. These panels are about 1⁄4 to 1⁄2 inch (6.3 to 13 mm) thick. T-seals between each panel allow thermal expansion and lateral movement between these panels and the Orbiter's wing.

RCC is a laminated composite material made from graphite rayon cloth and impregnated with a phenolic resin. After curing at high temperature in an autoclave, the laminate is pyrolized to convert the resin to carbon. This is then impregnated with furfural alcohol in a vacuum chamber, then cured and pyrolized again to convert the furfural alcohol to carbon. This process is repeated three times until the desired carbon-carbon properties are achieved.

To provide oxidation resistance for reuse capability, the outer layers of the RCC are converted to silicon carbide. The silicon-carbide coating protects the carbon-carbon from oxidation. The RCC is highly resistant to fatigue loading that is experienced during ascent and entry. It is stronger than the tile and is used around the socket of the forward attach point of the Orbiter to the External Tank to accommodate the shock loads of the explosive bolt detonation. The RCC is the only TPS material that also serves as structural support for part of the orbiter's aerodynamic shape: the wing leading edges and the nose cap. All other TPS components (tiles and blankets) are mounted onto structural materials that support them, mainly the aluminum frame and skin of the orbiter.

END OF REPORT.
#####+&

SPACE CAMP MEMORIES

1989 // Space Camp, Session 31

Day Three – SHUTTLE MISSION DAY

WEDNESDAY | JUNE 14, 1989

Phew, after a long day, and a long mission, we're all back at the Habitat preparing to head off to bed. Finally. And this time I've been told to leave the air conditioning vent alone! (I'll explain that in a minute.)

It wasn't supposed to happen this way – our mission was scheduled to begin around 6:00pm (right after dinner) and end around 8:00pm. But we didn't get started until after 8:00pm thanks to today's storms. We had a terrible time with them too. Not only did those storms push back our mission but also canceled our Rocket Park tour today, but I'll get into more about today's activities in a bit.

About the air conditioning vent comment... well, it seems I did a bad thing last night...

ICE COLD ///

Yesterday afternoon, when we returned from our excursions at the pool, we were all allowed to return to our rooms to get cleaned up and change, remember? Recall then that when we did return to our room we found it extremely hot and stuffy. Unsure why, I looked at the air conditioning vent positioned in the center of the room and signed when my hand touched it. Sure enough there wasn't any air pouring out from it. Knowing that the temperature of the Habitat was well regulated, there wasn't any reason for this, I know, but I didn't give it much thought at the time, and my roommates didn't seem to care either. Besides we had just 20 minutes to do whatever we were going to do and report back down in the Habitat's atrium for assembly. So we went about our business meeting for lunch, building our rockets and later, having our teamwork skills tested during Operation: Space Station.

Through all of this the habitat remained hot.

Returning from the long day’s work we were once again thrust into a hot room – and we quickly decided then we had a problem on our hands. Two of our number high-tailed it out of our room in search of someone who could rectify the problem (Farren and Chris) while the rest either sat around or went on about their showering duties. I stayed behind so I could explain what we found during the day to anyone who might heed our cries for help. Sure enough, about a minute or two later, Farren returned with a counselor – a young lady who had been wandering the Habitat. We told her about our little problem and she told us not to worry; she'd have it fixed in a moment.

Five minutes later, she returned. “Well, I have good news and bad news,” she said.

“What's the bad news?” I inquired.

“Someone DID turn off the air to the floor, but I don't know why,” she replied. “But, it's working now and it should start cooling down soon.”

“Great!” we cheered, and with that problem solved, we continued going about our nightly routine - showering, and brushing our teeth... you know; getting ready for bed. (Anything but playing with the girls next door, right? Ha!)

By the time Farren took his spill and lights-out came, the room did indeed cool down a bit, but it wasn’t quite as comfortable as we’d like. So while everyone else finished getting ready for bed, I climbed up to the air vent and opened it up wide. I figured if we let as much air come in as possible it would cool down quicker. With everyone happy, we turned in and awaited the counselors to come check our names off. Today’s countdown: normal. Our countdown: fart noises.

Okay, let me explain that: so far every night after lights-out we do anything but go to sleep. The first night we talked about what we expected out of camp and why we were there. The second night we got silly telling jokes. Last night we teased Farren about the plastic in his butt. And tonight, well, we did a simulated lift-off – complete with farting noises - in celebration of our mission. No really! We actually had a contest to see who could make authentic (and loud) farting noises with their mouths after simulating a shuttle liftoff. The flatulent noise then would simulate the roar of the engines at lift off.

Anyway, once she was satisfied we were who we claimed to be, she left and it was lights-out. I rolled over and fell asleep without giving another thought to the open air vent...

... I woke up; shivering. It was so cold!

Half awake, and not sure exactly where I was, I managed to turn over and take a look at my watch, which I wear at all times so I won’t lose it or manage to get it stolen. Consequently, I never wear my watch to bed at home and I’m quite surprised it hasn’t bothered me thus far. In any case, the watched stared back a time of 2:07am.

“Two in the morning!” I moaned to myself.

Having little to no energy to do anything else, I rolled back over and fitfully tried to go back to sleep. I tossed and I turned; I turned and

I tossed. There was no getting comfortable in this bitter cold room. Why was it so damn cold in here? I thought momentarily until it finally donned on me that I had left the air vent wide open, and during the night, with the constant work of the Life Support system, the room continued to be chilled well after the heat of the night had gone.

Damn.

Unable to get back to sleep or stand the cold any longer, I made a decision to get out of bed, find something warm to wear, and close the air vent. The problem was I was so cold I didn't want to move! While I could sense the rest of the group was awake (I heard a lot of tossing, turning and shivering), it became clear that no one else was about to get out in the cold, dark room to do something about it. So I did. And when I threw off the covers and my feet touched the cold handlebars attached to my bunk bed (which allows me to climb up into it and down from it), I almost cursed. How could I have been so careless?

The air vent in question was located smack-dab in the center of the room. In order to get there I would have to climb down, walk across the floor, climb up on one of the benches that were fastened to the floor and extend my reach back over the middle of the room, and doing all this while attempting to keep quiet. (Bear in mind I had nothing else on but a nightshirt and a pair of underwear). The bars I clung too were awfully cold; I could just imagine how cold the floor was going to be... but I had to do it. I had to go down there and fix the problem or I would never get back to sleep. So, standing there on the ladder, I hopped down without another thought and steeled myself for the rush of coldness.

Sure enough, the floor was as cold as ice - I was a lone brave soul in the middle of a dark, cold room. Through it all I took one step after another and made my way to the air vent. Once the vent was securely closed I shuffled back over to my locker and rummaged through it for something warm to wear. After looking through the contents in the darkened room, my hands laid upon something warm of value - a pair of sweat pants (thank god for mothers who over pack!) as well as a clean pair of socks. Pulling them on in record time, I rocketed back up into my bunk and fell fast asleep.

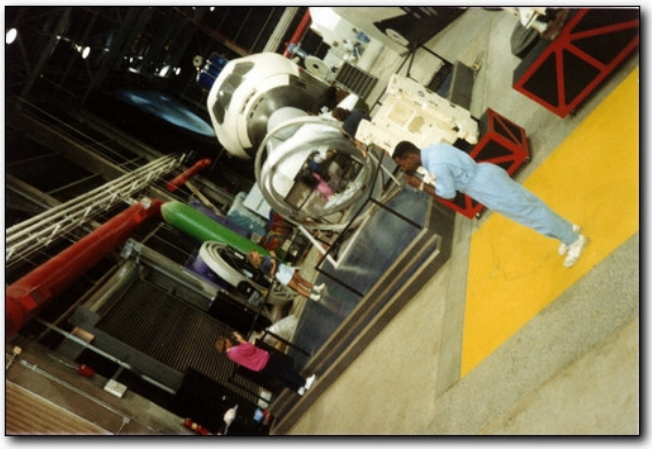
I stayed asleep until this morning’s “wake up” call, curling out of bed with a smile on my face. Everyone seemed pretty irritable and sleepy. At first I didn’t say anything. Neither did my roommates. But as everyone tried to get their gears in motion, eventually someone asked if they too were cold last night. I shrunk into the background. Sure enough, they affirmed that they too had been awakened by the bitter cold but were too cold themselves to do anything about it. Eventually I confessed to getting up and closing it – how could I not? Everyone knew I opened the vent in the first place. I guess it didn’t matter though. I was brave enough to jump down there with little on and save us from freezing. I was the one who slept well; most of all... I was the one who was warm!

TRAINING, LECTURES AND A TORNADO, OH MY! ///

Apparently what happened was the counselor we asked last night about the air conditioning failure turned on the compressors as asked, but in the process also turned down the thermostat as low as it could go, thereby effectively turning the entire habitat into a refrigerator! Everyone was grumpy at assembly and no one looked forward to our group picture together. All we all really wanted was to eat breakfast, but before we could do that, our team (along with UTC and Lockheed), had to take a picture together. This picture would then be given to us at graduation (so explained) along with our flight wings and a certificate – if we'd make it.

It took forever to get this picture done.

First it was cloudy and over-cast looking (technically I don't think the sun had fully risen yet!), and everyone was tired. Nat took us over and we lined up as we were told and took our seats on the rim of the moon crater, located out in the Rocket Park, where a simulated Moon Landing (complete with LM) is located. It's not the most comfortable place to sit let me tell you. And once we sat... we sat, and sat, and sat. By the time the picture was actually taken I was no longer in good spirits... and neither was anyone else!



Eventually the picture got taken and we retreated to the cafeteria for breakfast (good thing because it started to rain not long after). Following meal-break we marched into the main lecture room (located inside the Museum proper) and sat for a lecture on Astronomy and the Solar System, which for the audience was rather bland and boring. I think most of us here probably already knew about the Solar System and if they don't... what are you doing at Space Camp?! Following the lecture we headed back out onto the Training Center Floor and I had hoped we were going to attempt the 5DF Chair, alas not. But I did get tantalizingly close to the Multi-Axis Trainer – we watched Michelle tumble about.

To quote from SpaceCamp: The Movie, the Multi-Axis Trainer is a machine in which "three concentric circles, spinning in opposite directions simultaneously; object is to stabilize from central point, utilizing hand controls", and it's the only one of the trainers I really, really, really, really, really wanted to try. Unfortunately it's reserved for the next level of Camp, called Space Academy, Level I. So I had to be content to lay my eyes on it, and watch my counselor have all the fun. Though I'm not sure she enjoyed it.

The Multi-Axis Trainer (MAT) simulates the disorientation one would feel in a tumble spin during reentry into the Earth's atmosphere. The MAT is patterned after the MASTIF (Multiple-Axis Spin/Space Test Inertia Facility), a series of cages within cages, used for astronaut training during the Mercury program. The astronauts used this to condition themselves for disorientation that might occur in emergency conditions during flight. The MASTIF had a joystick which allowed the astronaut to control the device. The MAT has no joystick (thus the joystick on the MAT in SpaceCamp: the Movie was just a prop!) Consequently, the unit used during the filming is still on the space center floor – complete with holes where the prop was attached – but it's off to the side and though I got a chance to see it, we weren't allowed anywhere near it.

Lunch came and went and we attended more class work, and rehearsed our mission one more time – the good that did us – before assembling near the "Lunch Pad" for our tour of the Rocket Park. We were about to head out when all of a sudden the wind began to whip up and the glass windows and doors near the Training Center tremble under the intense gust. Michelle warned us away from the glass and to come further in, but at first we didn't; we were curious! And then – flash – the power went out. The only light now came from the unprotected windows and we all looked on in a combination of fright and excitement. We began to speculate: was a tornado on the way? As I looked on into the Rocket Park, with my hands on the windows feeling their vibration, and looking at the big Saturn IB Rocket standing tall, I wondered: would it fall over in this wind? And if it did, would the rocket smash through the roof and kill us all?

Unfortunately I had plenty of time to contemplate that – an announcement broke over the museum's intercom system not long after: a tornado was indeed spotted! Even more frightened now, we scampered off to safety in the center of the museum itself (a place we and the museum guests were instructed to go), and found a place to sit along a fortified brick wall. We sat down and began to talk nervously amongst ourselves. And then conflict arose.

Mark.

He'd already been a thorn in our side during Operation: Space Station, and prior to that he came to our team under what I would consider suspicious reasons. And ever since he's come he's been talking up how much he dislikes Space camp and being here; well I love it here! And Krystine! Oh my god, her constant boasting that Buzz Aldrin (2nd man to step on the moon) is some kind of relation to her family was getting on my nerves. The last straw came when the pair began suggesting, "We're all going to die from the tornado." I couldn't take it anymore – I had to say something. I mean, good grief!

Thankfully, though, we didn't break down. I stopped. She stopped. He stopped. And we went about our afternoon huddled in the museum wondering when the rain and wind would stop, when the power would come back on, and whether or not the missiles and rockets in the Rocket Park would still be standing once it was all over. About an hour or so later we found out: absolutely nothing happened. Nothing inside the museum was damaged, or was anything outside in the Rocket Park. Even the Habitats and the Pathfinder in the Shuttle Park were left spotless. So, then, where was this tornado? Better safe than sorry I suppose.

Due to the weather and power outage, the schedule for the rest of the day was thrown completely out the window, literally. And we found ourselves with little that we could do. Our mission originally

scheduled at 6:00pm, just following dinner, was now to happen sometime later. Lockheed's mission was interrupted mid-stride and would have to be restarted, and those who were scheduled to follow would have to do so. We'd just have to wait. Eventually, though, it came time for our mission.

MISSION: COLUMBIA ///

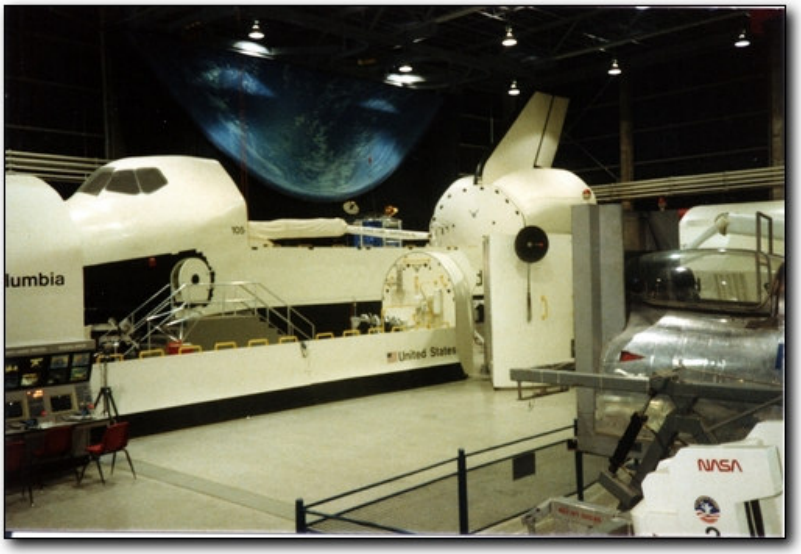
Space Camp is home to a number of Space Shuttle simulators. There's Enterprise, Discovery, Atlantis and Columbia. While Discovery is used for Academy, Level I and both Enterprise and Atlantis for Academy, Level II, Space Campers (such as myself) use Space Shuttle Columbia and its Mission Control deck, situated just outside the simulator platform. As I was assigned to Mission Control (thanks to my relatively poor score on the position test we took earlier in the week), my job was out here on the Training Center floor. I watched with envy as some of my friends climbed into the Shuttle... On the Flight Deck: Farren, Shuttle Commander; Ziggy, Shuttle Pilot; Clark and Krystine, Mission Specialists (Spacelab). The rest of us took up our positions on the ground: Mission Scientist & Orbital Systems Officer, me; Flight Director, Matt; and Tracking Officer, Mark. The Public Affairs Officer was unassigned and I'm not sure who held the spot of Launch/Landing Director.

How I got to handle two positions at Mission Control is actually quite funny, though.

Due to the size of our team, we didn't have enough members to fill all the positions on board the Space Shuttle, the SpaceLab and Space Station as well as those at Mission Control. Since the Shuttle positions were more important, those were filled first. Space Station and SpaceLab positions were filled (as needed) next. Mission Control positions on the ground then followed.
Originally it was Matt who had two positions, handling both Mission Scientist and Flight Director; however, there were many times during the run-through that the Mission Scientist talked directly to the Flight Director. Matt would effectively be talking to himself a good portion of the time! Although Matt would continue to perform this role during our script reads, I assumed the role for our actual mission. He was happy for the change and I too, it would make my job a little more important. Though I guess you can take it this way: it would be the only chance one could truly talk to one's self and actually get a reply, or for that matter, carry on a complete conversation!

He didn’t see the humor in it.

A few minutes before the simulation began I sat down at my position and looked over my Science board. Regardless of my feelings (I really wanted to be aboard the Shuttle), I also wanted the mission to go as perfectly as possible, so I familiarized myself with the switches, lights, knobs and buttons of the panel; the script and its workflow; my headset and the controls there-of. And I wondered... what does a Mission Scientist do? For that matter, what were the responsibilities of any of these positions?



According to our handbooks, a MISSION SCIENTIST is responsible for the Spacelab and Space Station Operations, and should see that both operations remain on schedule. And an ORBITAL SYSTEMS OFFICER is responsible for countdown and launch to the final OMS burn and landing for the mechanical operation of the Shuttle. This person monitors pressurization of the fuel tanks, the cabin pressure of the orbiter, and verifies main engine and SRB ignition at launch. Matt’s job as FLIGHT DIRECTOR was equally important – perhaps more so. His responsibilities included the operation of the orbiter and shuttle system from ignition to touchdown. Even Mark as WEATHER AND TRACKING OFFICER was important: The Weather and Tracking Officer must verify that all conditions such as wind, visibility, and cloud cover are acceptable for a safe launch and landing. As a tracking officer, this crewmember keeps track of the orbiter's position and the losses of signal (LOS) that may occur.

Feeling a little better about the importance of my position, it was then I noticed one of the panel lights lit up out of sequence – signaling a switch had been flipped on within the Space Shuttle. Having looked at the script, I knew that light should not be on, so I put on my headgear and called over to someone within the Shuttle. “There’s a light on my Mission Scientist board. Should it be on?” I got a reply but not the one I was looking for; no one really took it seriously. So I repeated myself until someone caught it and switched it off. With that done, I was satisfied and sat back, happily waiting for the mission to begin.

I was ready. Matt was ready. We were ready.

All pre-flight countdowns commence in roughly the same manner: days and even weeks to months in advance, a countdown clock begins. Since we only had two hours, the clock was somewhat accelerated (you think?). Throughout the countdown a number of holds are built in. These pauses are built in to allow the launch team (that's us) to target a precise launch window, and to provide a cushion of time for certain tasks and procedures without impacting the overall schedule. For a Space Shuttle, built-in holds vary in length, but always occur at the following times: T-27 hours, T-19 hours, T-11 hours, T-6 Hours, T-3 Hours, T-20 minutes and T-9 minutes. For the sake of our mission, we started at T-20 minutes and holding.

And this is where we picked up the mission parameter...

This hold, typically lasting no more than 10 minutes, gives the Test Director a chance to conduct final launch team briefings, and to complete inertial measurement unit preflight alignments. At T-9 minutes, which could last for a few moments to hours depending on the situation, is the time when the launch window is determined, flight recorders are activated, and a final "go/no-go" for launch polls are conducted by the Test Director, Mission Management Team and Launch Director. If everything is A-OK, the clock starts running and hopefully doesn't stop! But this isn't a time we just sit still and watch. During this time the Orbiter Access Arm is retracted (at T-7 minutes, 30 seconds), the Auxiliary Power Units are started (at T-5 minutes), the Solid Rocket Boosters are armed (at T-5 minute), the Main Engines perform a Gimbal Test (T-3 minutes, 55 seconds), and the "Beanie Cap" Oxygen Vent arm is retracted (T-2 minutes, 55 seconds).

A minute later: "Colubmia, Launch Control. Please close and lock your visors." And then… the Launch Pad Suppression System is activated (at T-16 seconds), the hydrogen burn-off system is on (the sparks, at T-10 seconds) and then the final countdown...

Ten.
Nine.
Eight.
Seven.
Six.

"We have Main Engine Start!"

Five.
Four.
Three.
Two.
One.

LIFTOFF!!

And boy was it exciting. Our mission kicked into high gear then, and we said our lines and punched our buttons exactly when we were supposed to. It was almost hard to believe that a team that almost ripped itself apart yesterday could not only mend but also come together and make this happen... without any petty bickering. We even shared a few laughs, courtesy of our scripts. Take Zig for example, our Pilot: during the launch sequence he had to say a line or two about the vibration effects of the Solid Rocket Boosters (SRBs). Another such line came the moment it was time to jettison those SRB's: "Boy, it's a smooth ride now that the SRBs have been jettisoned!" It was simply priceless; I took all I could not to laugh out loud. Thankfully he didn't have too many of those... and I figured out how to switch the headset communication channel (from A to B) in order to laugh without really being heard.

Sometimes the mission just got boring and I'd switch communications back over in order to grunt out m disapproval of what was going on. Since Channel B was nothing but dead air, I could freely use it without repercussions. I attempted to explain this little trick to Matt when he also had some emotions to get out, but unfortunately he didn't pick up on what I was trying to tell him. (He got it after the fact but it helped him little then.)

Most of that frustration bore from Mark at the control of the visuals. As Tracking Officer, Mark controlled all the cameras, be it the ones on the Shuttle or the ones at Mission Control – all the screens we would see. This meant we saw whatever he wanted us to see. Usually he would switch the screens from scene to scene at the most crucial moments, you know, those that required lines or buttons to be said and pushed at precise times. It was hellish trying to get him to stop switching views so we could see the mission clock at all times! Although I will give him credit for cycling through to the Mid-Deck camera, where Krystine and Clark were stationed most of the time (or was that the SpaceLab?). Usually when he cycled over there we saw the two of them just sitting in their seats, looking down at their scripts. I could see that Clark was bored and I was bored looking at him.

So one time when there was a long stretch of silence on the headset, I turned my channel on and whispered out to him: "Clark-ee-poo".

It was great! His head snapped up but there was no one there but Krystine!

The mission continued on without much of a hitch. More lines were said and buttons pushed and before we knew it, the mission came to a successful conclusion. We doffed our headsets at Mission Control and waited for our teammates to disembark Columbia and join us. We were all shocked to see it was past 10:00pm and though we were all completely exhausted by the experience, all were in a good mood – the mission was genuinely fun! Huddling around Nat and Michelle, then, we wondered about our score. How did we do? Did we do well? Did we fail? What? What? Our mission wasn't perfect of course, as expected, and that hurt our overall score. But there were still a couple of more days to go and many more missions to be run. Without a perfect score thus far there was still hope we might have done well!

“So,” Michelle then asked once we had settled down. “Who was whispering ‘Clark-ee-poo’ over the radio?” With a little bit of reluctance, I spoke up and said it was me. She turned and laughed saying she got a real kick out if it, as did most of my other teammates!

* * *

I feel good about our chances. Our mission seemed to run well and we all pulled together as tight as any other team I know to get it done. So I’d call that mission success! Hooray Team Martin Marietta!

MARTIN MARIETTA

Now, as I said, we’re back at the Habitat preparing to head to bed. We’ve got Clark back tonight, sans cow. He was released back to us earlier today so he could participate in the mission), and so far he seems to be just fine! And Farren... well, he’s not walking up the walls tonight but he’s fine too. Even Mark is in good spirits for a chance so it looks as if all is well tonight.

What will tomorrow bring I wonder?

Will we get to launch our rockets? Will we get to tour the Rocket Park? And will we finally be able to wander around the Museum?

It’s hard to believe we only have one full day left here and then it’s all over. It’s gone by so fast. Some are ready to leave, I know. But I’m not.

I almost wish I could join Blue Week (Wednesday through Monday), which came in earlier this morning. The Habitat was abuzz with check-in and orientation activities while the rest of us prepared to begin our mid-week day. Earlier in the week I wanted this to end; I wanted to go home. Now, I want to start all over again.

Maybe I will in my dreams tonight.

Goodnight!

P.S. I got up the courage to ask Nat for his book tonight, so I could fill-in the missing blanks I had. He was a little shocked by the request but handed it over. I have until tomorrow morning to do with it as I please and get it back to him. I’m very pleased. He even said he liked me for taking the initiative. My roommates have been laughing at me, though. But that’s okay. I’m enjoying the knowledge. There was quite a bit to write in!

TO: KGB COMMANDER

FROM: VLADIMIR BORIS

REASON: “The Pathfinder”

КГБ-3

СССР
КОМИТЕТ
ГОСУДАРСТВЕННОЙ БЕЗОПАСНОСТИ
при СОВЕТЕ МИНИСТРОВ СССР

Comrade, I have come across most amazing thing.

Here at the Space & Rocket Center, the capitalists have full space-shuttle mock-up on display. It is said to be the only one of its kind in the entire world! Though not a shuttle destined to fly, they say, the Pathfinder did help create the systems and backbone of support that would ultimately be used in NASA’s Space Shuttle program. I believe we could use such technology to revive our Buran Program and help learn from our… failure.

# # # # #

Pathfinder (OV-098) is constructed from steel, wood and an old rocket motor, surprisingly, and was used by NASA to test roadway clearances, crane capabilities, structure fittings and how vibrations would affect the Shuttle during a launch. Though it had planned to conduct these tests with the first Shuttle it built – Enterprise (OV-101) – after landing tests that launched it from the back of a Boeing 747 jetliner, NASA chose to build Pathfinder instead. This was probably good idea – Enterprise was more expensive article and losing Pathfinder would save program from embarrassment. The tests were done at a special test stand at Marshall Space Flight Center at Redstone Arsenal (see last report) and were completed successfully. And like Enterprise before it, Pathfinder was sent to Kennedy Space Center in Florida so that engineers there could practice hoisting the Shuttle in the big Vehicle Assembly Building (VAB) originally constructed to house the Saturn V moon rockets.

They dare not try it on the real thing, like us.

Once tests were complete, Pathfinder was returned to Huntsville, where Teledyne Brown Engineering (one of Space Camp’s sponsors) rebuilt the craft for a Japanese company (who purchased Shuttle) to look more like the real Space Shuttle. Teledyne then sent the craft on a tour of Japan, displaying at the Great Space Shuttle Exposition in Tokyo from June 1983 to August 1984, before returning it to Huntsville. Upon its second return, the Pathfinder became a permanent display at the Space & Rocket Center – so getting access to it might be tricky.
The Pathfinder, 122 feet long, 56 feet tall with a wingspan of 78 feet, weighs approximately 89 tons. Two of the Pathfinder’s main engines powered the first flight of Columbia (OV-102) in 1981. Pathfinder’s right-hand nose-cone also few on Columbia’s maiden voyage in 1981. Though nose-cones aren’t normally recovered after use, this one happened to land upright and floated in water. It came here on October 22, 1986 from the Marshall Space Flight Center (where it had been stored following Tokyo) on a pair of specially designed trucks traveling the streets of Huntsville at less than 5 miles-per-hour.

Accompanying the Pathfinder Orbiter are an External Tank (the first ever) built by Martin Marietta, a set of Solid Rocket Boosters built by Morton-Thiokol (advanced booster casings which were developed after the Challenger (OV-099) explosion, and three Main Engines built by the Rocketdyne division of Rockwell International.

The external tank is 154 feet long and 27 feet in diameter, weighing 33 tons. It has been involved in many test firings but has never flown in a mission – if it had it would not be here, Comrade. This particular tank was used in special Shuttle mock-up tests called the Main Propulsion Test Article, or MPTA. The MPTA included an orbiter and its three main engines. This way engineers could learn how to fuel Shuttle, run through countdown and ignite engines for testing without damaging the real article. The test itself was held at the National Space Technology Laboratory in Bay St. Louis, Mississippi. Martin Marietta Aerospace helped modify tank (MPTA-098) so it could be displayed here. It arrived by barge, covering 1,250 miles over Mississippi, Ohio and Tennessee rivers to reach Marshall Space Flight Center.

The rocket boosters were added in 1988, Comrade. These were built for NASA as test equipment, but the tips of them are actual working parachute pods (we should get look). The boosters themselves are 149 feet long, and weigh more than 50 tons each. They're made from graphite filament, which makes them much lighter than the steel encased boosters that are used in Shuttle Program today. Besides, ours are better.

The display is impressive, comrade.

It is dedicated to the brave astronauts aboard STS-51L, the ill-fated Challenger (OV-099) mission of 1986.

Fotos follow.

END OF REPORT.
#####+&

SPACE CAMP MEMORIES

1989 // Space Camp, Session 31

Day Four – ROCKETRY DAY

THURSDAY | JUNE 15, 1989

You're not going to believe this. Its nuts! We're up late again tonight... and you're not going to believe the reason why. We're building a space station! Or, rather, we're re-building it. That's right; the space station concept that nearly tore our team apart is being rebuilt tonight. Why? Michelle told us earlier today that by some happenstance, someone dropped our project while setting all of them up for display in the Team Room. What she didn't want to tell us right away was that it shattered into many pieces and was completely destroyed. Naturally this drew outrage from every member of our team since we'd nearly killed ourselves trying to get the thing built in the first place, and here someone went and deliberately (well, that's what we all think) dropped our space station?

I bet it was UTC. Or Lockheed.

No one complained when we said we'd rebuild it so we've taken it overnight to try and do just that. We have the technology. We have the capability to build the world's first space station. This model will be that station. Better than it was before. Better... stronger... faster! Who are we kidding? We really don't want to be doing this but no one else wanted to take up the challenge so here we are. At the moment we're taking a breather... We've already been yelled at by one of the floor counselors for being too loud, so, while I'm free let me report on our last day here.

THE MANNED MANEUVERING UNIT ///

Today we were given some free time to just be ourselves; to find discovery within the museum, under Michelle's supervision of course. One of the exhibits within the museum that piqued our interests was an EVA chair set up so that you can sit in it, use its controls, and actually fly through space via a projection screen and dock with a satellite. In fact, that was the whole point of this exercise was to see if one could use an MMU and pilot it to its destination. The Manned Maneuvering Unit (MMU) is a self-contained backpack unit allowing the individual astronaut to fly free in space. MMU's are stored on both sides of the forward section of the cargo bay. The MMU's are stored on the Flight Service Station (FSS). This is a place where the astronaut can don (put on) and doff (remove) himself from the MMU.

The FSS also acts as a service station for the MMU, because the astronaut can recharge the propellant tanks and recharge the batteries. The MMU is easily flown with precise control and is best kept simple, reliable, and flown within the scope for which it was designed.

Naturally we weren't working with an actual MMU, but it was almost an exact replica. Now, along with the chair were a computer and a projection screen. To use the MMU, one had to sit in it, find the controls to his right and left (allowing movements in six degrees - aka, the 5DF Chair), and use them to maneuver to a satellite in orbit and grasp onto it. The docking was accomplished by using a set of cross hairs, which were provided on screen and a blinking dot on the satellite to line up with. Easy enough, right? That's what everyone thought, including Zig, Columbia's Pilot. He was given the first try since he was a "pilot". He would get real close but go out of control each time after trying to slow down. The computer would pull him back, reset and he would be allowed to try again. After three runs, his fuel became exhausted and the game was afoot. Now it was my turn.

Getting used to the controls was not an easy task. The right side of the MMU controlled direction, while the left controlled speed. Using both at the same time was very tricky and took a lot of concentration. However, I hopped in the chair and immediately put the blinking dot in the cross hairs and accelerated towards my goal. I started going off in a tangent just like Zig, only I was able to recover, line up again and go right at it. I pushed the stick full forward then back again and the image instantly froze. At first I thought I had crashed into the satellite but then, "MMU DOCKED WITH SATELLITE- GREAT JOB PILOT!" came flashing across the screen. Everyone was amazed that I did it on the first try! Some of them clapped while some of them shook my hand in congratulations. With the dare completed, I turned to Zig and said, "You know, I should have been Pilot." He agreed, humbly.

Following my perfect flight, we explored the rest of the museum, finally getting a chance to spend as much time at the exhibits that interested us the most, such as Wally Schirra's Mercury Spacecraft (Sigma-7; the eighth flight of Mercury, launched October 3, 1962 on a Mercury-Atlas D, sustaining orbit for 9 hours and 13 minutes and successfully splashing down after 6 orbits), the Skylab Space Station Astronaut Training Mock-up (which was constructed and used to train the astronauts on how to successfully live in the structure – it's a walk-in), and one of the largest chunks of the Skylab that remains today, charred remains from its controlled descent through the atmosphere.

On the lunar side of things, the US Space & Rocket Center has a great collection, and we enjoyed seeing it. There's the Apollo 11 Quarantine Van, which is the actual transport vehicle that Armstrong, Aldrin and Collins rode in. The original purpose of these vans was to keep all the nasty germs on the moon from contaminating us. It was a simple but futile measure as there is no oxygen on the moon and therefore no germs to bring back. This van was also in a ticker-tape parade in honor of the astronauts' return.

Also on display is one of NASA's LRVs (Lunar Rover Vehicles). The "Moon Buggy", as it is more commonly and affectionately known as, was designed at the Marshall Space Flight Center to allow astronauts aboard the later Apollo missions (15, 16 and 17) to venture out farther from their LEM than ever allowed before. The LRVs allowed the astronauts to cover over 56 miles and achieve a distance of 4 miles from the LEM. Among the Rover's features are: direct radio communications with earth, a television camera, a 15mm cine-camera and its magazines, a 70 mm ordinary camera, a drill, a magnetometer, pincers for taking samples, miscellaneous tools, storage closets, drawers beneath the seats and various other items. By all accounts the Moon Buggy was very successful, although my drawing of one was not (but we shall not bring that up again).

A lunar sample from the Apollo 12 mission is nearby. Sample #12065 was picked up by Alan Bean and Pete Conrad as they explored the “Ocean of Storms”, a vast lunar mare. Although visited by Conrad and Bean, this area of the moon was also visited by a hand-full of robotic explorers: Luna 9 and Luna 13 from the USSR, and Surveyor 1 and Surveyor 3 from the USA. And perhaps the crown of the exhibit is the Apollo 16 Command Service Module. Apollo 16’s CSM, named “Casper” had a three manned crew: Charles Duke, Thomas Mattingly, and John Young. The mission launched on April 16, 1972 and landed 11 days later.

We even simulated a mission to the moon in the museum’s Apollo capsule mockup – how can you resist getting in a capsule and flipping switches? Or how about using a robotic arm to grab blocks and move them about? Or taking a spin in a gyro chair, which simulates the reaction of a gyroscope? All fun things – especially the gyro chair! You take your seat in the simulated spacecraft, move the handle slowly to the left and hold that position. Then move the handle to the right and hold that position. The spinning wheel at the top acts as a gyroscope and as you change its position, it will cause you and the spacecraft to move in the same direction. It’s an important part of a space vehicle’s guidance system!

And out front is the center's Blackbird; it's cool! Lockheed's SR-71 Blackbird cruises at speeds of Mach 3 and can fly from coast to coast in 68 minutes. Called one of the safest planes ever developed, the SR-71 is scheduled to be retired from service in 1990. The SR-71 on display here is an A-12 model, and the seventh vehicle of its type built.

We also got our tour of the Rocket Park today...

THE ROCKET PARK ///

What John Glenn calls "the finest rocket collection in the world," the Rocket Park salutes the work of Doctor Von Braun and his team by tracing rocketry's evolution throughout the years. The Rocket Park has been a host to an Apollo 10th Anniversary celebration reenactment of the Lunar Module landing on the moon and is currently a home for the United States Army Missile Command's contributions to national defense throughout the years.

Besides the rockets and missiles on display, there's also a Moon Buggy (a six-wheeled early design built to test the possible configuration for a mobile vehicle for exploring the surface of the moon. One important design factor that carried through to the final design used by the Apollo astronauts was the wire wheel) and a Mobile Laboratory (initially built as a study of the type of vehicles that might be used to explore the moon's surface. After NASA completed its studies, the lab was used by the Department of the Interior for direct application in the field of geology.)

There is, of course, no mistaking the Saturn I, the center-piece of the display. The Saturn I was the first large space vehicle developed solely for space exploration; it was designed and developed at the Marshall Space Flight Center. Saturn I operates at a top speed of 17,000 miles-per-hour and can launch 11 tons of man and equipment into orbit. A rocket similar to this one launched the first unmanned Apollo spacecraft and three Pegasus satellites for meteoroid detection in space into orbit. An updated version of this rocket, called the Saturn IB launched Skylab astronauts into orbit. This particular rocket is a Saturn I – Block II.

Surrounding the Saturn I are the various rockets we took in our attempt to reach the stars, such as the V-1 Buzz Bomb rocket (a German cruise-type missile called the “Buzz Bomb” because of the unusual sound made by its engine. It is powered by an aero-pulse engine, which burns any gasoline-type fuel and produces 900 pounds of thrust. Approximately 20,000 V-1s were launched against England and Belgium during 1944-1945. Over 1,200 US built copies, called the JB-2, were tested by the Army and Navy. The concepts of the V-1 lead to the V-2, which proved that the basic theories of rocketry were correct. First launched on October 3, 1942 at Peenemunde, Germany, the V-2 broke all records of height, weight, speed and range. The V-2 was brought to the United States following the War and inaugurated the US Missile Program.

The Missile Program began by Von Braun and his associates gave us the Redstone, Jupiter and Juno.

The REDSTONE, known as “old reliable” because of the many diverse missions it fulfilled in the early days of the space race, begat three versions: a military, satellite, and manned version. The one on display here is the military version, designed to transport nuclear or conventional warheads at ranges of up to 200 miles. Its power plant burns liquid oxygen and an alcohol-water mixture producing 75,000 pounds of thrust. JUPITER C, the US Army’s second version of Redstone, launched the first US Satellite – Explorer I – on January 31, 1958. Another Jupiter rocket launched two primates named Able and Baker into space for the US Army in 1959. That experiment proved that living creatures could pass through lift-off and re-entry and return safely to earth. The Jupiter generates 150,000 pounds of thrust. The celebrated Miss Baker, who retired from the “monkeynaut” corps and used to reside here at the Space & Rocket Center, was a passenger on a Jupiter just like this one. The JUNO II, also on display here, was a modified Jupiter with an upper stage added for launching space probes. A rocket like this one launched the first Pioneer and Explorer series of satellites.

These rockets were great at launching smaller payloads such as monkeys, satellites and interplanetary probes; however, bigger, more powerful rockets would be needed to lift man and machine into orbit, and beyond. These are the Mercury-Redstone, Mercury-Atlas and Gemini-Titan derivatives.

The third version of the REDSTONE was the first of a series of rockets used in the US manned space flights. In May 1961, a MERCURY-REDSTONE rocket launched Alan B. Sheppard on a sub-orbital flight aboard Freedom 7. Thus Sheppard became the first US Astronaut to ride a rocket. The ATLAS space launch vehicle was originally designed as a weapon and later modified to launch manned and unmanned space hardware in 1962. The ATLAS launched John Glenn, the first US Astronaut to Orbit the Earth, into space aboard the Mercury Friendship 7 spacecraft. ATLAS rockets also launched the Ranger, Surveyor, Lunar Orbiter and Mariner spacecrafts, visiting the Moon and Mars. And then there's TITAN, the US Air Force rocket that was initially developed for defense. TITAN II was used by NASA to launch the two-man Gemini spacecraft, a role the rocket performed very well. A stage recovered from a Gemini-Titan V launch is on display. It's the largest piece of a rocket stage ever recovered from a manned flight – the forward half of the first stage. The complete vehicle boosted Astronauts Gordon Cooper and Charles "Pete" Conrad into earth orbit for an 8-day mission aboard Gemini V on August 21, 1965.

But perhaps the most exciting to see is the Saturn V moon rocket, displayed on its side out back.

The Apollo Saturn V was designed to transport man to other planets (although the Moon was as far as they got) and lift tons of cargo into space. The Saturn V has five Rocketdyne F-J engines, the center one being fixed with the surrounding four being on gimbals (meaning they can move). These engines consume 5,000 gallons of liquid fuel per second producing the 160 million horsepower power the FIRST STAGE - 138 feet long and 33 feet wide – requires to lift the entire package from the launch pad. During flight the first stage burns kerosene and liquid oxygen and operates for 2 ½ minutes and shuts down at 35-40 miles altitude.

The SECOND STAGE powers the spacecraft to an altitude of 117 miles above the earth at a speed of 15,300 mph. The five J-2 rocket engines generate one million pounds of thrust and burn liquid hydrogen and oxygen. The THIRD STAGE increases the spacecraft orbital speed to 17,500 mph. After one orbit it re-ignites to push the spacecraft away from earth at a speed of 25,000 mph on a path to the moon. This single J-2 engine generates 225,000 pounds of thrust. On the last few moon flights, this stage has been guided to impact the moon in order to record seismographic information.

The INSTRUMENT UNIT serves as the central brain of the total vehicle. It is packed with computers and electronic controls designed to maintain a path of flight that will place the astronauts at the required point in space. Attached to it is the APOLLO spacecraft. The 100,000 pound Apollo consists of the lunar module, service module, command module, and launch escape system. The Lunar Module not seen here is stored with its legs folded inside the container directly behind the Apollo Command and Service Modules. The astronauts are in the Command Module for most of the flight, and this is the only part of the Apollo-Saturn vehicle that makes a complete round trip back to earth. The launch escape tower, the most forward part of the rocket, is used in the event of a failure on the pad or just after lift-off. Its rocket motor has a thrust of 150,000 lbs - twice that of a Redstone rocket.

This Apollo-Saturn V vehicle was used for ground testing on Earth, therefore, it has never flown in space. However, it is very similar to those moon rockets that have launched astronauts to the moon.

Standing on the pad, the vehicle is 363 feet tall, or about the length of a football field, and weighs 3,000 tons (6,200,000 pounds) fueled and ready for launch, thrusting 7,600,000 pounds. On Space Day, July 20th, 1987, the rocket was honored as a National Historic Landmark - the only rocket in history to receive such a status! The Apollo-Saturn V rocket on display is also one of the only surviving test vehicles left and is a testament to the scientists, engineers, and technicians who designed and built this massive beast.

And for added display is a full-scale exterior mock-up of the Skylab space station. Three crews of astronauts lived in Skylab while orbiting the earth for a total of 161 days in 1973-1975. The astronauts used part of this mock-up during training inside the Neutral Buoyancy Trainer at Marshall Space Flight Center. Launched into space using the last remaining Saturn V rocket, the third-stage of the rocket (without the rocket engine and related components) was converted into the living quarters for the astronauts.

Beyond Skylab are a couple of America's X-Plane designs – the X-15 Rocket Plane and the X-24 Lifting Body.

The X-15 rocket powered plane made the first manned probes into the lower edges of space. Several X-15 pilots including Neil Armstrong earned "astronaut" rating by flights to an altitude of 50 miles in a plane such as this. The X-15 flight program also contributed significantly to the Mercury, Gemini, and Apollo projects. The X-15 was carried aloft by a B-52 and released at about 45,000 feet and 500 mph. Its rocket engine then fired for the first 80 to 120 seconds of flight. The remainder of the 10 to 11 minute flight was powerless and ended with a 200 mph glide, landing on a dry lakebed.

The Lifting Body is just a mock-up of the X-24 rocket powered airplane. The X-24 is carried aloft by a B-52 plane, much like the X-15 before it, and released at 45,000 feet. The rocket plane climbs to 60,000 feet after an initial boost from its rocket engine. Afterwards, the pilot glides the vehicle to landing. Developed by Martin Mariette, the X-24 provided research information for the Space Shuttle in its early beginnings.

And then there are the missiles out in "Missile Row", but I spent very little time out there – missiles don't excite me, but I bet the Vladimir found them "veeeeerry intewesting".

TRAINING, LECTURES and MOVIES ///

Although this was our last full day of Camp, and our mission had been completed, we still trained hard.

While we were out in the Rocket Park the entire team had the opportunity to take to the skies in the Space Walker. This simulator-turned-ride creates a momentary sensation of floating in space by operating on a long "boom" or arm. Your weight on the long end of the arm is balanced by movable counter weights on the short end of the arm. You achieve "lift off" by using your feet and pushing against the ground really hard, which sends you and the arm straight into the air. Following the curved motion of the lever, you'll hit "weightlessness" as you pass through the vortex (completely up and down). Then, of course, you fall back on the other side and repeat your pushes. That'll send you back over and you repeat the process. It's easy and fun!

On the Training Center floor we also finally got a ride in the Five Degrees of Freedom (5DF) chair. As most physicists know, there are really six degrees of motion, but unfortunately here on Earth, only five can be simulated at any one time – and to do that you need this chair. The five directions are: Forward and Back, along the Y-axis; Left and Right, along the X-axis; Pitch, Roll, and Yaw. The sixth degree is the Z-axis, which more or less is up and down. The 5DF chair rides on a cushion of air rendering the forces we take for granted - inert. As you sit in this suspended chair, the simulator will allow movement in any of the five different directions depending upon your initial push off, simulating the frictionless environment of space. Such free movement allows an astronaut to practice tasks here on the ground that would need to be completed in microgravity once the mission begins.

It's also a fun demonstration of Sir Isaac Newton's Third Law of Motion: *For every action there is an equal and opposite reaction: or the forces of two bodies on each other are always equal and are directed in opposite directions.*

It’s really quite zany to be floating about without much control over where, when and how! The only bad thing about this simulator is the way you’re strapped in. If you’re a guy, it’s really unpleasant as one of the straps is threaded between your legs to prevent the occupant from sliding out when the chair is being moved about. When the instructor pitches the thing down you get quite the wake-up call. Matt was the first of our little group to experience this phenomenon, and received the treatment worse than the rest of the team. We learned from his example and knew exactly what to expect! It was quite funny: when his training piece was over, he hobbled over to Zig and I in pain. Naturally we kid him about it the rest of the day! [That's me there upper left!]

At lunch we received a special and unexpected treat.

Earlier in the week, as part of our lecture circuit here at Space Camp, we attended a speech on Space Food and its applications aboard the Space Shuttle – one that neither Zig or I will ever forget – yes, that’s the one by the “Beef Lady”. (“Is this beef? Noooooooo!”) Nightmares aside, she knew her stuff. Recall there are several classifications for food that is sent into space: Beverages (B) are various rehydratable drinks; Fresh Foods (FF) are foods that spoil quickly so they need to be eaten within the first couple of days of flight to prevent spoilage; Irradiated Meat (I), which is beef steak that is sterilized with ionizing radiation to keep it from spoiling; Intermediate Moisture (IM) type foods which are those that have some moisture in them but not enough to cause immediate spoilage; Natural Form (NF) foods, which are mostly unprocessed forms such as nuts, cookies and granola bars; Rehydratalbe Foods (R), which are foods that have been dehydrated and allowed to rehydrate in hot water prior to consumption; and Thermostabilized (T) foods, that which has been processed with heat to destroy microorganisms and enzymes that may cause spoilage.

Our special treat was getting the opportunity to eat some of the dehydrated (now rehydrated) food that the astronauts get to eat while in flight aboard the Space Shuttle. Complete in original packaging and everything! So with remnants of “is this bacon? Noooooo!” in our thoughts, we chowed down to some very interesting concoctions. Mostly drinks and side dishes but it was all very fun and interesting! Dinner wasn’t as interesting as lunch, unfortunately, but the fun did bleed over into our movie – the last one of the trip – whose title escapes me but the counselors were having a blast with it, literally. While Zig, Matt and I abandoned our “Space Babies” personas, it seems the counselors picked up our silliness.

Every so often the ground would blow up in the film (caused by dynamite explosions) and whenever an explosion occurred a camp counselor would come over the dome's intercom system and bellow out: "Get that Gopher!" And after the largest explosion of all, what do you think he said? "Get that gopher, YEAH!" It made for interesting movie times all around!

Our last and final training took place in an inflatable Planetarium inside the Habitat, atrium level. During that instruction we learned about certain star constellations and other heavenly bodies. The only bad thing about this experience was that the confines of the balloon structure were rather small and it was very hot inside! But we all took turns as instructed.

Then it was time to turn in, so they cut us loose.

* * *

Oh, and of course we had some time to launch off our model rockets! The launch platform is actually on the other side of the Habitat Complex, even on the other side of the Marriott hotel, near the entrance to the Space & Rocket Center campground (where my grandparents are waiting for me in their Winnebago). Most of the entire Camp compliment on Red Week (Sunday through Friday) was out there, launching their rocketry creations. It was chaos, naturally, but as with mostly everything else this week, a lot of fun was had too. Believe it or not there weren't any miss-fires and it seems I didn't have anything to worry about with the parachute either – it performed flawlessly, gently gliding my rocket and its "cricketnaut" payload to the ground safely.

That's one small chirp for a cricket, one giant leap for cricketkind!

And the rocket is re-usable too – just reassemble the pieces and launch again! I've saved mine; I'll put it with the red rocket I acquired from the Rocket Center last year, it'll be great!

Okay, we're about ready to tackle the final pieces of this space station build-out and once it's done, we'll have to sneak it back over to the Team Room over in Hab II, and then go to bed. We're almost there but there's still plenty of work ahead of us – some of the pieces don't want to stay together – so we've got our work cut out for us.

Until tomorrow then...

TO: KGB COMMANDER

FROM: VLADIMIR BORIS

REASON: “Missile Row”

КГ-3

СССР
КОМИТЕТ
ГОСУДАРСТВЕННОЙ БЕЗОПАСНОСТИ
при СОВЕТЕ МИНИСТРОВ СССР

Comrade, you won’t believe. These American’s have their missiles on display right here at the Space & Rocket Center! Inside the museum is an exhibit on the US Army’s contributions to the space-race, but out in Rocket Park, there is an entire missile exhibit to see. It is amazing! I have included in my report of today’s Rocket Park activities a full picture round-up of these missiles for further study. This is more than we could have hoped for! On display, Comrade, are these items:

- ENTAC: A surface-to-surface guided missile of French manufacture used in limited numbers by the US Army. No longer in use, it was effective against tanks, armored vehicles and bunkers.

- SERGEANT: A Field Artillery Ballistic Missile System that is reliable, rugged, accurate, and mobile. It utilizes an internal guidance system and solid propellant motor, giving it immunity to known electronic countermeasures.

- HERCULES: This is the United States' primary high altitude air defense weapon in operational status. The weapon has successfully killed every winged target ever flown against it.

- NIKE AJAX: The USA’s first operational Air Defense Guided Missile System. No longer in service use, the Ajax was replaced by the more advanced Nike Hercules system during the 1960's.

- NIKE ZEUS: The Nike Zeus missile, developed by the US Army Missile Command, played a key role in providing the feasibility of an effective ballistic missile defense.

- HAWK: Hawk can search out and destroy attacking aircraft. The Hawk Air Defense System is transportable and capable of maintaining a high rate of fire.

- SPARTAN: The Army's largest and most powerful missile, the Spartan is a long-range interceptor for the Safeguard Anti-ballistic Missile System. This missile has three solid propellant stages and is capable of operating outside the earth's atmosphere.

- SPRINT: This sleek anti-ballistic missile is a two-stage, short-range interceptor and can reach its target within seconds after launch.

- LANCE: The Lance is a surface-to-surface ballistic missile, which is to provide greater fire support to Army divisions.

- HERMES: The Hermes began in 1945 as an Army project covering a general program of research and development. This technology led to long range surface to surface and high altitude air defense missiles. The Hermes was designed to carry a heavy warhead to a range of 90 nautical miles.

- CORPORAL: The Army Corporal is a surface-to-surface guided liquid fueled missile capable of engaging tactical targets far beyond the range of artillery.

- HONEST JOHN: The Army's Honest John is a simple, free flight rocket. It is a highly mobile self-propelled launcher and retains the accuracy of standard artillery weapons.

- LITTLE JOHN: Little John is one of the Army's most advanced free flight rocket systems. It is highly mobile and packs the explosive power of heavy artillery.

- LACROSSE: The Lacrosse represents one of the Army's first attempts to obtain extreme accuracy with a surface-to-surface guided missile. Launched on a ballistic trajectory from a rear area, it could be picked up in flight by a forward observer and then steered directly to its target with radio-controlled commands.

- PERSHING: The Pershing is a two stage, solid propellant ballistic missile with a selective range capability. It carries a nuclear warhead to a range of 400 miles.

- HOUND DOG: The US Air Force Hound Dog is a supersonic, jet propelled, air surface standoff strategic missile. It is carried in pairs under the wings of B-52 bombers and has a range of 500 miles.

Technology from the Space Race was also on display in the Rocket Park. Various missiles turned rocket such as the V1, V2, Jupiter, Juno, Redstone and Atlas missiles, and also the Saturn IB and V; however, we have specifications on these items and further study not required.

Fotos follow.

END OF REPORT.
#####+&

Day Five – GRADUATION DAY
FRIDAY | JUNE 16, 1989

Man, I'm pooped.

My new friend Andy here is pooped too. I've not had a chance to go see him the last couple of nights, as he was bunked down in Habitat II. Although that shouldn't have been a hindrance, the only time I had to visit was during our nighttime preparation hour and for some reason the counselors frowned upon that.

Maybe they thought I was up to no good.

Tonight, though, we don't have to worry about that. We're done! We're sad it's done but we feel good about it. Talk about an accomplishment, no? And it's two-fold tonight: Andy has been teaching me the game of Cribbage, which I've heard of but never could understand how to play. I too have been teaching him some card games, like Kings-in-the-Corner, Spite-and-Malice and Hand-and-Foot. So we've been keeping ourselves pretty busy with games while his mom and my grandparents talk it up in the Winnie.

We'll be pulling out of here tomorrow morning, heading to Sevierville, Tennessee for the summer. Or, rather, more specifically for Douglas Lake, which is just outside of Sevierville. This is where Matt is from, if you recall; Ziggy is from Knoxville, TN, which isn't that far away! So I hope I get an opportunity to see them again during the summer. We head into Knoxville all the time to browse either East Towne or West Towne Mall, so I'm sure we can arrange a meeting at his house in Knoxville. Or, perhaps, he can come with us to Dollywood, Dolly Parton's theme park in Pigeon Forge, TN. Now that would be fun!

In either case, Andy and his mom will be joining us at Douglass Lake for a night or two, before heading back home to Virginia. So the fun's not quite done yet.

Earlier today...

We all got a little bit of extra rest this morning, as there wasn't much ado about activities. This was welcome, as Farren, Chris, Mark, Clark and I stayed up quite a bit later than we had hoped to get the space station back together. We felt for Jeff, the only member of our room that was also not a member of Martin Marietta (remember, he was on the Lockheed team), and though we tried not to blast him with lights and keep the noise down, he found it a little difficult to sleep.

Sneaking it over to the Team Room in Hab II turned into more an adventure than we thought as well, but in the end we were able to penetrate the enemy camp and deliver our package. By the time we did get up we were immediately instructed to pack up our gear and prepare to disembark not long after graduation commenced.

Graduation was held in the Space Camp cafeteria, located near the Space Camp Training Center, around 10:00am. So, we marched over there for breakfast, ate hurriedly, and then marched back to the Habitat until it was time for Graduation. When the time came we all marched over and were seated on the floor behind our parents and wait the festivities to begin. It was explained to us then what would happen: we would be called up team by team by our counselors, and when "Martin Marietta" was called, we were to stand up as a team, and prepare to walk to the front of the room when our names were called.

At that time we would be handed diplomas for completing Space Camp and Wings! It sounded simple but there was a lot of confusion due in part to all the family members wanting to catch a glimpse of their “little darlings.”

I have to say I was a little nervous around all these people, and a little saddened. The entire week had been a roller coaster of emotion and activity; to have it all end so suddenly - to have a dream fulfilled - was certainly an emotional, yet personal moment. Just then I didn’t have time to search for my grandparents, who were out there in the crowd of family members, somewhere, leaving me to my thoughts (my parents were unable to attend due to previous job commitments, much to their chagrin). Luckily I was roused from them not long after we had quieted down – we were about to get underway.

The ceremony began without much fanfare, but a lot of clapping. I could only watch as various counselors from all the other teams got up, spoke about their groups, called them up and one-by-one they picked up their certificates and wings. There were even a few special guests on hand – from an astronaut or two to just plain administrative folks – who came by to say their piece about the program and the week that had transpired. As I was sitting there (about 30 minutes into the program), I wished nothing more than for them to get on with the show. The lull did, if nothing else, allow me time to silently reflect back on the past week - reliving all the good times and bad that we as a team experienced. One week ago I hadn't known any of the people sitting around me, but now these people were friends. And I had a ton of memories I would cherish forever with my newfound friends.

Only one thing snapped me out of my trip down memory lane, and that was when I caught my first glimpse of Michelle (our counselor) up at the podium ready to give a small speech about her team - our team. Being in the back of the room I had to crane my neck in order to hear her well, and that was not very. She talked about how the team came together in the end, showing teamwork, friendship and leadership, and how we were one of the better groups of kids she had the privilege of tutoring. She then began to call us up one-by-one, highlighting our personal achievements while handing us a certificate, a pair of metal wings, and a group picture (the group picture we took the other day). After shaking hands, we were instructed to sit back down with our teammates and wait.

Once the group certificates were handed out, the ceremony turned once again to speeches as the individual cadet awards for Best Mission, Outstanding Trainee and Best Team were presented. Alas, neither our entire team nor anyone within it would be honored with any of these awards, though I lusted after them all. What a perfect end to a triumphant weekend it would be to take home a specialized award, wouldn’t it?

But it was not to be and in a way I felt disappointed. While I feel we did have our faults, we were pretty much behaved, fun loving, and even pulled together to overcome our problems with the Space Station and the Mission. Regardless, we offered our applause to the winners just the same, if a bit reluctantly on my part.

The ceremony lasted about an hour and when it was done I joined my grandparents in the medley of kids rushing to find their own family members. My grandparents offered their congratulations, as did Andy's mother, whom they found and watched the ceremony with. A few words and nervous kids didn't stop grandparents and parents alike from taking pictures. In fact, my grandparents shot quite a few of the graduation and were not done yet! We lassoed Michelle for a picture and a couple of my teammates before it was all over. And you know it's all over when your next task is to return to the Habitat and gather up all of your belongings.


U.S. SPACE CAMP
HUNTSVILLE, ALA.

AWARDS

Ricky Russo

U.S. SPACE CAMP® WINGS

In recognition of completing the requirements for U.S. SPACE CAMP® involving an intense curriculum in principles of aerospace technology, space exploration , and discovery as applied to this nation's space and rocketry programs, presented this date in Huntsville, Alabama.

June 16, 1989

Deborah Barnhart
Director of
U.S. SPACE CAMP® /ACADEMY™

Edward O. Buckbee
Director
The Space and Rocket Center

I spun up my locker combination for the last time; how ironic that its combination was 11-16-00, the very same dates as my Space Camp session. I then gathered up my belongings and handed off my small Space Camp duffel bag to my grandfather, and took one last look around the room before leaving it for good. HL 3-10 had been my home for a week and while it was a short time, it became something more and I hated to let it all go.

Alas, I parted ways with the room, the Habitat and returned to the museum area where my grandparents and I (with Andy and mom in tow) took a tour of the museum, snapping pictures of the artifacts as we went along. We even took in “The Dream is Alive” Omni-Max movie in the Space Dome, which I enjoyed, even though I had seen it already once that week (and quite a few times at Kennedy Space Center). Following the movie we returned to the cafeteria to get a last bite to eat, and all hell broke loose.

I wanted to take a picture of the cafeteria area (now that it had been set back up), as it was one of the places we had spent quite a bit of time in as cadets, so grabbed my grandmother's camera. I made a quick check of how many pictures we had left and prepared to shoot my shot. When it was done I looked at the total again and became instantly confused. The number didn't advance. All that was displayed was this “S”. So, I turned to my grandmother and asked her: “What does an ‘S’ mean on your camera here?” Disaster, that’s what it meant, but she didn't know that. “Maybe it means start,” I said to her. She took the camera from me and took another picture. It still didn't advance.

Oh no.

We now knew what the 'S' meant -- the film never caught in the camera! This meant all the pictures she had taken of graduation, the museum, of Michelle and I, or anything in between had not taken. Horror and shock was instantaneous - what was she going to tell my mother? If there was any one thing she wanted out of my graduation was a lot of pictures (since she couldn't be there) and now we had none! In the end there wasn’t anything we could do about that – it just happened. To try and make up for the loss we went around the museum again, snapping shots of the exhibits we could remember taking pictures of before and tried to track down Michelle in the Habitat for a picture. She was the only one we were not able to get - she had already gone home! Without knowing her last name, I will probably never be able to get in contact with her again and the picture we never got at graduation would have been my only visual reminder of her. Oh well, it was a simple mistake. I assign blame to no one.

Other events of the day included a trek to the parking lot to get my grandfather’s glasses from his car, and the debacle of me and Andy to get back into the USSRC without having to pay. Getting out of the Museum is an easy affair but it didn’t even dawn on us that we have no proof that we belonged there in order to get back in. Would they let us back in because we were Space Campers? We didn’t know! We had just graduated! Thankfully calm heads prevailed and we formulated a tricky little mission: We decided we'd use our Space Camp ID badges, which we thankfully still had in our pockets, to slip through the guards at the Habitat. We'd be able to re-enter the museum through the back door (out through the team room if necessary) and rejoin our family after a few minute's walk through the Shuttle Park and Training Center.

Now all we needed was some good excuse to get into the Habitat, go from Hab I (my room) to Hab II (Andy's room - and where the exit to the museum grounds were) just in case we got stopped. “What about you forgot something in your dorm?” That was it! We agreed on that, put our badges back on, and began walking toward the Habitat complex. We entered without out much of a problem, found ourselves in the atrium, and turned to walk towards Habitat II. It was then we spotted an adult looking at us so I began the charade that Andy had forgotten something. I began to say, “How could you have forgotten (something)” when he beat me to the punch and said the same thing! (Ack!) Thankfully, the two of us recovered enough to get our acts together, walk through the doors, and be on our way without much notice. [And as a side note, the Habitat was eerily void and creepy. I'd never heard it so quiet before; it almost made be glad I was leaving out the back].

* * *

Thanks to our quick wit, we rejoined our families in no time, who were beginning to worry about us. We recanted our tale, laughed it up and left the Rocket Center shortly thereafter to fetch dinner at a local Pizza Hut. From there, we returned to the Rocket Center Camp Ground (where both my grandparents and Andy's mom were camping) and played Cribbage, cards and other games.

I wish I could say it’s been a quiet night.

Those on Blue Week have been treated to a fire drill it seems, as we heard the alarm buzzing for quite some time over at the Habitat, followed by a number of little heads and bodies marching to the safe zone. And even at the Marriott there’s been quite a stir, something to do with a bed mattress fire, or something similar, but it’s hard to know from here.

Alas we’re off to bed now. I have a feeling as soon as I lay my head down I’m going to fall right to sleep. Finally I can get back to a regular sleep schedule; I’ll be rid of the cold room and thin sheets (though I’ll miss that) and no more rood awakenings every morning (though I’ll miss those too). I’ll even miss Jeff hanging his watch in the fire sprinkler above his bunk (I often wondered what would happen to it if there’d been a fire?) I’ll miss our jokes about Clark and his cow... the countdown and farting liftoffs... the girls next door... Farren falling on his tape deck... and...

Tomorrow plans to be a fun day though too.

In the morning we’re planning to have breakfast together and head over to an antique car show here on the museum grounds, then we’ll shove off towards Douglas Dam, stopping in Sweetwater, Tennessee for a tour of “The Lost Sea”, an underground cavern environment, and if we get to the lake in time, we’ll go out to Dollywood for some rides and shows!

It should be fun!

"A DESIRE TO RETURN?"

Even before the week at Space Camp was over the desire to return was strong, despite the earlier misgivings I had about the experience. I spent most of the summer with my grandparents at Douglas Lake (our normal summer-time escape) in Eastern Tennessee, reliving my experiences through dreams, thoughts, and the limited number of pictures we did manage to take. I was so consumed with Space Camp that every day and night I would traverse my manual, reading the various pages and looking at the information within, hoping to recapture some of that lost magic. It gave me pride knowing that I had taken – for me – a rather bold step and asking Nat, our night-time counselor, whether or not I could use his manual to fill in some of the blanks in mine and thus get the answers to the diagrams, puzzles and various other materials left blank for cadets to ponder over. I was even more moved when he readily agreed, handing over his "teachers edition" whilst putting his hand on my shoulder.

"I like you boy," he said to me then and I swelled with pride and accomplishment.

But the book was only part of my passion; the other came with the T-shirt that the program provided each cadet. Night after night I wore my shirt with pride and thus started what I can only refer to as my "company loyalty" to Martin Marietta. Since I was on the Martin Marietta (now Lockheed Martin) team, I began to research the company whenever I could, to find out what they did – what they made – which eventually turned into a road trip to nearby Oak Ridge, Tennessee to a facility they had there. Of course the public was not allowed inside the building, but I was able to procure a few pictures of the outside, with MARTIN MARIETTA embossed triumphantly above the doorway. Although meaningless, doing this gave me a sort of connection back to Space Camp I would not otherwise had. And as strange as it may sound "company loyalty" continues to this day; when I see Lockheed Martin's name on something, whether it be a building or a television commercial, I silently salute the name in retribution for the experience the company gave me. After all, without a grant from Martin Marietta (and other aerospace and aeronautical companies), Space Camp would not be a reality.

By the end of the summer I returned to my home in Sebring, Florida, entered school, and life went on. A day never went by without something reminding me of the experience, though, and as the school year progressed my parents began to wonder if I wanted to attend Space Camp again. Naturally, I jumped at the chance! There was one caveat: the offer extended to attending a session at the new Florida campus, which had just opened in late 1988 to help with the growing awareness of

Space Camp and to accommodate the large numbers of kids hoping to attend therein. The campus did offer a unique opportunity, one I had a chance to experience for my first Space Camp session, but turned down. Knowing the movie was shot in Huntsville there was no way I wanted to go to Florida for my first Space Camp experience – it would ruin the magic of the movie!

But now that I had experienced Space Camp in Huntsville, would I enjoy it in Florida?

Pre-arrangements to attend a session were made for sometime during Spring Break (March 25-30) or after school (June 10-15), although the decision on which week to go did not have to be made right away. With about a month's time to decide I thought heartily about the adventures I might have there. As one who believes that dreams are the answers to questions we are afraid to ask ourselves directly, it was through a number of nightly escapades that the answers I sought regarding this question came to light: the experiences I felt I would have in Florida were vastly different than those from Alabama, and considering the amount of fun I had in Huntsville, I didn't want to be tainted by the Florida campus experience. Therefore, I decided not to attend a Summer 1990 session at Space Camp Florida.

Dreams weren't the only persuasive elements. Hard facts were too.

For starters the Florida campus at that time did not have a Habitat to house trainees, which I had fallen in love with (cadets were housed at a nearby Howard Johnson's hotel); there was no central Space Center location upon which the program was anchored (Space Camp Florida was not at the time located at the Astronaut Hall of Fame near SpacePort USA, right at the mouth of NASA's Kennedy Space Center, rather at some other nearby facility); and the campus did not seem to have the same number of simulators, training or other equipment to completely immerse a trainee, which would not grant me the excitement I sought.

But my hopes of returning to Space Camp didn't end there.

One of the provisions of not attending Space Camp Florida that summer included the potential of being sent to Space Academy, Level I in Alabama for a session in 1991. That program, I argued, would allow me to further my experiences received in Space Camp and take me to a place I so wanted to be: Huntsville. My parents overwhelmingly agreed to my decision and on November 5, 1990, I was registered (Confirmation #: H124096MR) for Session #24: June 16-21, 1991.

And then I began to wonder... and dream again... how much different would this program be compared to the last? Would I be on the same team? Would I be in the same room? Would I have the same counselors?

It didn't matter: I was going back!

U.S. Space Academy
Session 24
June 16 – 21, 1991

SPACE CAMP MEMORIES

1991 // Space Academy, Session 24

Day Zero – ORIENTATION DAY

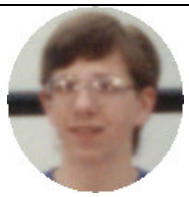
SUNDAY | JUNE 16, 1991

Hi there!

The first day of Space Academy is finally over and I can already tell it's going to be a grueling week – phew! We're scheduled to be up at 6:00am or so and won't hit the sheets again until around 11:00pm – talk about your long days! Tonight is the only exception, our counselors advised us, so we should take heart and get a good night's rest for tomorrow brings it on heavy!

I'm excited to be here, couldn't you tell? This feeling is in such stark contrast to the first night I experienced two years ago at Space Camp, isn't it? Then I was down, uncertain and shy about where I was and what I was doing here, going so far as to complain about having to get up for military-style calisthenics and bed making inspections, or feeling put-out for having to ask to pee during the day, but now I course with excitement. I've been through this before and there's no reason to fret, or get my hackles raised: this is what I came for - this camaraderie, this sense of belonging, this reveling in all things space. I can't wait to get out there and begin our training, to interact with the team!

What an interesting team I've got this year, a collection of guys and girls alike with all sorts of interests. Even in my room there's a wide range of personalities, and sitting here, perched upon my bunk bed as I am, has given me the opportunity to observe my new roommates:

Wim	Michael	Rich	Kevin	Chris L.
				

Across from me is Wim Becker, a very quiet, soft-spoken individual who mainly seems to keep to himself. He seems to have a budding artistic talent (I've seen him take out a drawing pad once or twice) though I know little else beyond his blonde kept hair and fair complexion. Closest to the door is Michael Carter, a brown-haired boy sporting glasses.

Although I loathe portraying him with a face full of acne, the description fits. I could also use words like tall, thin and lanky too. Next to him, above one of the desks was Richard Booker. Rich (as we called him) was from California and has that beach-boy type attitude, look and speech. He appears to be a good person though, pleasant to be around. In the top bunk beside him is Kevin Richardson. Sporting braces he, he seems to be an outgoing person if sometimes disinterested in the goings on around him. And last, but not least, below him is Chris Laystrom, a thick bulky guy from the mid-west somewhere. He's not slow but he talks that way; couple that with his blonde hair and you might understand. He too is enthusiastic about the program, though a little too outgoing: he "dropped trou" a few minutes ago here in the room. Although it's nothing to see such a thing in a locker room setting (not to mention quite expected), here in a room full of people you don't know? Yeah, probably not.

But these are my mates, of HL-308!

The team is different too. I'm on what is called the video team and it seems a good portion of our activities will be filmed onto VHS, edited and given to us at graduation for posterity. Isn't that cool? But more on that later... First, let's get up to date on how I got to here.

THERE AND BACK AGAIN: A BRIEF RECAP... ///

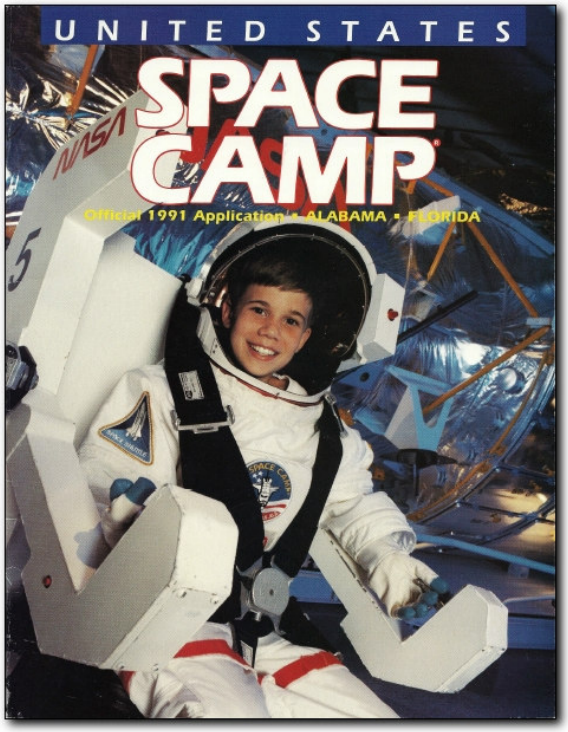
In 1950, when Dr. Werner von Braun arrived in Huntsville, the city boasted a population of only 15,000. More than thirty years later it has been forever forged into the history books as *the* place where America's space program began, where the rockets were developed that put the first US satellites into orbit, that sent men to the moon, and went on to power the Space Shuttle. As Director of the NASA Marshall Space Flight Center, Dr. Braun cultivated the idea to expose young people to science and math using the space program as the focal point of a course of study. If the country had baseball and football camps, why couldn't science have a camp to encourage interest in the space program? In the mid 1970s, he began to work on the Space Camp idea with US Space & Rocket Center Director Ed O'Buckbee, who saw the idea through to fruition in 1982. That first year was much like early space travel, a step into the unknown. But 747 students signed up to find out about the excitement of space exploration in a summer-camp environment. The following year that number rose to 1,400. The next year it was over 2,000. Then 3,000. 5,000. In 1986, with the release of the movie "SpaceCamp", which was filmed on location at U.S. Space Camp in Huntsville, Alabama, attendance shot to over 12,000. The word was now out.

That's how I found out about SpaceCamp, through the movie.

SpaceCamp: The Movie, for the uninitiated, is a thrilling contemporary adventure about a group of teenagers whose summer at a camp for future astronauts turns into an unexpected space shuttle voyage. The film stars Kate Capshaw as Andie, a camp instructor and astronaut who has not yet fulfilled her dream of spaceflight; Lea Thompson as Kathryn, a serious-minded young lady who is determined to become the first female shuttle commander; Tate Donovan as the brash but likable Kevin, who discovers the spirit of team-work; Kelly Preston as Tish, a lady with a photographic memory and a passion for the fashions of Cindi Lauper and Madonna, who proves to be less frivolous than she first appears; Larry B. Scott as Rudy, a young man for whom Space Camp provides the key to self-confidence; Tom Skerritt as Zach, a former astronaut and head of Space Camp; and Leaf Phoenix as Max, a star-struck youngster whose dreams of space adventure come true in a way that exceeds his wildest expectations.

I was hooked. And when I found out that Space Camp was a real place – I had to go! And doing so was a dream come true, but what next?

It took two years for the Space Camp Foundation to conceive, create and put into action a more advanced program for more advanced youth following the Camp's original creation in 1982, but by June 1984, Space Camp Level II (later "Space Academy, Level I") was born. This five-day program open to kids in the 7th, 8th and 9th grades would intensify academic study with an increase focus on Space Shuttle operations. Throughout the week, trainees would use such equipment as the 1/6th Gravity Chair, Multi-Axis Trainer, the Space Station Mobility Trainer, discover weightlessness in the Maneuvering Pod, and use the GMMU to train for satellite docking. Two, two-hour Space Shuttle missions (undertaken in highly accurate simulators) would comprise the use of such mock-ups as the SpaceLab, the Space Station Freedom module, and the Hubble Space Telescope.



And it would take me two years to make the leap from Space Camp to Space Academy, Level I.

ARRIVAL & REGISTRATION ///

After a year and a number of odd weeks and months leading up to our departure date it finally arrived - June 14th, 1991, another Friday. The morning came early. Not that we left early mind you, it just came early because I couldn't stand sleeping one minute longer. And I had quite a number of minutes and hours to wait after hopping out of bed. With my grandparents already off on their own adventure (although I would be seeing them at my Academy graduation), it was up to my parents to ferry me up to Huntsville this year... and that could only take place once my mom got off work, which would not happen until after 5:00pm. So with little to do while waiting except to pack, I busied myself about doing that, putting together the clothes I'd need to wear and other wares I might use during the week. With the list of requirements similar to that from Space Camp (see right), packing was a synch! Just as soon as my mom pulled in the driveway – and not a moment later – we turned round and began the long drive to Huntsville.

√ - Combination Lock
√ - Comb
√ - Shorts (in good taste)
√ - Sleepwear
√ - Shirts
√ - Swimwear
√ - Any needed medication
√ - Wrist Watch
√ - Walking Shoes
√ - Blue Jeans
√ - Toothbrush / Toothpaste
√ - Rain Coat
√ - Soap
√ - Notebook and Pen
√ - Suntan Lotion
√ - Clothes Hangers
√ - Bug Repellant

Our route would be similar to the one my grandparents and I took via Winnebago the last time - follow US 27 through Columbus, Georgia into Phenix City, Alabama then take US 231/431 into Huntsville from there – with a little change: rather than sleeping overnight in Phenix City (parked in a K-mart lot no less), we'd lodge in a hotel in Tallahassee; it was as far as we could get. Although our reservations were messed up at the hotel in Tallahassee (we arrived at the wrong location; who could blame us, it was pouring!), we bunked down for the night. The following morning we rose to a bright sun and prepared for our (okay, I'm too young to drive – but their) long drive up through Georgia and Alabama. And for most of that time I was stuck in the back of my dad's pick-up truck - though enclosed with a topper and carpeted, riding in the bed was still quite uncomfortable and hot even with a couple of sliding screened windows for air (largely ineffective and loud) – for most of the journey, coming out of that shell only once during a stop for lunch. Sleep was again fitful when we arrived in Huntsville.

Registration for Space Academy commenced timely and we were down at the Habitat bright-and-early for it, which was already abuzz with other Space Camp and Academy cadet check-ins. The Habitat seemed to beckon me in some strange way, working on my soul like an aphrodisiac, and I was flushed with excitement – I wanted to be inside!

When I did push through the doorway I let it all wash over me and my thoughts turned to some of the dreams I'd been having: who the counselors might be this time or what room I might be in, hoping it would be in Habitat I. I would know soon enough...

As before, Space Camp registration was held on one end of the Habitat atrium, with Space Academy registration occurring on the opposite end (banners raised high so as to identify them) – and chaotic lines followed both. Thus we piled in the appropriate line, pulling up behind a dozen or more families waiting to check in their "little darlings", and waited. While we waited we got to know those around us and I ended up striking up a conversation with a kid in line just before me. I am not sure where he comes from, but he appears similar in age, height, hair color and all – even freckled-faced! We exchanged names (his: Keith Clement) and discovered we were both there for Space Academy, Level I – we immediately hit it off. In fact, I've just come from a visit to his room to see how his first day was and found that any jitters he may have had have long since gone. He's integrated with his team quite well (oh, wait until you hear which team he's on) so I left him to it – not wanting to butt in. But being back in line we hardly knew each other and talking to him about the adventure ahead (of which I had some experience) made the time go by quickly and before we knew it we were up next.

"Name please?"

As soon as Keith had given her his name the counselor busied herself punching it into her computer. Once she saw he was confirmed, she rifled through a box of envelopes printed beside her, stopped to look at one, then pulled it out, handing it over. The look he gave her as he stared at it was priceless: probably something akin to the look I gave the registration counselor upon my first visit here: uuuuuh, what does all this mean? His card read "MART – 307" and since he didn't comprehend the abbreviations I stepped in and told him the MART stood for "Martin Marietta and you're in room 307 here in Habitat I, on the third floor, on the right-hand side." Then I looked down at the lady for confirmation – "Right?" She just stared back at me and nodded. I had to add I came to Camp two years ago so I was pretty familiar with the jargon, just to get her to move on.

Then she asked for my name; I gave it. She went through the exact same process and pulled out my card. I grabbed it up and immediately took a gander at the team name - the most important bit in my opinion because, really, I had a wish and I hoped it would be granted – and sighed. It was not Martin Marietta; BDM would be my team for Space Academy.

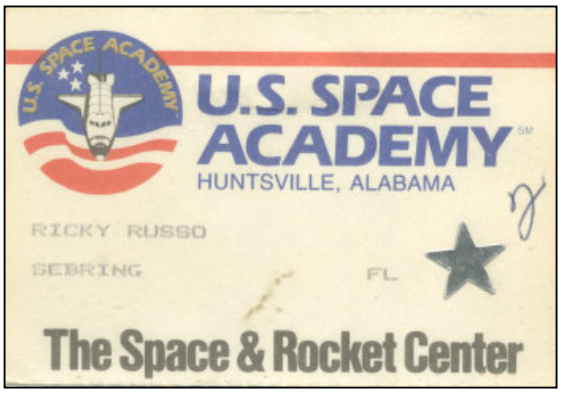
(BDM is short for BDM International, an aerospace systems and technical services company founded in 1959. The B, D and M actually stand for the names of the three gentlemen who established the company: Dr. Joseph V. Braddock, Dr. Bernard J. Dunn, and Dr. Daniel F. McDonald.) My assigned room was “308” and that was that – dream shattered; my new friend Keith would live it for me. But while I also didn’t get the second dream granted – being in the same room as Camp – room 308 is right next-door, it’s hard to beat that! With the room and team assignments out of the way, Keith and I grabbed up our linens and went up the stairs to our respective rooms. I turned left once we reached the third floor and Keith turned right. He was right across from me!

I walked into the room expecting a certain amount of hustle and bustle, but I was greeted with nothing but silence instead; I appeared to be the first one in the room. And though this was not HL 3-10 it was its sister: it was laid out exactly the same! So I chose the same bunk as I had in 1989, even knowing the trouble I’d have later making it every day, just to continue the magic. I even made sure I used the same locker and position I had (matching the number above the bunk to that embossed on the locker’s door, not that it really mattered much). Once settled in, my parents bit me farewell, as they unfortunately had to make the trek back home for the start of the workweek, so I returned to the atrium looking for something to do.

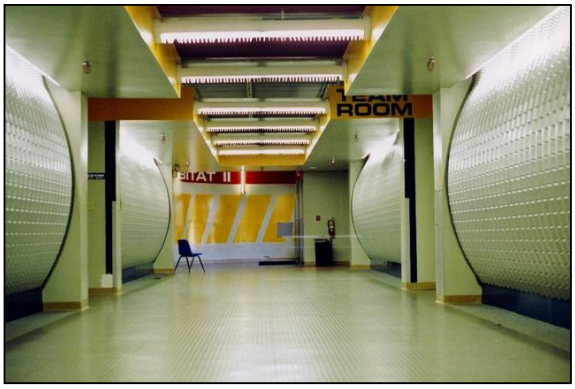
Keith, on the other hand, was in the process of buying a flight suit when I happened upon him again and we picked up where we left off. His parents dropped him off at Camp as well, so he understood the need to have someone to talk to. Of the various things boys talk about (um, girls?), we also wondered what Space Academy would be like. I referenced my past Space Camp experiences, giving him a day-by-day blow of the adventures, and mis-adventures, I had then and he seemed quite excited about the whole prospect (not that he wasn’t before), but he wasn’t too sure about his team though. It seemed to lift his spirits when I told him he was “a lucky dog” for getting on Martin Marietta; having someone else covet what you have has that effect on people, not that it helped me any.

With the purchase of his flight suit in tow, he and I returned to his room so he could stow it until it was needed. Upon entering I was taken aback: I found his room to be quite a bit... different from mine! Though the basic layout was the same it was... flipped or reversed from rooms on the other side of the Habitat, although I'm not quite sure what I had expected; a reversed design made perfect sense. The colors here were also unusual – those in my room were blue while his were red, which made the demeanor of the room look dark and harsh... and awkward! Not nearly as inviting as the bright, open and airy look of my room, which is odd because they're exactly the same dimensions.

Our free time ended when the registration process came to a close around 2:00pm. Our next task, which we had no choice but to accept, was to assemble with the rest of our newly appointed team members down in the Habitat's atrium to mingle and meet them, get to know one another (and the grounds) by taking a tour of our surroundings, and pick up a few more odds and ends we'd need for the week's activities. I met three of my teammates right away and I feel we might become good friends in the same vain as Zig and Matt from Camp – guy to... you know... pal around with. They are: Chris Cole, a short skinny brown-haired kid with glasses from Indiana (who has quite the sharp intellect); Chip Connelly, a stockier (and silly) brown-haired kid from Georgia; and Hans Sheithower, a mousey freckled-faced red-head from Minnesota who could talk a mile a minute (and is feisty despite his size). None of them were assigned to my room, though (I know because I asked!), but we began to talk amongst ourselves anyway, breaking the proverbial ice.



Eventually we were interrupted by a counselor who came by to write either a "1" or "2" on our name badges (which I frowned at – why mark up the front of my badge?) and soon enough we discovered these were tour assignments; I was handed tour #2 while my newfound friends were scheduled for tour #1. It didn't matter to me – I went with them anyhow! The tour of the facilities was generic and contained highlights of the Habitat structure, such as: where the bathrooms and showers were located (and, of course, which ones forbidden to use based on your gender), where to meet your team every morning, where to get "Shuttle Bucks" (a new kind of certificate for cash program going on here, which is supposed to help with trainee theft) and where to put your linens at the end of the week.

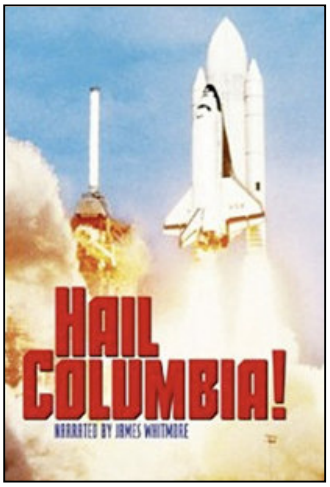


Then we shuffled out through Habitat II and were advised about the Team Room ("Challenger" Room now) and what kind of activities we might hold here. Next it was out back into a new section – portable row – where we were each handed our Space Academy logo T-Shirts, a baseball cap, and our Academy log books. We met our counselors not long thereafter – Leigh Ann Thompson (Day Counselor) and Vince Autry (Night Counselor) – and were lectured at large about the rules at Camp, the USSRC and what adventures awaited us.

Both counselors are pretty cool, easy going and down to earth. Vince (our night-time counselor) appears to be the more mellow of the two, though, and he's quite the ham. But I guess when you like what you do it's hard not to show it! He also was kind enough to warn some of us about a fire drill that would probably happen some night during the week. The purpose of the drill, of course, is to practice the emergency egress plans posted on the insides of everyone's door, although sometimes trainees get more than they bargained for. Vince then relayed a story about a previous team he counseled, how when everyone left the Habitat most were sprayed by startled skunks and no matter how many times they washed, those poor cadets stunk of skunk the rest of the week!

Dinner and a movie followed – "Hail, Columbia" – a favorite.

HAIL, COLUMBIA! ///



Board the mighty shuttle Columbia for its maiden voyage. Experience one of humankind's crowning achievements: the inaugural voyage of the world's first space shuttle. "Hail Columbia!" goes behind the scenes with astronauts John Young and Robert Crippen as they prepare for their historic launch. Feel the thunderous liftoff and our heroes' awe as Columbia achieves orbit for the first time. Join the celebrations as the shuttle triumphantly touches down, mission accomplished.

The first launch of the Space Shuttle occurred on 12 April 1981, exactly 20 years after the first manned space flight, when the orbiter Columbia, with two crew members, astronauts John W. Young, commander, and Robert L. Crippen, pilot, lifted off from Pad A, Launch Complex 39, at the Kennedy Space Center. This was the first of 24 launches from Pad A. The launch took place at precisely 7 a.m. EST. A launch attempt two days earlier was scrubbed because of a timing problem in one of Columbia's general-purpose computers.

Not only was this the first launch of the Space Shuttle, but it marked the first time that solid-fuel rockets were used for a NASA manned launch (although all of the Mercury and Apollo astronauts had relied on a solid-fuel motor in their escape towers.) STS-1 was also the first U.S. manned space vehicle launched without an unmanned powered test flight. The STS-1 orbiter, Columbia, also holds the record for the amount of time spent in the Orbiter Processing Facility (OPF) before launch – 610 days, the time needed for the replacement of many of its heat shield tiles.

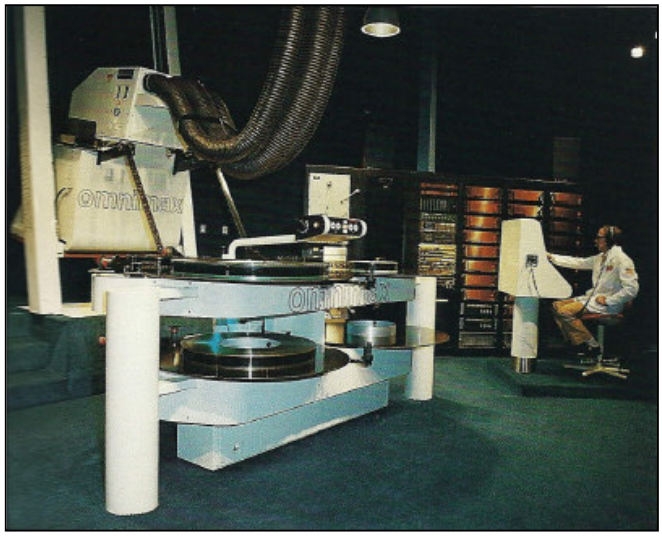
The primary mission objectives of the maiden flight were to perform a general check out of the Space Shuttle system, accomplish a safe ascent into orbit and to return to Earth for a safe landing. The only payload carried on the mission was a Development Flight Instrumentation (DFI) package, which contained sensors and measuring devices to record the orbiter's performance and the stresses that occurred during launch, ascent, orbital flight, descent and landing. All of these objectives were met successfully, and the orbiter's space-worthiness was verified.

During flight day 2, the astronauts received a phone call from Vice President George H. W. Bush. President Ronald Reagan originally intended to visit the Mission Control Center during the mission, but at the time was still recovering from an assassination attempt which had taken place two weeks before the launch. Columbia reached an orbital altitude of 166 nautical miles (307 km). The 37-orbit, 1,074,567-mile (1,729,348 km)-long flight lasted 2 days, 6 hours, 20 minutes and 53 seconds. Landing occurred on Runway 23 at Edwards Air Force Base, California, at 10:21 am PST, 14 April 1981. Columbia was returned to Kennedy Space Center from California on 28 April atop the Shuttle Carrier Aircraft.

And it was all captured in glorious IMAX.

IMAX movies here at the USSRC are shown in the SpaceDome OMNIMAX theater, a 67-foot hemispherical screen that provides viewers with breathtaking panoramas of space as experienced by shuttle astronauts, or various other scenes so when you sit back in your seat, the action explodes all around you. (Seated just outside the projection booth's windows for a few minutes tonight, where we were supposed to be filling in the blanks about the Pathfinder in our Academy manuals, gave us quite the view of it. You can peer down and into the inner workings of the OMNIMAX camera and film set up – it's huge!)

IMAX increases the resolution of the image by using a much larger film frame. To achieve this, 65 mm film stock passes horizontally through the cameras. Traditional cameras pass film vertically. 65 mm film has an image area that is 48.5 × 22.1 mm (1.91 × 0.87 in), in IMAX the image is 69.6 × 48.5 mm (2.74 × 1.91 in) tall. In order to match standard film speed of 24 frames per second, three times the length of film moves through the camera.



IMAX uses "ESTAR" (Kodak's trade name for PET film) base. The reason is for precision more than strength. Developing chemicals do not change the size or shape of ESTAR, and IMAX's pin registration (especially the cam mechanism) does not tolerate either sprocket-hole or film-thickness variations. The IMAX format is generically called "15/70" film, the name referring to the 15 sprocket holes per frame. The film's bulk requires platters rather than conventional film reels. IMAX platters range from 1.2 to 1.83 meters (3.9 to 6.0 ft) diameter to accommodate 1 to 2.75 hours of film. Platters with a 2.5 hour feature film weigh 250 kilograms (550 lb). An IMAX projector weighs up to 1.8 t (2.0 short tons) and is over 178 cm (70 in) tall and 195 cm (77 in) long.

But back to the movie...

STS-1 was the first test flight of what was at the time the most complex spacecraft ever built. There were numerous problems – 'anomalies' in NASA parlance – on the flight, as many systems could not be adequately tested on the ground or independently. Some of the most significant are listed below:

- A tile next to the right-hand External Tank (ET) door on the underside of the shuttle was incorrectly installed, leading to excessive re-entry heating and the melting of part of the ET door latch.

- The astronauts' on-orbit visual inspection showed significant damage to the thermal protection tiles on the OMS/RCS pods at the orbiter's aft end.

- John Young reported that two tiles on the nose looked like someone had taken 'big bites out of them'. Post-flight inspection of Columbia's heat shield revealed that an overpressure wave from the Solid Rocket Booster (SRB)'s ignition had resulted in the loss of 16 tiles and damage to 148 others.

- The same overpressure wave pushed the body flap below the main engines at the rear of the shuttle well past the point where damage to the hydraulic system would be expected, which would have made a safe re-entry impossible. The crew was unaware of this until after the flight. John Young reportedly said that if they had been aware of the potential damage at the time, they would have flown the shuttle up to a safe altitude and ejected, causing Columbia to have been lost on the first flight.

- Bob Crippen reported that, throughout the first stage of the launch up to SRB separation, he saw 'white stuff' coming off the External Tank and splattering the windows, which was probably the white paint covering the ET's thermal foam.

- Columbia's aerodynamics at high Mach numbers were found to differ significantly in some respects from those estimated in pre-flight testing. A mis-prediction of the location of the center of pressure (due to using an ideal gas model instead of a real gas model) caused the computer to extend the body flap by sixteen degrees rather than the expected eight or nine, and side-slip during the first bank reversal maneuver was twice as high as predicted.

Despite these problems, STS-1 was a successful test, and in most respects Columbia came through with flying colors. After some modifications to the shuttle and to the launch and re-entry procedures, Columbia would fly the next four Shuttle missions. Hooray!

* * *

And sadly that's about it, really. There's not much for me to do with the extra time, though, except sit here and observe my roommates. But what interesting ones they are; it's definitely going to be an interesting week! I can't help but feel a little sadness though, of the fact I won't be here with Clark, Farren, Jeff, Chris and, yes, even Mark. Nor will I run into Zig and Matt when we re-assemble the team in the morning. Nor will there be any more faux reports from Vladimir Boris to some un-named Soviet organization, which might not exist for much longer by the way. The Berlin Wall came crashing down just after my time at Camp (late 1989), which perpetuated a number of changes in Gorbachev's government – it (meaning the Soviet Union) might not last the rest of the year.

How times change, no?

Already we see those changes here in America. For the first time Russian Space Agency artifacts are on display at the USSRC – and we'll get to see them starting tomorrow! We've also have a slew of other activities planned, such as: a lecture on the Space Shuttle's systems (from an operational stand-point), begin rehearsing the scripts of our missions (which means we'll be getting our crew assignments too tomorrow – Commander, please!), begin building our model rockets, and hit the Training Center Floor for a ride in the 1/6th Gravity Chair, the 5DF Chair and more!

Can't wait!

SPACE CAMP MEMORIES

1991 // Space Academy, Session 24

Day One – SHUTTLE OPERATIONS DAY

MONDAY | JUNE 17, 1991

It's been a great first (or is that second?) day! We've done quite a bit today, from attending lectures about Space Shuttle Operations, getting our mission assignments, practicing our first mission, designing our mission patches and hitting the training center floor. It's been so fun I can't wait for the rest of the week to unfold. Such a stark contrast from the first day I was here isn't it? Then again maybe not... by this day last time I was flying pretty high too. But it's good to be back, I tell you; everything is right where I left it.

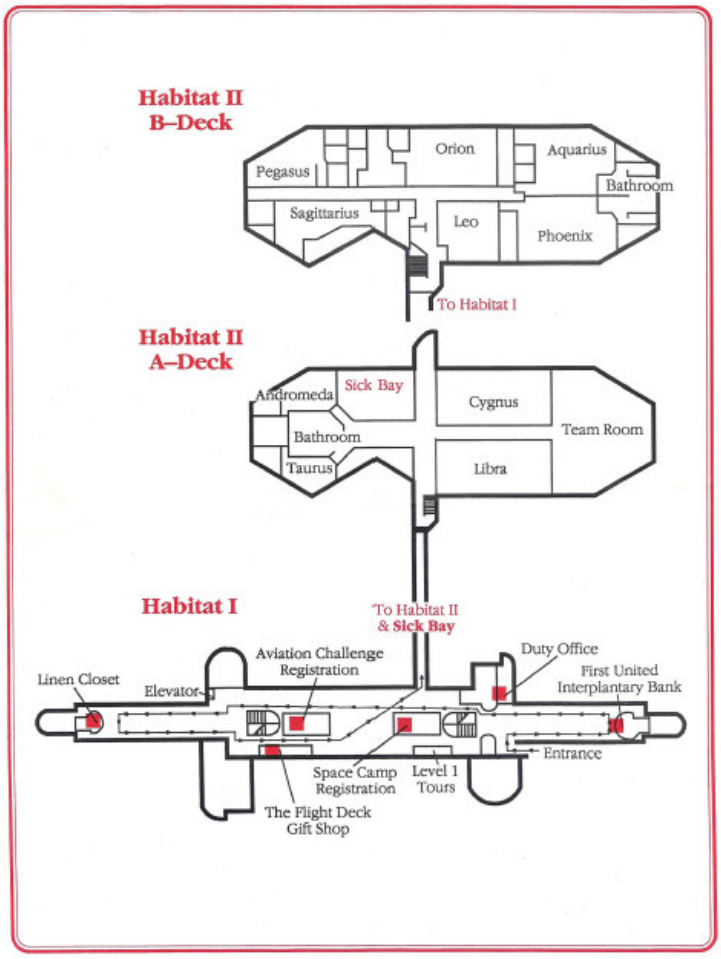
The Habitat Complex we're all bunked down in (Habitat I) remains a simulated Space Station environment, built to house up to 800 Space Camp and Space Academy trainees during these week-long adventures. This unique structure, an addition to the Space & Rocket Center grounds the last time I was at Camp, features individual compartments for six persons with built-in sleep stations, computer work areas and storage compartments (lockers). Habitat I has a towering four floors, which opens up to a central atrium that is used for registration and various assemblies throughout the week. Down in the atrium is where our registration was yesterday.

Designers incorporated many aerospace concepts in this four million, 328-foot Space Habitat. For example, it has hatches for doors; ports instead of windows; and benches instead of chairs (which, of course, would float in space. These items extend the atmosphere of living and working in a weightless environment, which I totally love. Structurally, the Habitat's exterior is comprised of over 45 curved metal panels, which give the building its cylindrical appearance. The "tubes" of the Habitat are longer than a football field and are divided up into 66 bays, which are our rooms.

Ten corporations, each of which contributed at least $100,000 toward construction of the $3.65 million Habitat I building, receive special recognition. At least one section of the habitat is named for them: Lockheed, Wyle Laboratories, Rockwell International, The Coca-Cola Co., Teledyne Brown Engineering, Morton Thiokol, Grumman, The BDM Co., Boeing and Martin Marietta.

Original	Became
Bathroom	Waste Management
Heating and Air	Life Support System
Maintenance Room	Enviro Control
Window	Earth Study
Elevator	Transport
Water Fountain	H20 Dispenser
Emergency Exit Plan	Emergency Egress
Hospital	Sick Bay
Snack Room	Galley
Room	Bays

Alas there was little change; many of the zany monikers still remain:



One change I've noticed is the designations for the rooms are slightly different. Instead of HL 3-10, rooms are now plainly referred to as just 310 or in my case 308. (The view below is actually a shot taken right outside of my habitat door. Across the way is the "Odd" side of the Habitat with room 307 - Keith's room - on the left hand side of the floating astronaut - under his feet). The Earth Habitat, or Habitat II also saw a little change. Sick Bay was still called Sick Bay but the room designations here changed as well. In 1989, the open bay rooms were called Blue Bay, Red Bay, Green Bay, Purple Bay, Orange Bay, Yellow Bay, and other colors of the spectrum. Now it seems the names have evolved from colors to the names of star constellations. The bays are now designated Pegasus, Sagittarius, Orion, Leo, Cygnus, Libra, and Andromeda to name a few.

But it all still feels the same – and that's good!

And, oh yes, the boys were not allowed to traverse the fourth floor this year. A fact that hadn't really caused alarm to anyone because they didn't know about past rules (we were allowed to visit that floor in Camp. In fact, I had just to see what was up there) Since the girls are all housed on the 4th floor again, if they catch any of us up there we will be immediately expelled from the Academy with no refunds!

"WHAT'S YOUR CHEER?" ///

As a trainee who had previously been to Camp this was all old-hat to me. Last night I warned everyone about the rude awakenings they give here every morning... you should have seen the looks of disbelief. Ha!

"Around 6:00am," I began to tell them, "the bangs will begin down the hall and – if you don't hear it coming - we'll be rudely awakened by the ominous sound of our hatch (door) being flung open with such a force it'll slam into the side of the habitat wall – BANG! It will be so bad," I continued, "you'll jump right out of your bunk and if you're not the counselors have wily ways of making you wake up – they'll just turn on the lights and yell: 'okay guys, it's time to get up!'

When the lights went out no one believed me and thus no one was prepared for the rude awakening... but me! (I was already awake when they came). My teammates were so jolted they didn't know what had hit them. The hatch door burst open – BOOM! – and the lights blazed brightly – FLASH! - and our counselor's voice thundered loudly – ROAR! "Okay guys, it's time to get up!" - Now it was their turn to look like deer in headlights. My teammates were so jolted they didn't know what had hit them. I, on the other hand, just sat there and laughed.

And thus began our morning routine – showers, dressing, grooming and preparing. Of course, the counselors could be pains in other ways too. Not only did they wake you rudely, they also held morning inspections of your room to make sure they were tidy. This first morning we would receive our first taste of this "military style" treatment. We weren't allowed to join our teammates in the central atrium until our rooms had been inspected - to make sure our beds were made correctly and the room was neat and tidy. If the room was found unsatisfactory we'd have to go back in there and fix whatever was wrong (they wouldn't tell us) and we'd have to get it re-inspected.

And would you believe it they had to do this to us our first day! The beds were fine and nothing was in disarray - I think they just wanted to call us in for embarrassment and to make their point. But I didn't let it ruin my day... I'd already been through this before and I loved every minute of it.

After our morning wake up call, showers, and inspection, we were allowed to meet with the rest of our team down in the atrium. There, much like at Camp, we were expected to assemble and call off. Basically, this was a role call - to make sure everyone was present. We were assigned a number and we'd have to assemble according to that number. When our counselor called out for us, we'd have to call off that number to let him/her know we were there.

After this numerical countdown, there was a slogan to present that would represent the spirit of the team. And each team had to come up with something similar. We were all assigned this duty last night – to come up with such a saying – but we were all stumped. "What's your cheer?" they'd ask us and we did not know. So Vince, our evening and morning counselor (pictured right) came up with ours on the spot; a simple, yet powerful ending to our count-back: "BDM... Hoooogh!" It wasn't immediately liked – perhaps because it was just too generic (like a Navy or Marine call) but we decided to go with it until we could come up with something ourselves.

Though truth be told I don't think we're going to change it... we've been using it all day and nobody has come up with anything else. Consequently, TRW came up with "TRW Let's Rock the House!", and then they proceeded with their count back, and finished with "TRW we just do it!" The only other cheer I remember is Martin Marietta's, which was "Nobody does it better like Martin Marietta!" After count backs were over, PT would begin. And all this before our 7:00am breakfast!

"HOW MANY POUNDS OF THRUST...?" ///

"How many pounds of thrust does the Shuttle produce at liftoff?"

Six million nine hundred eighty-one thousand four hundred.

That's what Tish Ambrosé recalled after being asked the same question from one of her fellow teammates in SpaceCamp: The Movie. How in the world did she know all that? Well, besides remembering everything she reads, she also studied hard while at Space Academy; this level of Camp isn't just playtime – we're here to learn! And they don't call this day Space Shuttle Operations Day for nothing. Today we had multiple lectures on Shuttle Operations, from the components that make up the launch system to how they all integrate systemically and all points in between. If you weren't familiar with how the Space Shuttle worked before today, you certainly are now!

Following the lecture we broke to receive our crew assignments, which were simply handed out based on a questionnaire about our basic interests, our studies at school and the classes we liked (and disliked) the most. It was a harrowing if unscientific way of handing out the assignments but I guess I made out okay. For our first mission – Atlantis – I will be on the Space Station as a Station Specialist (I'm a little bummed about this because I really want to climb into the Atlantis simulator; it's the one they used during the filming of SpaceCamp: The Movie and its one of the most complete and life-like of all the simulators) but I'll also be performing an EVA outside the station on the Hubble Space Telescope mock-up they have here on the floor – all while sitting in a 5DF Chair (so this should be interesting). For the second mission – Discovery – I will be in the Shuttle cockpit as... wait for it... the Shuttle Commander!!! HOORAY!! Although I won't get the opportunity to see the Atlantis cockpit at least I didn't draw Mission Control duty again (which I did for our mission at Space Camp), so I'm about as happy as I can be with that.

I could barely contain my enthusiasm for our mission rehearsal that immediately followed – yeah, things happen quickly around here. We had to get acquainted with the Space Station module, the Atlantis simulator (for those lucky buggers) and those in Mission Control (which for Space Academy is not on the Training Center Floor). A counselor took us through the ropes and we all nodded as if we knew what to expect – will we? We'll have to wait a couple more days: our missions are scheduled for Wednesday evening and Thursday morning!

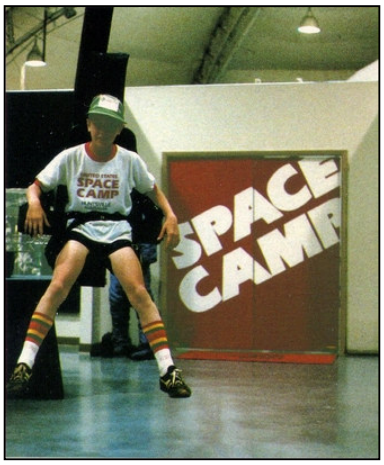
But we didn't have to wait long to begin training...

"DON'T PUSH OFF...!" ///

"The cushions of air the zero gravity chair rides on helps you simulate the weightlessness you'd experience during EVA, that's Extra Vehicular Activity. That's the work you'd be doing outside the Shuttle. To work in space you have to know how to move in it. Don't push off, Tish. Nothing will stop you unless you're acted on by an outside force!"

That's the GMMU and it was one of three simulators we used throughout the afternoon following the lecture and mission rehearsal on the Training Center Floor, or TCF as we call it here. The Training Center and adjoining cafeteria are more recent editions – added in 1988 as an expansion to the Space Camp program. This relatively new facility has its equipment laid out similar in style to that used by real astronauts, such as John Young, Sally Ride, Joe Allen and Kathy Sullivan during their astronaut training. The Training Center was completed at a cost of $4.5 million dollars we're told, to duplicate the functions of equipment and training at the astronaut-training center at NASA-Houston. This facility contains some 70,000 square feet, some five times larger than the area previously devoted to Space Camp activities.

It’s one of the most awesome places to be at Camp; today we hit the floor to partake in not only the GMMU exercises (that’s Grounded Manned Maneuvering Unit), but also the 5DF Chair (Five Degrees of Freedom) and 1/6th Gravity Chair (usually referred to as the Moonwalk trainer for reasons that’ll become clear in a moment).



The 1/6th Gravity Chair is modeled after one the Apollo astronauts used for moon walk training, as it is designed to simulate the Moon’s gravitational pull, about 1/6th that of the Earths. For example, a person who weighs 150 pounds on Earth would weigh 25 pounds on the Moon. Hence the chair gives trainees a realistic feeling of walking in the reduced gravity of the moon. The apparatus is suspended on a long bungee like cord; upon sitting in the chair your weight is balanced against the tension in the cord. Once properly balanced you’re set off on your task. If you step too hard, you'll end up in the ceiling, so for the most part the counselors keep a hold of you. Once strapped in you're asked to do a variety of things. First it's a side-to-side walk, then a bunny hop, and on to whatever other steps you think might propel you across the floor (like a slow motion jog). After about three or four walks around you're done!

Leigh-Ann, our day-time counselor, was amazed that I was doing her bunny hops, twists and turns, and the various other things she asked us to perform well when most of the other trainees had a tough time with it. Of course I had a secret, which I quickly let her in on: I’d been here before! And it was basically the same maneuvers now as it was then. She agreed with me and thereafter we seemed to get along much better. We talked quite a bit the rest of the day during certain activities and I got out of doing the really dumb "first Camp" type of things today. It's nice to do get in with the counselor; this way you can goof off and you won't get punished that much - Hee, hee, hee!

We also took a trip on the 5DF Chair/GMMU.

As most physicists know, there are really six degrees of motion, but unfortunately here on Earth, only five can be simulated at any one time – and to do that you need this chair. The five directions are: Forward and Back, along the Y-axis; Left and Right, along the X-axis; Pitch, Roll, and Yaw. The sixth degree is the Z-axis, which more or less is up and down. The 5DF chair rides on a cushion of air rendering the forces we take for granted - inert. As you sit in this suspended chair, the simulator will allow movement in any of the five different directions depending upon your initial push off, simulating the frictionless environment of space.

Such free movement allows an astronaut to practice tasks here on the ground that would need to be completed in microgravity once the mission begins. It's also a fun demonstration of Sir Isaac Newton's Third Law of Motion: *For every action there is an equal and opposite reaction: or the forces of two bodies on each other are always equal and are directed in opposite directions.*

It's really quite zany to be floating about without much control over where, when and how! The only bad thing about this simulator is the way you're strapped in. If you're a guy, it's really unpleasant as one of the straps is threaded between your legs to prevent the occupant from sliding out when the chair is being moved about. When the instructor pitches the thing down you get quite the wake-up call. I said as much to my male teammates before the activity began, recalling the wake-up call Matt received last time I was through here. Having learned from my words (and having this morning's wake-up call still fresh in my roommate's minds at least), some of them listened to me and saved themselves from a great amount of pain and embarrassment.

That won me some more friends today for sure!

Much of the rest of the day was spent watching our teammates jump, hop, step, tumble and rock and roll in these simulators, which was quite a bit of fun; dinner was at 6:00pm and we assembled for our movie after: "The Dream is Alive". Released in 1985 and narrated by Walter Cronkite (of CBS News fame), it's all about NASA's Space Shuttle program and its one of my most favorite IMAX films. The movie includes scenes from numerous shuttle missions, beginning with footage of a de-orbiting Discovery (STS-51-A; the mission where astronaut Dale Gardner holds up a "For Sale" sign, referring to the Palapa B-2 and Westar 6 satellites that it captured) on its approach to Cape Canaveral, complete with sonic boom.

Mission STS-41-C, the 11th for the shuttle program and the fifth for Challenger is featured most heavily, beginning with the deployment of the Long Duration Exposure Facility (LDEF) satellite. The capture and repair of the Solar Max satellite also receives a great deal of coverage, including a detailed overview of training for the mission in the Underwater Astronaut Training tank, a large pool at NASA. This particular mission is of interest, as the first attempt at capturing the satellite failed, and a second attempt almost 12 hours later had to be made. That portion of the mission was a success, with the satellite being brought to the payload bay on the next attempt, and was repaired quickly by astronauts James van Hoften and George Nelson.

Additional STS 41-C mission activities included a student experiment located in a mid-deck locker to determine how honeybees make honeycomb cells in a micro-gravity environment. Other shuttle missions are interspersed during the feature with the STS-41-C footage. Highlights include:

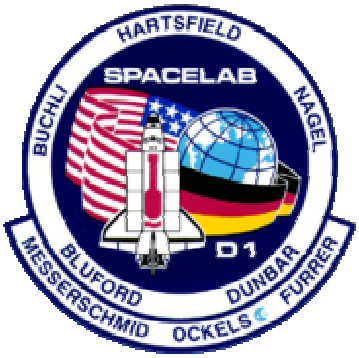
- The first launch of Discovery (STS-41-D), with footage of liftoff, the deployment of two of the three satellites on this mission, and special attention given to the novelty of the experimental OAST-1 solar array, which we hope will be used in the upcoming Space Station Freedom concept. Footage is also shown of Discovery's landing and transport from its landing site at Edwards Air Force Base to Kennedy Space Center on the back of the Shuttle Carrier Aircraft.

- The sixth flight of Challenger (STS-41-G), notable as the largest crew aboard the shuttle, the first time two women flew together on the shuttle, and the first space-walk by an American woman, Kathy Sullivan.

- Additionally, a small amount of time is also dedicated to other aspects of the shuttle program, including: other crew that work on the shuttle; the work of inspecting and replacing the shuttle's heat tiles; training the astronauts must complete to prepare for missions; what the astronauts eat on space-flights; and how astronauts would bail out if an emergency occurred on the launch pad (the stomach wrenching part!)

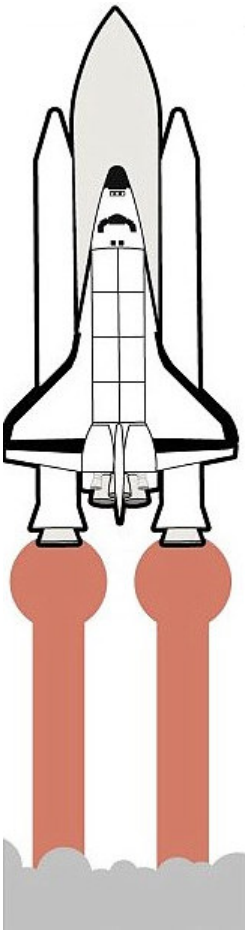
And then it came time to draw the patch...

"I CAME TO DRAW THE PATCH!" ///



... said one of the counselors as he told us a story tonight just before winding up our day about our task to draw a team patch for our upcoming Shuttle missions. The entire Space Academy trainee group was called into one of the huge lecture halls and we sat in anticipation, wondering what in the world the counselors were talking about. The story goes that one week a young man came to Space Academy with paper and pencil in hand, with just one thought on his mind: he came to draw the patch. Everywhere this trainee went he thought of nothing else than of drawing his teams' mission patch. It was his purpose in life - his destiny. And so he did and his life at Space Academy was complete!

Now, while this story is false, the task behind it was quite true. We were expected to draw a mission patch for our team – one for both missions. The patch would be a representation of our team spirit, the hard work and dedication we put in to make the upcoming missions successful and see if we couldn't work together as a team. The only guidelines provided were these: while the patch could take on any shape, a portrait of the Space Shuttle and all the names of the team had to be on it. The patch also had to be creative because not only were we competing within our own team, but with the other teams that week as well. And those teams with the best patches would win a special award at the end of the week.



In order to complete the mission successfully we'd have to pull together as a team and decide who amongst us would draw the patch, and what design that person would draw. I wasn't all that pleased leaving the meeting... would it become Space Camp's "Operation: Space Station" all over again?

So with that little bit of incentive the meeting broke and we were set off amongst our teams to figure a way to fulfill this new, first mission. Now, I can draw a little bit, but not very well so I knew this was not a task I could undertake so I deferred to those around me and believe it or not, the group picked up on this challenge quite well and went about it without any bickering! We decided that there would be two patches drawn: one for the Discovery mission and one for the Atlantis mission and the best patch design would then be redrawn into the entire team patch! One of the two souls slated to draw the patch was none other than Wim Becker, my roommate. His talents with the pencil were virtually unmatched within our team and for the next hour or so, he was seen with pencil to paper.

His concept was a beautiful rendition of the Space Shuttle in orbit around a planetary body (Earth) with all our names in a ring around the design, similar in style to official Space Shuttle patches from NASA. By the end of the exercise his was the one we voted for as a team; it would forever represent us. Would it be good enough to beat the other 16 teams? That will be determined Friday at Graduation.

* * *

So, yes, we've had a very full and fantastic day of activities here at Space Academy. I'm so happy I chose to come to this next level in Camp rather than go to Space Camp Florida last year – this is definitely going to be so much more fun! Two missions - upon one of which I get to assume the role of Commander – and a plethora of new simulators to try, such as: the Space Station Mobility Trainer (SSMT), using the GMMU to perform a Satellite Docking Maneuver, the Maneuvering Pod (a cylindrical apparatus outside the museum doors in the Rocket Park; I hear you get in a circular pod and then are shot up through the tube – way cool!), and of course the Multi Axis Trainer (I've been waiting to ride this one for years!), and more!

We're also bound fo—

--sorry, a counselor came in the room wondering why we were all still in here, as if there was some other place we were supposed to be?

"Yeah, uh, we just had a fire drill... you were supposed to be outside with your team."
"Oh, should we go now then?"

Hahahaha, it's too late. The drill has just ended and everyone is starting to file back into the Habitat. I don't recall hearing any kind of announcement, an alarm or other kind of notification, do you? OOPS! Oh well, we're no worse for wear. If there is an emergency we've got an "EMERGENCY EGRESS" placard right on our door that we can follow.

Alas, where was I...

Yes, so, tomorrow we're scheduled to take a tour of the Marshall Spaceflight Center (MSFC), which I assume will be very similar to the trip we took as "little darlings" at Camp. Time has also been set aside for us to practice Mission #2, which is the Discovery mission – my mission as Commander – so that'll be fun. And who knows what else!

Day Two – MISSION EXPERIMENTS DAY
TUESDAY | JUNE 18, 1991

"Foul! Foul! Get'em Vince!"

It's late here, evening, and you'll find a group of us on the outside of Habitat II playing a pick-up game of hoops on Space Camp's make-shift basketball court. It's not much, with only a rim, a backboard, and half-court space, but it's just enough to have kept us busy following tonight's IMAX movie – Blue Planet – which offers an eloquent reminder – and a cautionary warning – that the planet Earth is a delicate living organism, constantly reshaped and rejuvenated by the awesome forces of nature. Through a unique view from Space and from underwater, Hurricanes, glaciers, volcanoes, thunderstorms, asteroid impacts, undersea furnace vents, and earthquakes are all explored as a system of interconnected forces that ensure the planet's survival. Partially filmed by NASA astronauts from orbit 200 miles above the Earth's surface, with astonishing clarity, this orbital perspective supports the film's ultimate purpose: to reveal the awesome beauty of the Earth, and to emphasize that we, the custodians of this miraculous gift, are also the greatest threat to the planet's delicate health. Proof of man's destructive influence offers a sobering reminder that our responsibility toward nature is perpetual, essential, and routinely abused.

It's really quite a stunning piece of film. One of the best I've seen in a long, long time. I found myself moved by it; my teammates are a different matter. All they wanted to do was play basketball after the movie so... here we are. I'm afraid I've fouled out of the current game – it has been strict out there as far as calls are concerned – but it's been a lot of fun. I recognize a couple of guys from BDM (it's not hard because they're also my roommates) but there's a couple here I don't: one has a Martin Marietta T-shirt on and the other is shirtless, but I believe he mentioned he was on Lockheed's team, or was it UTC? I forget. In either case Vince, BDM's nighttime counselor, also joined in the fun; he's been quite a lot of fun and a top-notch counselor to boot.

Yeah, I'm playing. Can you believe it? And I find I really don't feel that awkward about it – usually I do but it's been a lot of fun so far. I'm not sure how much more we're going to be playing since it's getting quite dark (there's one or two lights back here shining down on the court, that's how come I can write a little) but we'll see how things go. We'll have to quit sooner or later because we all have to be up again in the morning for activities at the pool, and if they're anything like the activities I experienced at Space Camp, we're going to be tired afterward, so we'll need our sleep.

Until then (or until I get called back into the game), I'll take you through today's activities.

MARSHALL SPACE FLIGHT CENTER ///

Waking up today was a little easier for my teammates and I, than yesterday. I, of course, had already been indoctrinated in Space Camp's masochistic torture wake-up program, but none of my roommates this go-round had, as I said yesterday. Today they took the slamming doors, bright lights and booming voices in stride but, much to our chagrin, the counselors still found something wrong with our morning preparations, so we had to all go back in and see what they took a fuss too; again we found nothing and were cleared on our second inspection tour. Following our morning recital of "BDM, Hoooogh!" the team made its way over to the Space Camp cafeteria, located near the Training Center floor. Unlike yesterday, though, where we'd hit the lecture circuit following our meal, today we piled onto the infamous Space Camp busses and took a ride out to the Redstone Arsenal, touring NASA's Marshall Space Flight Center.

The Marshall Space Flight Center (MSFC), named in honor of General of the Army George Catlet Marshall, was formed in 1960 to build the giant rockets an infant NASA would need to break the bonds of gravity and explore space. MSFC quickly established itself as the free world's leader in rocket propulsion systems research and development. The center's launch vehicles continue to provide the nation with assured access to space, but today's programs at Marshall encompass far more than just rocket engines. Included in some of its management are components for Space Station Freedom! The Marshall Spaceflight Center is sitting on 1,800 acres with more than 3,000 employees right in the middle of the Redstone Arsenal. One of the many things we learned about the center during our tour was how prominent it really was during America's Space Race.

The history of the space-race is fascinating, and told in detail on the tour.

Suffice it to say, Doctor Wernher von Braun and his team developed rockets for the Army Ballistic Missile Agency (ABMA) through the 1950's. It wasn't until 1958 that they developed the Jupiter-C rocket, which in its Juno 1 configuration (with an extra stage) launched the first United States satellite into orbit - Explorer 1. All in all the Redstone Arsenal presented NASA with rockets to send Alan Sheppard, the first American astronaut, into space and even help them get to the moon. During the moon program, MSFC provided NASA with around 32 Saturn V rockets, six of which equipped to land on the moon. They even developed the moon buggy used in the last three lunar missions.

During the moon program, MSFC provided NASA with around 32 Saturn V rockets, six of which equipped to land on the moon. By the 1970's Marshall thrust forward with America's first and only space station to date: Skylab. It also had its hand in the Apollo-Soyuz Test Project (ASTP) mission, which linked an Apollo capsule with a Soviet Soyuz spacecraft for the very first time. Marshall also managed certain aspects of Space Shuttle development. It tested the structure of the Space Shuttle using the orbiters Enterprise and Pathfinder, and designed and tested the Solid Rocket Boosters, External Tank and Main Engines currently used in the Shuttle program.

Much of this history are the highlights of the center’s tour, such as: part of a Solid Rocket Booster and test versions of SSMEs, mock-ups of upcoming Space Station Freedom modules, Redstone Test Stand, Propulsion and Structural Test Facility, Saturn V dynamic Test Stand, and Neutral Buoyancy Simulator.

The Redstone Test Stand was used during the 1950’s in early development of the Redstone missile propulsion system. This was the test stand where the modified Redstone missile that launched the first American into space, Alan Shepard, was static tested as the last step before the flight occurred. Propulsion and Structural Test Facility The Propulsion and Structural Test facility, developed in support of Jupiter missile development, was modified and used for testing on the first clustered engine stage in the American space program, the S-IB stage of the Saturn I launch vehicle. It was also used as the primary test stand for the development of the F–1 engine, the largest liquid rocket engine ever developed. The F–1 generated 1.5 million pounds of thrust.

The Neutral Buoyancy Simulator was designed to provide a simulated weightless environment needed to perform engineering tests in preparation or space missions. The extra-vehicular activity protocols for the Skylab rescue and Apollo Telescope Mount film retrieval were developed in the facility. And sometimes, current astronauts come to train here; if you're lucky you might see one! (We were not). The simulator is approximately 70 ft. in diameter and has a depth of 40 ft. It takes about 1.25 million gallons of water to fill these dimensions.

And the Saturn V Dynamic Test Stand was used in 1966–67 for ground vibration testing of the Saturn V launch vehicle and the Apollo spacecraft. Completion of this program was the final step prior to the launch of Apollo 11, the first manned lunar landing mission. In 1972–73 the stand was used for tests involving the Skylab Space Station, and in 1978–79 for ground vibration testing of the complete Space Shuttle vehicle.

As the tour, the facilities, and the items seen were the same as Camp (and virtually the same any other time I'd taken the tour), I wasn't as enthralled with this as I could have been, but there's still a lot of cool stuff to see and it is interesting from a Shuttle development perspective, something we're learning quite a bit about here at Space Academy.

That being said, however, following our trek to MSFC and our subsequent return to the Habitat to pick up our personal effects, I had quite the embarrassing moment. And rather than just come out and tell you about it, let me set the stage: in the few moments we had to sprint to our rooms I took the opportunity to find the nearest bathroom. I knew from experiences yesterday and since my arrival that the nearest facility was a couple of doors down, so there wouldn't be a problem in using the toilet quickly, before rejoining my team-mates down in the Habitat's atrium. So, I rushed out of the room and into the nearest Waste Management facility.

When I pushed my way inside I became shocked to find quite a different layout than the restroom I'd used before. The showers here were open, instead of the closed curtain variety I found in the other boys' restrooms. And there didn't appear to be any urinals around, just a huge row of cubicles along the wall in a tucked away corner. Not giving it another thought I went in and selected one. The first cubicle I came to had an Out of Order sign on it, and I should have turned away right then, but I didn't.

The next one had a puddle or two of water on the floor, so I went a little further down. This one, a few doors down from the entrance, appeared to be in fine order so I went in, did by business and began to leave; I ran smack-dab into a couple of girls pushing their way through the entranceway. Confused and somewhat embarrassed that I ran into them, I then thought it was rather strange for two girls to so nonchalantly walk into a boy's bathroom, and was about to say something to that regard when they beat me to that punch.

"Hey, aren't you in the wrong bathroom?"
"Uhhh, no?"

I didn't say anything more to them, but I could hear them giggle as I made my retreat.

When I finally did make it outside I looked at the sign above the door. It sported a stick-looking figure in the same of a man – ha, ha! So I was right! A second glance at the sign, however, showed the stick figure had morphed from a man to that of a woman (wearing a dress). When I saw the pictograph I let out a laugh, what else was there to do? I really couldn't believe I had walked into the wrong bathroom and didn't even realize it until it was all said and done! Naturally when I returned to my room it was hard to keep the secret - I had to share! And you know what? They thought it was very funny also!

THREE CONCENTRIC CIRCLES... ///

Although I got over my embarrassment quickly enough, my roommates wouldn't let me live it down... at least for a while. And where better to dispel such adventures to the rest of your teammates than at lunch? Why of course! So for most of our meal period I was defending my stupid actions to the rest of the crew... luckily, though, it didn't get too out of hand, besides, following lunch any torment was cut off by a full plate of activities right through dinner: assembly in the auditorium for another rousing lecture (though I daresay teammates Chris and Hans got quite the kick out of it. The stumbled over each other trying to present an idea to the lecturer regarding acquiring water for a Mars mission; something to do with attaching lasers to the poles of Mars and tractoring an asteroid or some other heavenly body with water close enough to the planet... or some such. An interesting idea but...), hitting the training floor for two more pieces of equipment (both of which I'll get into momentarily), and rehearsing for our second mission – my mission – Discovery.

How was climbing into the Shuttle cockpit for the first time?

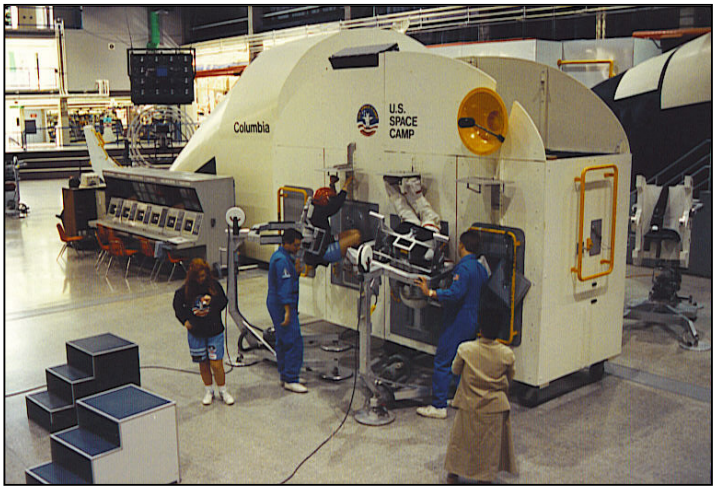
Awesome! Totally awesome!

Although we were there to practice the first few minutes of our mission scripts, which would help acclimatize us to the activities we'd be expected to perform in the next day or so, I couldn't help but sit in the Commander's chair in awe. Oh, I practiced along with the rest of the crew, working out what panels I'd need to be aware of so I could swiftly and efficiently flip the correct switches (Yes, panel C3 is on the right-side of the Commander – that's from where the SRBs are jettisoned, the ET let go and the OMS system burned), and advised what would be expected of me as the Shuttle Commander. My Pilot, Jeff Bedrosian, was also getting the same lecture from a Camp staffer; only part of his job was to use the RMS system behind us (that's Remote Manipulator system – the big arm) to help launch a satellite from our payload bay. I listened in a bit and the number of switches, knobs and buttons to press, flip or turn was a bit unnerving. I do hope he paid attention today.

It was all good.

After practicing the countdown sequence – T-minus 9 minutes and counting – up through to a few moments to lift-off, we departed the shuttle and continued about our other two activities, which included a test to see if we could safely dock with a satellite and my personal favorite (and the one thing I'd been looking forward to these past couple of years) a ride in the MAT, the Multi-Axis Trainer.

First, though, the Satellite Docking Maneuver.



This task was accomplished using a specially equipped MMU trainer – called the GMMU, or Ground Manned Maneuvering Unit, to "dock" with a "satellite" on the floor. The "Satellite" was nothing more than a mock-up apparatus on a rotating wall affixed to rollers on the ground, with a hole in the middle of the dish structure made to look like a docking clamp. The task: maneuver the MMU chair (which itself was attached to a 5DF Chair) with a special docking prod attached to the front of it across a small patch of floor space and, by using the probe, achieve a hard-dock by using the system's non-androgynous method (which is to say you use the "male" "probe" to insert and mate with the "female"

It seemed rather simple looking at it and watching a nearby counselor demonstrate the process; performing it first-hand was a little more harrowing, even if the concept was similar to the Video MMU trainer out in the lobby of the museum! What made it so difficult? Being on the 5DF's cushion of air and using regular MMU controls to navigate the contraption to the target. It took a number of approaches from quite a few of us... myself included... to bring the two spacecraft safely together in a secure dock. Still, it was a valuable lesson to learn in not only docking mechanics but also in mobility with the MMU, even if we couldn't move along the Z-axis.

Because the Satellite Docking Maneuver exercise was taking longer than expected, we were immediately advised to head over to the Multi Axis Trainer (MAT) as soon as we accomplished our task with the GMMU. I didn't just rush over I dashed to the line. Of all the training apparatuses and events at Space Camp (or Academy in this case) this one thing was the biggest, the most important and thus (it follows) the most anticipated of all, ever since I'd seen the film. It was an experience I had hoped to gain during my tenure at Space Camp two years ago, alas, Camp trainees aren't allowed to use the Multi Axis Trainer (or weren't, I saw some Space Campers on the MAT yesterday evening; I was incredulous. How dare they!); it was only for Space Academy cadets. But now I needn't wait any longer. I'm here in Space Academy and it is my turn to ride.

To once again quote from SpaceCamp: The Movie, the Multi-Axis Trainer is a machine in which "three concentric circles, spinning in opposite directions simultaneously; object is to stabilize from central point, utilizing hand controls". Let me tell you, it isn't that easy. In fact it's impossible! The Multi-Axis Trainer (MAT) simulates the disorientation one would feel in a tumble spin during reentry into the Earth's atmosphere. The MAT is patterned after the MASTIF (Multiple-Axis Spin/Space Test Inertia Facility), a series of cages within cages, used for astronaut training during the Mercury program. The astronauts used this to condition themselves for disorientation that might occur in emergency conditions during flight. The MASTIF had a joystick, which allowed the astronaut to control the device. The MAT has no joystick (thus the joystick on the MAT in SpaceCamp: the Movie was just a prop!) Consequently, the unit used during the filming is still on the space center floor (in the same spot as last time) – complete with holes where the prop was attached – but it's off to the side and though I got a chance to see it, we weren't allowed anywhere near it (again).
But that didn't matter... I was getting my own shot in the trainer.

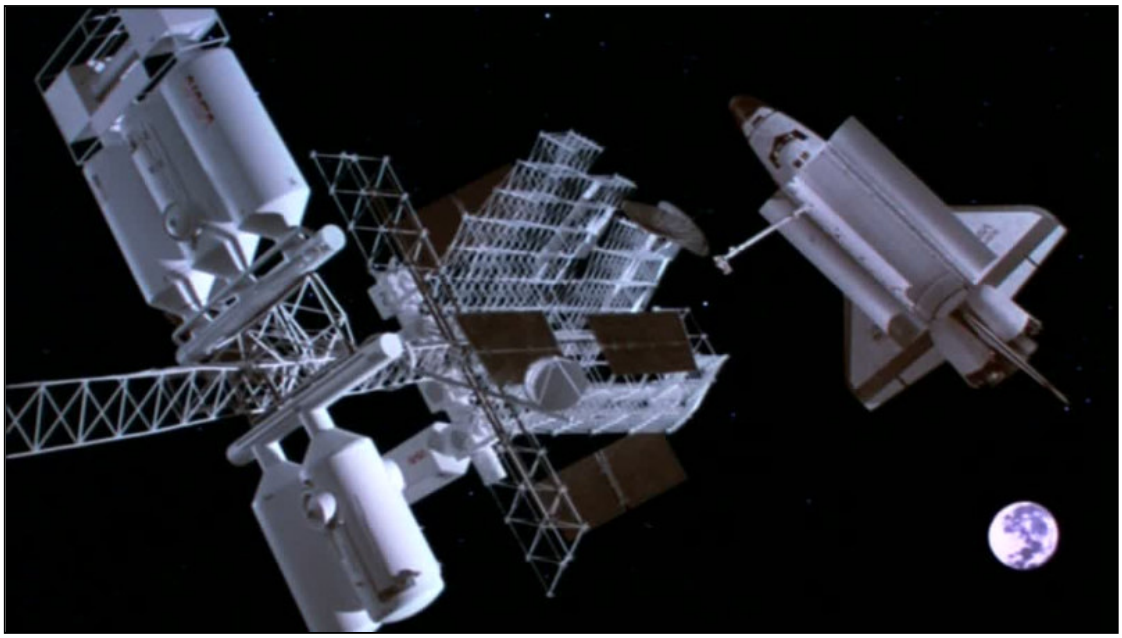
I watched excitedly nervous while some of my other teammates tumbled head-over-heels in the contraption, but when it came my turn I didn't hesitate to hop right up in the seat, and begin to strap myself in (thanks to watching the movie uncountable times I knew exactly what to buckle, where and when!). Leigh-Ann, my day counselor, explained what was going to happen as I busied securing myself and although I tried to tell her I already knew and had been waiting for this moment for more than four years, she prattled right on. And soon as she was done, she closed the metallic swing "lap" bar and let the first ring go – SWOOSH! I bet if anyone had a camera and took a picture of me there'd be a smile of immeasurable proportions visible on my face. I could hardly believe I was there, strapped in and buckled up just like Kathryn was from the movie, you know? The only difference between her journey and mine was the lack of a joystick – there was no critical test for me to master here!

Just then, as the apparatus began to move, I took hold of the bars above my head – something I didn't need to be told to do (even though the counselor did say so). Thus with a groan and a whir I was in motion; round and around and around I went! WAHOOOO!!

It’s an interesting experience really because you never make the same turn twice; you’re never in the same exact position from one spin to the next and I suppose that is what makes the Multi-Axis Trainer a valuable tool (or at least a valuable experience to be accustomed to, in case your spacecraft does end up in a flat spin). Though it was a short ride, a lot shorter than I had wanted or hoped it would be my time with the MAT was done. But it was well worth the wait!

SPACE STATION: DAEDALUS ///

On Sunday, and again on Monday we were told what our activities would be during the week, besides the training and the shuttle missions. Of those duties (one of which was drawing a patch, which was earlier discussed) was designing and building a space station. A project that was very much similar to the one built during my tenure at Space Camp - the difference here was the attention to detail. It had to be functional, in budget, and held to normal spatial constraints. The parameters were clear: The Space Station would have to be built to conform to the needs and desires of humans in the year 2080. The only restrictions levied were that the designers could only use the Space Shuttle (if it was in operation at that time) only 20 times. Other requirements were common sense things such as: the station must support life and have the necessities of the people on board.



The Space Academy manual explains this project quite well:

Your team has been asked to design a space station, which will become operational in the year 2080. The challenge of designing such a space structure lies in your ability to successfully define its purpose, efficiently design its structure, and be able to launch it within the number of allotted shuttle flights. You get 20 flights of the Space Shuttle or the Shuttle-C [The Shuttle-C concept is a NASA proposal to turn the Space Shuttle launch stack into a dedicated unmanned cargo launcher.

This would use the Space Shuttle External Tank and the Space Shuttle Solid Rocket Boosters, combined with a cargo module that would attach similarly like a Shuttle, using the Space Shuttle Main Engines to boost it into orbit – or everything but the Orbiter]. Our objectives have been met in building a lunar base and sending a mission to Mars and commercialization of space is already taking place. Your objective can be whatever you want as long as it does not concern any military or defense ideas. Each Space Station design must include these five phases:

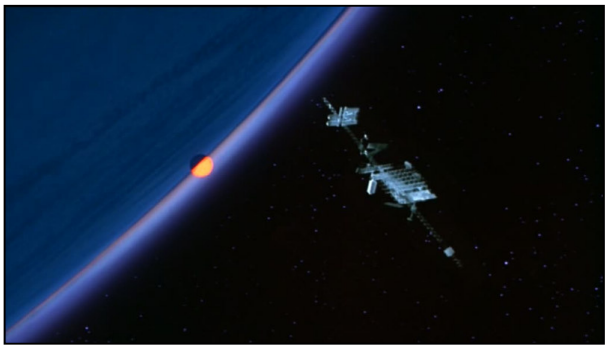
1. Statement of Objective and Needs Analysis: Basically state what the purpose of the station is and what the needs that will be fulfilled by the space station.

2. Feasibility Statement: Is it feasible, practicable, and workable? This phase will list what will be taken up on what shuttle flights (in order) and how many shuttle flights you will require.

3. Crew and Back-up Systems: This phase will determine how your space station will support man's needs while in space and what back-up systems you may have devised.

4. Drawing: This is the fun part; you sketch your station design module by module, inside and out (when necessary).

5. Explanations: You get to explain what all your labels mean and what that area does and why it is needed on board your space station.



After this is considered you will be presenting your phases to your counselor in a written statement. Then the team will give a five-minute presentation on the space station and you should be ready to answer any questions that may arise about your station designs or on anything about your space station. The space station must be designed so that it will not require more than 20 flights of the Space Shuttle or the Shuttle-C. There are no existing space stations that are manufacturing the materials that you would need. And it must be operational by the final 20th flight. The Space Shuttle's cargo bay is 15' x 60' with a maximum cargo weight of 45,000 lbs. The Shuttle-C has cargo bay dimensions of 15' by 81' and a maximum cargo weight of 80,000 lbs. The parts of the Space Station are as follows:

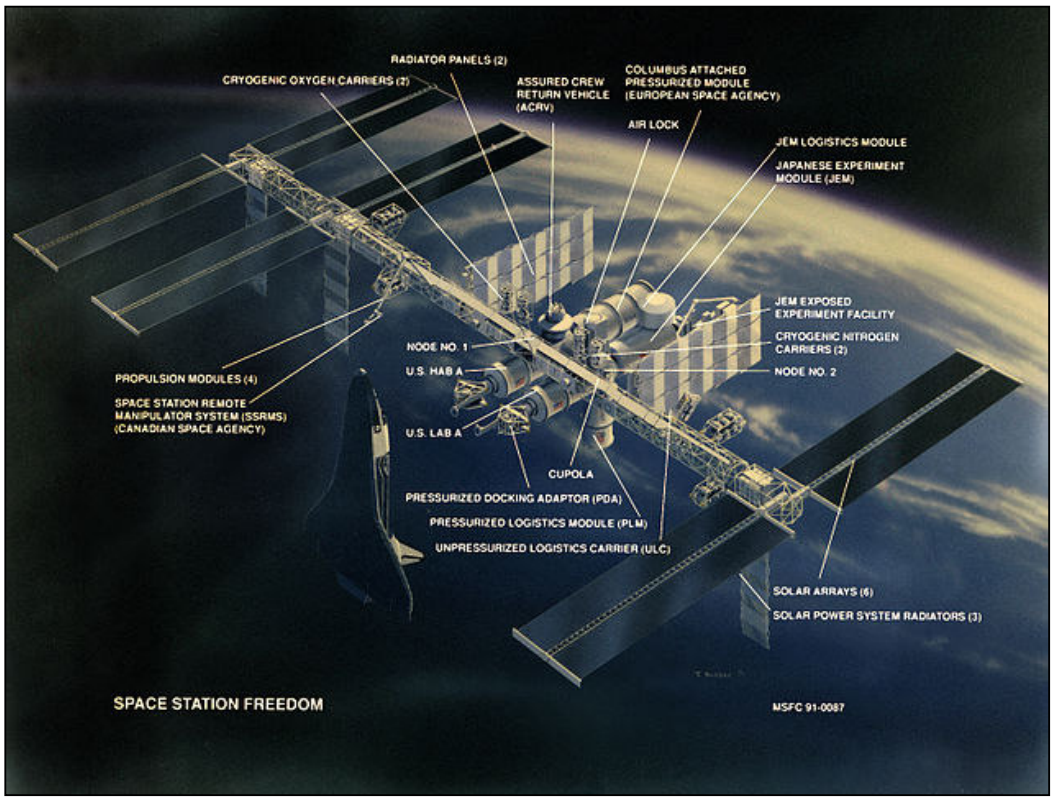
Resource Node: These nodes house most of the command and control systems as well as doubling as connecting passageways between laboratory and habitation modules. To connect two modules together, four nodes will be necessary. Each node has six docking ports, four around the sides, one on top, and one on the bottom. Its shape is cylindrical and has dimensions of 17' long and 14' wide. Its weight reaches (per module) 10.55 tons or 21,100 lbs.

Habitation Module: Each station will require one module for eating, sleeping, personal hygiene, waste management, recreations, health maintenance and other functions requiring pressurized space. Each module will support a crew of eight. It is cylindrical shaped with dimensions of 44 feet long and 14 feet wide, with a weight of 28.2 tons or 56,400 lbs.

Laboratory Module: This module will provide a shirt- sleeve environment for performing laboratory experiments and other research activities. It is a cylinder shaped module with dimensions of 44 feet long and 14 feet wide, with a weight of 28.2 tons or 56,400 lbs.

Pressurized Logistics Carrier: This module is used to transport and re-supply items that require a pressurized environment to your space station and be returned to the ground. This module is a must. This is also a cylindrical shaped module with dimensions of 17 feet long and 14 feet wide with a weight of 10.55 tons or 21,100 pounds.

Solar Array Wings: Two solar arrays can adequately power one module, either that be an experiment or habitat module. When fully deployed the array spans a length of 108 feet and a width of 34 feet. The weights of these wings are 2.32 tons or 4,640 pounds. They SAW's can be compacted into a container only seven inches deep.



Space Tug/Garage: Your station may require such a module to service free flying experiment modules or capturing satellites. This cylindrical shaped module is 17 feet long and 14 feet wide and weighs 10.55 tons or 21,100 pounds.

Truss Assembly: This is a required piece of space equipment needed to support modules, attached experiments, and solar arrays. The Truss will be assembled in orbit so you don't have to worry about that. It's cylindrical with dimensions of 17 feet long and 14 feet wide, weighing in at 104 pounds per foot of the truss.

Flight Tele-robotic Server (FTS): The Tele-robot is composed of a main body, arm positioning system, and manipulator arm assembly. The FTS will be used to assist the crew in assembling, servicing, inspecting, and maintaining the station and its payloads and systems, thus reducing the amount of EVA's required. The dimensions are 84" x 41" x 36" and it weighs 1,500 pounds.

Mobile Servicing Center (MSC): This is a robotic system comprising your space station remote manipulator system (SSRMS) and the Special Purpose Dexterose Manipulator (SPDM). These elements will be used initially to assemble your space station and later to perform maintenance tasks like load and unload the Space Shuttle, exchange Logistics Modules, service externally attached payloads, and move suited crew members, payloads and cargo around the station. Here are the dimensions: Main Platform: 14' x 14', SSRMS: 58' long, SPDM (2 arms): 6.56' long each weighing 10,584 pounds.

With our assignment and our limitations and such, we began our work following dinner. It wasn't an easy task, mind you. Not only were we supposed to draw the thing up, we were also expected to give an oral presentation on our Space Station as well as a detailed report explaining the whole process. It was clear that there were going to be long nights ahead, especially if this Space Station task was going to be anything like Operation: Space Station was during my Space Camp experience. As during other exercises, we broke into two teams (but not like the teams assigned for our swimming exercise). Our callback numbers decided the teams for this exercise. Since mine was 15, I was on the BDM-Odd Team. Anyone with an even number was on the BDM-Even Team. With that decided, we broke and began to create a space station for the later half of the 21st Century. Sounded easy, right?

Sure it does. Everything started out fine until minute disturbance began to crop up in the two groups: everyone wanted to do the space station in their own image and no one could agree on one basic building block. Sound familiar? With experience in this type of argument, I decided it was time to back away from the project from the earliest problem and not get involved in another heated argument over Space Station design. However, bowing out of the problem wouldn't help solve it and I felt a little more than guilty for abandoning my teammates. So I returned to them moments later and asked, "what do you want out of your space station? What is its purpose? Please agree on one thing and go with that idea because we're going to be in a bigger mess later if no one can agree now. Trust me."

Wouldn't you know they seemed to agree with that logic and went on without further incident?

Across the bay the second team was missing a man, which made their team uneven. With the Odd team settled, and still not coming up with a purpose for their design, I asked my two counselors, Leigh Ann and Vince, to see if they wouldn't mind my switching teams. With my "experience" in these matters as well as the imbalance caused by the missing team member, they allowed the switch with one condition: I would, in fact, become the ambassador to both teams and help keep them focused.

In the end everything came together like it was supposed to and both teams designed, built, and showed their space station designs. The BDM-Even team built an interesting drive-in movie theater as their Space Station concept. It was an interesting concept, however, but they seemed to miss the point of the project and didn't score many points for their efforts. The other team, BDM-Odd, pulled together and came up with a station built to specifications. It had the right gravity control, oxygen, adequate medical facilities, sleep quarters, and everything else a person would need to live aboard a space station in high Earth orbit. Once the ideas were finalized, the designers completed their write-ups about their stations and turned them into the counselors.

* * *

We'll be expected to give oral presentations about our space station concepts in front of the other Space Academy trainees in the next couple of days – yikes! And, as with "the Patch", we aren't going to find out who would win the Best Space Station Award until graduation on Friday. It's going to be a long wait!

Meanwhile, it looks like I'm going to be getting back into this game, so I'll conclude things here. I can't believe I'm having so much fun with this... it's so not me!

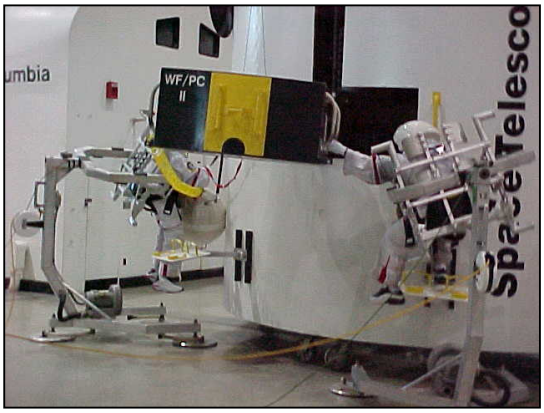
SPACE CAMP MEMORIES

1991 // Space Academy, Session 24

Day Three – TEAMWORK BUILDING DAY

WEDNESDAY | JUNE 19, 1991

Greetings Cadets: Mission Success!



But boy am I pooped out – not to mention completely soaked in sweat, but I'm not all that interested in discussing that aspect. I will say, however, that the reason I am all sweaty is because of the hard work I put in as Station Specialist during our Atlantis mission, which just concluded. Not only did we have to perform cardiovascular activity tests inside the module, but we were also responsible for stepping into space and servicing the Hubble Space Telescope, a mock-up of which sits in the middle of the Training Center floor. I'd like to see you try to fix the ailing telescope while completely suited up, floating around in a 5DF chair with little control and barely being able to see out of your visor... and see if you're not worn out and a little sweaty too!

But I digress. It was a fun time and a good mission overall I think, but I'm getting ahead of myself here. First up on today's agenda was a visit to nearby University of Alabama at Huntsville to perform a few tasks in their Olympic-sized pool, get lectured some more, and hit the Training Center Floor for some last-minute instruction and preparation, an IMAX film, and we even had time to eat three square meals today...

TEAMWORK AT THE POOL ///

Following breakfast we all assembled out front of the Habitat complex and boarded the busses, infamous as they are, to take yet another trip off campus. Why are these busses infamous you might ask (since I mentioned it last time)? Well, they're hot, they smell, and they're old! So it makes for an interesting ride; today it was to the University of Alabama at Huntsville (UAH) to play in the pool, or that's what the majority of the campers here thought. I knew better of course, and tried to tell Chris, Hans and Chip (who were a little excited to be going swimming mind you) that we weren't being rewarded or just going to kill time splish-splashing around, we were going to do a lot of work!

Last time I was here we practiced emergency escape plans. This time I wasn't sure what we were in for but I knew our skills would be tested and our teamwork challenged!

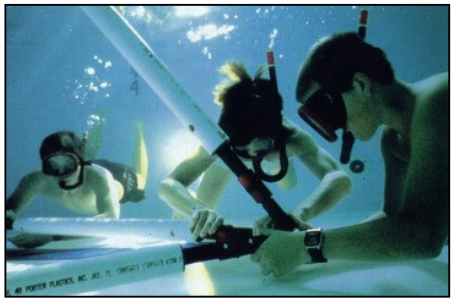
Once we arrived, the counselors asked us all to disembark and, as before, stand against a nearby wall. The counselors explained the rules of the pool while we stood out there in our swimming gear. They were typical: no jumping, running, splashing and the like. And only after the rules were established were we allowed inside. Chris (pictured left), Hans, Chip and I set our stuff against a far wall and then our assignment was revealed: build a three-dimensional structure (a Tetrahedron) in the water. I figured this was going to be easy until our counselor told us it was going to be at the deep end of the pool, and it was over 12 feet deep! So our team would learn another lesson too: how to stay afloat!

To accomplish our assignment our twenty-man/woman team was split into two smaller squads - Team A and Team B. I was assigned to Team A, which consisted of Myself, Kevin Richardson, John Strom, Mike Carter, Molly Flanigan, Wim Becker, Andrea Gould, Chip Connelly, Laura Bishop, and Chris Cole - all members of BDM. The second team, Team B, consisted of Jeff Asell, Casey Fuhrman, Brandi Lane, Stacy Brooks, Matt Hunt, Matt Hueffner, Jeff Bedrosian, Chris Laystrom, Richard Booker, and Hans Scheithauer - again, only members of BDM. And then we got to it.

Team A began the exercise in the middle of the deep end, completely cut off from the walls. Our task was to complete the structure as quickly as possible, assigning members of the team specific jobs in order to maximize efforts. For example, Molly was assigned the detail of swimming to the wall to get a piece of the puzzle and relaying it back to us. Likewise, Chris Cole could not get in the water (for this exercise), so his job was to hand the parts from poolside down to Molly when she came over (since she could not get out of the pool). The rest of us were to support the structure (and each other) as the contraption came together. Let me tell you that I had quite the tough time with this one. It was really hectic in the pool!

I could hardly keep my head above the waterline for any period of time to see what I was doing, let alone know how many pieces of the puzzle we had floating around us; I’ve really learned how to keep myself a float when unable to touch the bottom of the pool, ya know? Sorry! Since Molly was getting tired swimming back and forth with vigor I thus took to helping her so I could keep swimming. As long as I kept swimming (and not still) I knew I’d be fine. Everyone else was frantically trying to complete the contraption as fast as they could, splashing water all about as they also tried to keep their heads above water. Before long the structure began to take shape... but it didn’t look quite right.

As Murphy's Law would have it - if anything could go wrong, it would.



When we started to look at our creation we knew we'd done something wrong - instead of building a Tetrahedron we started putting together a rectangle! That meant our pieces would “dry” up before we'd ever finish building the thing. So we had no choice but to disassemble the entire mess and rebuild it from the word go. During that process I stayed well away. It wasn’t done in record time but it was done nevertheless, and in a respectable amount of time too, I might add. We surrendered the pool to Team B watching them struggle to complete their structure. When it was all said and done, Team A had completed the cube faster than Team B, by at least half the time!

Regardless of the task, we learned everything we were supposed to: team work. Everyone pitched in – including me – whenever and wherever we could. And we recognized that if we couldn’t do something we didn’t just hang around, we did something else to help out; I helped our courier out and she was quite grateful. Without teamwork our team would not be able to function and with a mission coming up I didn’t want that to happen. Before long we returned to the Space & Rocket Center and retired to our rooms to change.

PARDON ME GUYS... ///

Returning to the Habitat was fleeting at best, though. We had just enough time to change out of our wet clothes, dry off and put on new clothes and meet our team down in the atrium. Because although we were all tired and hungry we still had one more thing to do before lunch – attend a lecture! I was first to reach my room and thus took to changing immediately upon entering it. When I was done, I set out to find the nearest bathroom again.

All that water created an urge to go!

Thinking about the mishap earlier, I remembered to rush down to the second floor where the nearest boy's restroom could be found. I made it down quite easily without a problem, went in and that was that (I made doubly sure the figure on the sign was indeed that of a man). I came out and went back to my room... but when I pushed on the door it wouldn't open. Room 308's door didn't feature a hatch-lock mechanism like all of the other rooms did. Either this was because our door had been broken sometime in the past or that's just the way it happened to be. Our door you could push right open like a door to any business. So, when the door wouldn't budge I was quite puzzled. That should have provided me the first clue that I wasn't where I was supposed to be. Not thinking, I turned the latch handle and began to walk inside. To my surprise there were a group of rather tall gentlemen in gray uniforms. For a moment I couldn't fathom why they'd be in my room unless...

They turned to look at me and I could tell by the looks on their faces they wondered what a kid was doing in their room.
"Oops," I said aloud, and closed the door.
I was on the wrong floor!

What obviously had happened was that I went to the corresponding door that would represent my room, only I wasn't on the third floor and the door I went to wasn't to my room! When I did make it back to my own room the guys asked me what was wrong - my face must have betrayed the incident. After I had told them what had just transpired, they became hysterical. Technically it wasn't all that hard to become disoriented in regard to the Waste Management facilities. The one near our room on the third floor was a ladies room (which I found out). Below us on the second floor was the closest men's room. And while we weren't supposed to leave our floor to use another floor's restroom, most of us did because the nearest men's restroom was at the other end of the Habitat - and none of us wanted to run all the way down there!

Alas I was teased again all through lunch. Can't a guy buy a break?

RED STAR IN ORBIT ///

Besides the lecture and lunch, the rest of the afternoon was a hodge-podge of locations and activities: some time on the Training Center Floor, some time in a portable classroom, and some time in the museum itself, getting a chance to look around at our own pace, in our own way.

On the Training Center Floor we were introduced to the Space Station Mobility Trainer, one of the program's newest gadgets. Using movable Velcro bottomed handgrips and shoes; a person can walk in a 360-degree route to demonstrate the type of experience, which the Space Shuttle Astronauts may require preparing for their incredible journey into space. At least that was the concept. To do get into this contraption you had to stand, hunched over in the middle of the thing while they strapped you onto the middle bar. Once strapped in, all you have to do is walk normally - or as normally as you can while gripping onto the latches and the middle bar so you don't "fall" out of sync. I think the only thing I liked about this trainer was that it makes you feel like you're defying gravity when you walk upside down. That was pretty cool!

Out in the portable classrooms we learned about SpaceMail, a new computer thing from Apple. The Apple's were limited but the SpaceMail system looked promising. It was designed to be a system to link up trainees via the telephone (but through the computer) so one could talk

to another through the system, leave “electronic mail” and basically keep in touch. It sounds like an interesting system. It would be great to keep in contact with the friends I’ve made here; however, it also appears to be quite expensive so I doubt most cadets’ parents can afford it. Besides, the program appears to only work on Apple computers and I definitely do not have one of those at home, only a Commodore 64, so I’m out of luck.

And then we were turned loose upon the Space and Rocket Center to play with all the exhibits they had on hand, including the special exhibit entitled “Red Star in Orbit” (installed December 1990). The US Space & Rocket Center is the first and only stop in the United States for this international tour of space hardware, and it’s aptly named because the exhibits are all about the Russian Space Agency. Edward O. Buckbee, Director of the Space & Rocket Center, hand-picked these artifacts and art personally to display here on a trip he took to Russia nearly two years ago and the USSRC is the first and only stop in the United States for this international tour of space hardware; the first time any such artifacts have been seen outside of the Soviet Union! Some of the artifacts on display are...

- A remote-controlled, unmanned mobile laboratory called Lunokhod that was operated by a five-man team on Earth. It conducted soil, cosmic ray and atmospheric tests on the Moon. Museum display is a full-scale model.

- The MIR Station, which represents an important aspect of the Soviet space program, is displayed at one-third scale. MIR is considered the first permanently manned space station because it is modular, although there were others (Salyut). It was launched in 1986 and can accommodate up to six cosmonauts, although the usual MIR crew is two to three. MIR is also capable of docking five separate spacecraft, making it a virtual hub in space.

- Cosmonaut space suit from the Soyuz era.

- A Soyuz spacecraft, which is best known to Americans for the famous docking in 1975 during ASTP, Apollo-Soyuz Test Project. That historic event saw Soviet Cosmonauts aboard Soyuz 19 and three American astronauts shaking hands inside an Apollo spacecraft. It was the first time the two united in space.

- An actual Vostok capsule that flew in the early years of the Soviet manned program. Vostok is best known for the flight of Yuri Gagarin, in 1961, the first man in space. Vostok was used again in 1963 when Valentina Tereshkova made her flight. She became the first woman to fly in space.

- The Energiya-Buran space transportation system is displayed at 1/20th scale in the Spacedome Theater lobby. Energiya is the name of the launcher and is the first Russian vehicle to use liquid hydrogen propulsion technology. Buran, which means "Siberian Snowstorm," is the orbiter (which looks suspiciously like the American Space Shuttle, but...). The only flight of the Russian space shuttle was an unmanned mission in 1988, but it crashed on landing and its successors have so far not been used.

- The Vega Space Probe (1/lOth scale), launched in 1984 to study the planet Venus and record data from Halley's Comet in 1986. The craft was powered by twin large solar panels and instruments included an antenna dish, cameras, spectrometer, infrared sounder, magnetometers (MISCHA), and plasma probes. The 4,920 kg craft was launched by a Proton 8K82K rocket from Baikonur Cosmodrome, Tyuratam, Kazakh SSR. Both Vega 1 and 2 were three-axis stabilized spacecraft. The spacecraft were equipped with a dual bumper shield for dust protection from Halley's comet.

- The Granat Astrophysical Observatory (1/lOth scale), launched in 1989 for the deep space study of stars.

Quite a rousing exhibition!

The gift store, dinner and a movie followed... and then we all re-assembled out on the Training Center Floor for our first mission of the week: Atlantis.

MISSION 1: ATLANTIS ///

Scheduled between 9:00pm to 11:05pm was our first mission, the focal point of the skills we learned during the training we'd had up to now. For this mission to be successful we'd have to work together as a team (which we had proven we could do throughout the week with The Patch and Space Station assignments, as well as at the Pool earlier in the day). And as a team we took up these assignments on the ground, on the space station, and on the shuttle:

/// Cockpit Group

- Commander: Jeff Asell
- Pilot: Matt Hueffner
- Mission Specialist #1: Chris Cole
- Mission Specialist #2: Laura Bishop
- Payload Specialist #1: Chris Laystrom
- Payload Specialist #2: Matt Hunt

/// Space Station Group

- Space Station Commander: Andria Gould
- Space Station Officer: Hans Scheithauer
- Station Specialist #1: Casey Fuhrman
- Station Specialist #2: Ricky Russo
- Station Specialist #3: Kevin Richardson
- Station Specialist #4: Richard Booker
- Station Specialist #5: Jeff Bedrosian
- Station Specialist #6: Brandi Lane (*)

/// Ground Group

- Environment and Life Support: Mike Carter
- Flight Director: Wim Becker
- Weather and Tracking: Chip Connelly
- Station Operations Control Center: Molly Flanigan
- Spacecraft Systems Officer: Stacie Brooks
- Launch Director: John Strom

NOTE (*) Brandi Lane was assigned the position of Station Specialist #6 but was not present for the mission; she was sick and in the infirmary following our time at the pool. She missed the entire mission.

As Space Station Specialist #2 my job was two-fold: as I explained on the first day, I along with Station Specialist #1 (Casey Fuhrman) would be performing critical tests within the module (which I'll explain later) as well as stepping outside the Space Station to perform an EVA, that's Extra Vehicular Activity, to repair the Hubble Space Telescope. The module itself was a real representation of what a Space Station Freedom module was designed to look like. This added to the reality to the mission. Reality or not, the Space Station module was in chaos the entire two plus hours of the mission.

We weren't the only ream running a mission tonight and we had to share the module with that team (I don't recall who), who was running their mission using the Endeavor simulator. With two teams using the same module at once it turned out to be one confusing night! Most of the time Station Specialist #1 and I sat down against the module wall watching other team members performing their mission tasks. With all the running around and talking in the module one wondered how we even heard what our own schedule would be, which was: once the Atlantis lifted off and entered a standard orbit, our first task would be to perform the EVA portion of our mission. For the EVA, we'd be repairing the Hubble Space Telescope (a mock-up of the telescope was on the training center floor), then we'd be clear to perform our other "in module" experiments.

After a few minutes of sitting on the floor of the Space Station module, our time finally arrived. There was no need to go into an airlock or anything because the counselors just opened the Space Station module door and ushered us out onto the training center floor. Once we got outside of the Space Station module (which was wonderful because it was so quiet on the center floor as compared to the inside of the module), our first order of business was to DON the suit. DON is a term used within the space program to "get into or put on" your space suit. We weren't working with actual space suits, only cloth imitations, but we still had to get them on and there was an order to the madness. We were briefed about the DONing procedure while we stood outside the Space Station module:

EVA SUIT PROCEDURE:

- Step 1: Liquid Cooling Garment (LCG)
- Step 2: Boots
- Step 3: Lower torso assembly (LTA)
- Step 4: Hard Upper Torso (HUT)
- Step 5: Extra Vehicular Visor Assembly (EVVA)
- Step 6: Gloves

It was easy getting the suit on but finding boots and/or other parts that would fit me was more nightmarish. Of course, finding an intact suit (with all the pieces available) was like finding gold! Thankfully, I didn't panic and eventually found everything I would need to perform this mission task.

The EVA part of the mission was explained to us relatively simply; our task was to simulate repairing the Hubble Space Telescope whilst using the 5DF chairs to simulate space conditions. But unlike during our training session where counselors kept close hold on us while we floated on the cushions of air, during the mission we'd be under our own power and supervision, which meant we could float away from our target at any time. I tell you, stabilizing the chairs wasn't the hardest part of this mission; keeping them from floating away was! You might think that the word chair means we sat in them; quite the contrary, we actually hung in them - positioned and strapped upright. In this position, we swung back and forth suspended above the floor. In this configuration there was no way we could touch our feet to the "ground" in case we needed help - definitely going to be just like a real space mission!
To keep us from floating away, we were each given a small set of ropes ("Tethers") to fasten ourselves to the Hubble as well as tie our tool bags to us (and it) so they were in reach. Those ropes turned out to be lifesavers... definitely. Thanks to them we could focus on our mission objectives and keep our hands free to work!

As to that work? Well... our job was to float out there, replace a few items on the telescope then return to the Space Station module as soon as possible. My task was to replace the Hubble's battery complex, which consisted of taking out the old module, placing that in my tool bag, and return to it a brand new one (which I also had in by bag). Once that was finished, my second task was to prepare the Hubble for its refueling, accomplished by turning a knob and pulling a lever.

When that was accomplished we could return the Hubble to space. Station Specialist #1's job was... well... unknown to me as the counselors explained our tasks to us individually, so we weren't aware of each other's tasks... but had to coordinate the movement of the Hubble platform in order to perform them.

Wouldn't you know that after getting suited up, prepped and into the chairs our tasks were completely switched on us? That's right, I was going to be doing her job and she mine and neither of us knew what we were doing! I certainly couldn't do the job she was to do with the tools I had on hand, and vice versa so without knowing what else to do, once the mission started we withdrew the Hubble's platform package as instructed, but then turned the entire module around so we could perform the tasks we trained for. In the end, the mission to repair the Hubble took 50 minutes – longer than expected I think - and I was fighting the 5DF chair, and my own sweat running down my face (how annoying this was!), the whole time.

With the Hubble power module back within the confines of the telescope, I put all my tools away and closed its access panel. Casey and I called over to the Space Shuttle to report our success and congratulations were in order once we returned to the Space Station. Happy that this part of the mission was a success, I couldn't help thinking then that I couldn't wait to sit down somewhere and rest – the whole endeavor was so tiring I wasn't sure I could continue on.

The counselors pulled us away from the Hubble mockup and helped us out of the 5DF chairs. When my feet hit the ground I let out a huge sigh of relief. My body was so tired of holding on to that rope, fighting against the flow of weightlessness that I collapsed right there and sat for a few moments. The two of us would have to take off our suits - in the opposite order in which we put them on but I didn't care how it came off as long as it came off. It was really hot in the suit (despite the dry ice packs) and I would wager that I sweated more in those few minutes than I ever had in my entire life. There wasn't an inch of me that wasn't covered in water. My shirt was so soaked it was like I had been swimming with my clothes on – no, really I tell no lies. I thought about going to the restroom then and wringing out my shirt it was that bad, but, we had to get back to the Space Station and perform the second-half of our duties. Who had the time?

The experiments we were slated to run within the rest of the time allotted were called Cardiovascular Fitness and Task Disorientation.

Task Disorientation was unanimously chosen as the first experiment to run first, which was a rather simple task. It consisted of running through a maze with a pen or pencil (similar to those you'd find in any magazine or newspaper), done through different areas of Disorientation: the first, the normal way, looking at the paper and making your journey with the pen. The second, and by far the hardest, was to place the paper in a specially designed box that incorporated mirrors. The image of the maze was reflected back to us and turned about (backwards and upside down), so while we zoomed pretty quickly through the first part, the disorientation phase of our Task Disorientation experiment took a little longer.

The Easy Way: Station Specialist #1 (Casey) - 48 Seconds
Station Specialist #2 (Ricky) - 19 Seconds

The Hard Way: Station Specialist #1 (Casey) - 60 Seconds
Station Specialist #2 (Ricky) - 43 Seconds

Our second and final task was Cardiovascular Fitness, which consisted of us testing our cardiovascular fitness level by using a stair climb machine. Believe me, this is not a task you assign someone who doesn't like to run, jump or do any kind of physical work in general. But, my wonderful camp counselor assigned this task to me. It really was a simple thing to do though, made harder by having exerted ourselves completely during our time with the Hubble.

Here we had to perform climbs on the machine for a set number of seconds. And once the duration had ended, calculate our heartbeats-per-minute. I did the stair climbs for the durations necessary, counted my heartbeats and found nothing new: my heart rate was a little higher than normal. After I did one set, Casey did hers and we alternated to allow our heart rates to return to normal "at rest" conditions. Once the experiment had ended and the two of us correlated our information for our report, the task had ended and our mission was complete.

* * *

All we can do now is wait for everyone to finish his or her tasks... and with more than one mission going on in here that could take some time! Then again... there’s an alarm going off in here; it seems one of the shuttles just crashed into the Space Station – we’re all dead! (And from the sounds of things, it was the Endeavour, the other mission running this evening... sucks to be them!) So, with that I think I’m out of here and will go find solace out on the Training Center Floor. It’ll be quiet, and more comfortable I think. And maybe I’ll go find that bathroom to wring my shirt out... Eeew!

Day Four – SHUTTLE MISSION DAY
THURSDAY | JUNE 20, 1991

It's been a hell of a day, campers, and although I'm saddened to say that the adventure is almost over – the last bit of fun comes with tomorrow's graduation ceremony, but for all intents and purposes our time here is done – I'm a little bit glad. Oh, I'm not really looking forward to being done mind you, I've been having a blast here, but I could use some sleep. We've been going non-stop with early mornings and late nights for five straight days... I think I need a break. Or else I'm going to start missing morning assembly!

Oh, wait, I almost did this morning...

Yeah, it's funny, I warned my roommates at the beginning of the week about how it's hard to miss Space Camp's morning wake-up routine, with all the commotion going on just to rouse you out of bed, but that is exactly what happened this morning: I missed it. Totally. When I finally came to... all groggy and squinty-eyed... I found the lights were already on and that confounded me greatly. One of my roommates attempted communication with me, but in my sleep-deprived state I didn't comprehend what they had said. So I asked in return: "What happened here? Why are the lights on?"

"Dude, you totally didn't hear the lady yelling for us to get up?"

No. I didn't hear any slamming doors, I didn't see the flickering of the lights and I didn't hear any counselor yell at the top of his or her lungs that it was time to get out of bed.

I was dead to the world and boy did they laugh.

Boy did they laugh.

All I could do was sheepishly grin back at them – they got the last one! Turned out I had slept well past the wake-up time and had mere minutes to dress, freshen up and get my area ready for inspection – so I had to hop to!

And hop to I did. Not only did I get everything together in time, we finally passed inspection without having to get called back. Naturally, and of course, this only happened to occur on our final day here, but, still... worthy of note don't you think? The group photo shoot occurred following calisthenics, next breakfast, and then our team took a stroll through the Rocket Park – riding the Centrifuge and Shuttle Liner in the process.

I can tell you my thoughts were not on the rockets on display that morning, nor with the two rides taken (although I had experienced them before during my time at Space Camp), nor with launching our model rockets later in the day, nor with the Maneuvering Pod we'd all get a chance to flop around in, nor with the Space Station presentations we'd undoubtedly do. No, my thoughts lay squarely with the upcoming mission.

Discovery, the mission I was to command.

MISSION 2: DISCOVERY ///

Besides riding the Multi-Axis Trainer into oblivion, one of my other dreams of Space Camp was to command a Space Shuttle mission. Only then could I know how well of a leader I would be, and only then would I truly get everything I wanted out of the Space Camp experience. My hopes were doubly dashed last time by having the MAT restricted to Space Academy cadets and above, and being selected for two positions on the ground at Columbia Mission Control. And though Atlantis was the mission of choice, the Discovery was what I was dealt; but I would make it work, as a Commander should. Ground control may have the instructions and flight plan all laid out, but it was my decisions that would determine the outcome of the mission. As Commander, I was responsible for everything that happened on that ship... and though I sat, nervously drinking a Coca-Cola Slurpee just before the mission began, I was ready.

At about 11:00am our mission clock started. For the event I wore my light-blue Space Camp shorts (purchased at the beginning of the week) and my Space Academy Level I T-Shirt (provided by the program itself – that and the team photo required me to wear it). The thought crossed my mind about wearing my flight suit but I had worn that earlier in the week and was so hot in it I decided not to for the mission. In any case, our mission would last about as long as the previous nights', 2 hours and 15 minutes or so. And our objectives were about the same as theirs: launch, unload our payload (a communications satellite), rendezvous with the Space Station and conduct normal experiments and EVA's.

My support crew was as follows:

/// Cockpit Group:

- Commander: Ricky Russo
- Pilot: Jeff Bedrosian

/// "EVA" Group:

- Mission Specialist 1: Kevin Richardson
- Mission Specialist 2: Richard Booker
- Mission Specialist 3: Jon Strohm

/// "SpaceLab" Group:

- Payload Specialist 1: Stacy Brooks
- Payload Specialist 2: Chip Connelley
- Payload Specialist 3: Mike Carter
- Investigator 1: Matt Hueffner

/// "Space Station" Group:

- Station Specialist 1: Molly Flanigan
- Station Specialist 2: Wim Becker
- Principal Investigator 2: Matt Hunt

/// Ground Group:

- Flight Director: Casey Fuhrman
- Launch/Landing Director: Hans Scheithauer
- Payloads/EVA Officer: Brandi Lane
- Public Affairs Officer: Chris Cole
- Weather/Tracking Officer: Chris Laystrom
- Spacecraft Systems Officer: Lauri Bishop
- Mission Director: Andrea Gould
- Mission Scientist: Jeff Asell

John Strohm	Wim Becker	Mike Carter	Molly Flanigan	Chip Connelly	Stacie Brooks

Above is a Mission Control schematic of where each person was located (Back angle, facing a big closed-circuit screen). In the following paragraphs you will see a number of references to Shuttle switches and operations. Most of these are abbreviated terms because that is how they were introduced to us. My intention is to bring you along with me as I experienced it - this is as real as it gets, folks.

With any and all last minute instructions set, Jeff and I were advised to take our respective seats in the cockpit – the countdown would soon begin. It was then I noticed two manuals sitting in what would be my console chair. I asked about them before the counselor left and naturally she told us that “one is the mission script and the other is your checklist.” – Checklist? Indeed. Not only did we have to read a script while keep track of the time we also had to perform the activities on these checklists while doing the talking. The checklists weren’t a huge deal breaker, though; since they listed in step-by-step format what switches on which panels we’d have to press before, throughout and during the landing of our mission.

Once we got buckled in the countdown started.

It was T-minus-9-minutes and counting.

A minute later I was into my first checklist, busying myself with Alternating Current Sensor (ACS) to MONITOR. For this, I used the AC BUS SNSR switches on panel O13 and set them to their OFF positions (all three of them) for one second then switched them back to their MONITOR positions. These switches are part of the Electrical Power Distribution and Control (EPDC) subsystem, which distributes 28-volt DC electrical power and generates and distributes 115-volt, three-phase, 400-hertz AC electrical power to all of the Space Shuttle’s systems’ electrical equipment throughout all mission phases. The EPDC subsystem consists of a three-bus system that distributes electrical power to the forward, mid-, and aft sections of the orbiter for equipment used in those areas. The three main DC buses are Main A (MNA), Main B (MNB) and Main C (MNC). Three AC buses, AC1, AC2 and AC3, supply AC power to the AC loads. I cycled the AC ones.

Once that was done, we were ready for the crew access arm to retract, which it did at T-minus-7-minutes. We weren’t going to be getting off this bird; no way!

At T-minus-6-minutes, the APU (Auxiliary Power Unit) was pre-started. The APU's power the orbiter's hydraulic system for our operation - they would need to work perfectly or there would be no launch. Also at this time, the pilot busied himself with his own checklist. Some of the items on it were for him to turn on the BOILER N2 SPLY and BOILER CNTLR switches to ON, BOILER CNTLR PWR/HTR to A, the APU FUEL TK VLV to CL and the APU FUEL PUMP/VLV COOL to the OFF position. After he did all that, the APU CNTLR PWR switch needed to be turned ON and the HYD MAIN PUMP PRESS switches to LOW. The T-minus-5-minutes-and- counting mark came and went as the APU's finally powered up. At this time the Pilot checked the hydraulic pressure to make sure everything was a go - a GREEN. T-minus-4-minutes-30-seconds would have us switch to internal power (we’d be under our own power; nothing from the ground) and configure ourselves for lift-off by the T- minus-2-minute mark.

After that mark all we could do was wait until it was time for the big show. Two minutes doesn’t seem like an awfully long time, but when you’re waiting for the big bang... it is an eternity! Before long, however, the countdown I awaited my entire life (up to this point) to hear had begun...

“T-minues-10... 9... 8...7...6...5...”
“No RSLS Aborts," I said to myself. “Good.”

A Redundant Set Launch Sequencer (RSLS) abort would show if the Main Engines did not start as commanded, which would be lighting at the T-6.6 second mark. From this point to the ignition of the Solid Rocket Boosters at T-0 seconds, the main engines could be shut down. It’s actually happened on two shuttle missions thus far – STS-41D and STS-51F – and it has always happened under computer (not human) control. Luckily we didn’t have that problem here.

"4... 3..." - The Main Engines ignited!
"2... 1..." - Oh god, here we go!
"Zero..."- I yelped out, "SRB'S IGNITE!!"
"LAUNCH!" Mission Control called over.

"Roger Mission Control, we are at launch!" The launch happened perfectly and was quite life like. The simulator titled up as much as possible and shook around quite violently to simulate the bumpy ride astronauts normally feel during a lift-off. I give it a pretty good score for realism! Within six seconds the shuttle cleared the tower and we began our roll maneuver (an animation of the event was displayed on our “windows”). At T plus 30 seconds the Pilot and I switched the Attitude Director Indicator (ADI) and Attitude (ATT) switches on panels F6 and F8 to the LVLH position, thereby leveling us out. It was a smooth ride for the next minute and a half. By the time T plus 2 minutes came, it was time to jettison the SRB's (because they've passed their usefulness by this time). Seven seconds later this separation was to begin - only it didn't happen (but I’ll get to that in a moment).

A negative RTLS was called up at T plus 4 minutes and 20 seconds, which is a “Negative Return to Launch Site” abort. This basically tells the shuttle crew that if there is a problem the Shuttle could no longer safely return to the launch site area to land. There would be other places we could land around the world if necessary, but those too would become limited once we reached a certain altitude.

And then, "Mission Control, this is Discovery. We are single engine press to MECO." which meant we were ready for our Main Engine Cut Off. At T plus 8 minutes, 38 seconds into the mission, this should have taken place. It didn't. A few seconds after that the External Tank separation was to take place. "ET Separation on my mark!" Yet, nothing happened. OMS (Orbital Maneuvering System) burn #1 fired then #2 right after placing us in orbit. And once we were securely and safely in Earth Orbit, we received a message from mission control. "Control to

Discovery," said the director. "We don't show a green light on our panels for the jettison of the SRB's and ET?"
I was puzzled since as far as I knew everything happened like it should have – we were in orbit. Ahh, but then a thought crossed my mind: "Were we supposed to do that manually?" I asked. "Yes Commander," the operator responded. "Sorry," I said in apology. "I was not informed." And it was not part of the checklist I had on hand.

So much for commanding the perfect mission.

We were in orbit now and our next task was quickly coming upon us: to prepare for the satellite deployment. This would be a rather easy task to complete and was the responsibility of our Pilot. I tended the control panel on the Flight Deck, minding the Shuttle's position, while the Pilot rose out of his seat to the Remote Manipulator System (RMS) panels behind us, preparing to open the Cargo Bay Doors (CBDs) and complete our first mission assignment. Sounds easy enough, right? Wrong.

"Ricky!" I hear, as I'm going through one of my checklists. "Do you remember how to launch the satellite?"

Jeff had forgotten which buttons to press and if he couldn't remember how to do perform the task it would naturally fall upon me. So I got up and said, "Yeah, you turn this one and press that and... uh, I don't know. You were supposed to pay attention!" By that time there wasn't anything we could do - the launch window for the satellite had passed us by. The only thing we could do was sit back down and continue with the next task, which was rendezvousing with the space station. Even so, we wouldn't be starting the docking procedures for quite some time. During the preparation process we were supposed to make comments here and there about the satellite we – ahem – didn't launch, such as: how perfectly it had deployed from the cargo bay and how great the reception was we were getting from it. Since we didn't launch the satellite at all it struck me dumb to continue to read those lines, so I called down to the Instructor, who was monitoring the flight. I said, "Should we say the satellite lines even though we didn't get it deployed?" He said negative and in some instances we didn't talk to ground control – or anyone - for a long, long time.

But when we did it was usually to say something quickly, perform a checklist, then say we completed it – nothing spectacular. This too should have been easy. I for one would wait for the time on the clock to be right, say the corresponding line then get to my checklist; after completing that say my final line. One would think that it would be a simple task for people to understand. This was not the case for some however. Every time I would do that: read a line and begin my checklist someone would undoubtedly say, "Commander or Pilot, read your lines." Finally I got so fed up with it that I said back, "I'm busy right now. I have a checklist to complete before I say my line. Not before. Calm down!" But even though I had said that some still didn't get it. Go figure. Once everything settled down again we prepared the shuttle and our other crew members for their EVA's and experiments in the SpaceLab module. For the EVA, three of our crew would step outside Discovery and try to construct a Tetrahedron shaped piece of equipment just to see if astronauts could actually construct such devices in the void of space –

a test if you will. As for the SpaceLab experiments, even as Commander I wasn't privy to what dastardly trials they were running.

Time continued to tick away and before the Pilot and I knew what was happening, the three Payload Specialists were returning to the Flight Deck, their experiments at an end. Chip was the first to open the hatch from the Cargo Bay and when he did so it slammed against the wall of the Shuttle, causing a rather loud "BOOM!" to ring out. This started me and the Pilot and I heard Jeff turn and say "Oh no..." So we began to look at our instrument panels for any signs of errors, aborts, or problems that could have caused such a huge bang. There wasn't an indication of an explosion, but... with this commotion as well as the un-deployed satellite and the botched SRB/ET separation stuff at launch, we were sinking and sinking fast. No words had to be said; we knew. It was then I turned around and looked behind me; when I saw Chip in the airlock I instantly knew the cause of the problem and let out my frustrations over the airwaves: "to make matters worse, here comes Chip."

We had just cleared the SpaceLab folks when the EVA crew began to come back aboard as well, making even more noise. When they finally settled down into their seats and prepared for the upcoming rendezvous with the space station, rather than keeping quiet as would have been the protocol, they started talking amongst themselves! I pretty much ignored it since I had checklists to perform and various other assignments – such as an upcoming OMS burn to put us in the right orbit to dock with said Space Station. But then apparently someone didn't care for the noise because I next heard over the headset: "Commander, quiet your crew down."

I knew they were loud but at the moment I couldn't do anything about it. There were just too many lines and checklists; I got fed up enough to turn around and yelled, "SHUT UP!" which got their attention. It was so funny because it got so quiet in there. Then someone said, "Did he really have to say shut up?" Obviously someone didn't like my use of the words but I certainly didn't care. "Yes, that's exactly what I wanted him to say," came over as a reply. Obviously the SYST Operator agreed with me, which gave me a little confidence that I was doing a good enough job. (Although I'm sure I wasn't.)

The mission clock ticked along and it was just about time to dock with the Space Station; I was getting a bit nervous. With all the problems

we'd had on this flight I just knew we'd end up crashing into the Space Station (like one of the crews did during yesterday's mission) and I didn't want anything else to go wrong.

Besides, I wasn't sure what we were required to do in order to dock in the first place.

In order to Dock with the Space Station we had to transfer to its orbit. To do so we needed to run another OMS Burn. When I hit the switch to arm the engines the light did not illuminate on my panel. I didn't think much of it at the time since they eventually lit up. Then as we were supposed to shut down the OMS engines, we shut them down but the light did not go off. So Jeff and I looked at each other with concern – something was wrong. We called down: "Mission Control, Discovery. Are you monitoring the OMS engines? We appear to have a problem." Right away they came back. "OMS engines fine. A computer malfunction was found and corrected. Good job!" Phew... just a small computer glitch. It made me feel a little better...

With the crew quiet and the shuttle's orbit set, we began our trek to the Space Station. Steady... Steady... CLUNK! "Hard Dock achieved." The Space Station docking was one of the high points of the mission. It is also where it gets a bit confusing. I don't remember if we left someone on board the module or if we picked someone up - or both! I was so engrossed in the neat computer graphics they were displaying across the shuttle screens to be worried about the transfers. Besides, we didn't stay docked with the station for long and before I knew it, we were back out on our own in the big blackness of space on our regular orbit.

Then it was announced that we had to make some kind of emergency landing due to the fact that either one - there was a storm brewing at our primarily landing strip or two - there was something wrong with the shuttle's systems (I don't remember which). The SYST Operator called up from ground control to tell us the procedures required in this emergency landing. We wouldn't be doing this by computer - the Pilot and I would have to fly her in manually. The two of us would have to perform a series of S-Turns, which would position the Shuttle in the correct direction for landing, not to mention slow it down!

There wasn't much time so we had to prepare quickly. We fired our De-orbit Burn on time and in a flash we were on our way. Then we had to key in the correct codes to position the Shuttle just right so we wouldn't burn up on re-entry. I would enter these codes myself on Panel C3 - located between us. This was a great location because if I was impaired or there was another set of codes that needed to be entered; the two of us could do so. With the code OPS 3 0 3 and Item 24 we were go for Roll; item 25 for Pitch and item 26 for Yaw. Shuttle Discovery now had its maneuverability system activated. Next we had to set and check switch positions for our entry process. We really didn't want something turned off that we might need in the next few minutes. So I set CABIN RELIEF A and B to - ENA, ANTISKID to ON and NOSE WHEEL STEERING to OFF. I also had to set the ENTRY ROLL MODE to OFF and set both Speed Brake/Throttle controls to FULL FORWARD. Plus a plethora of other switches – countless others – that had to be checked and re-checked in order to make sure everything was right.

Item 39 EXEC was issued to get the orbiter control surfaces to prepare hydraulic system for entry and landing. Once that was checked, an Item 40 EXEC was performed to shut that down.
Time was going by quickly now and every second was critical. The Pilot and I did just about what we could to get the orbiter positioned before the Atmospheric Entry Interface began. Before we knew it the LOS was called and we lost communications with the Space Station and Mission Control.

LOS is caused by ionized particles enveloping the orbiter at this stage of entry. It can be a nerve-racking time if something goes wrong. I totally forgot about LOS and started playing with the communications to see if I could raise someone. When I couldn't get anyone on the horn the both of us became a little worried. Then I realized we lost our signal due to the Ionization Blackout effect. When the signal came up we calmed down and prepared ourselves to do our S-turns.

Using the control sticks in the middle of our panels – right in front of each of us - we did as we were instructed. To do these S-turns we pushed the joystick left 5 degrees, right 10 degrees, then left again for 5 degrees. In this sense a degree equaled a second so all we had to do was hold it left for a few seconds, then right for a few more seconds then left again, etc. I did S-turns once, the pilot did some too and then I finished the final S-turns and put the landing gear down.

Seconds later... TOUCHDOWN!

But it was not over yet.

I had to set the speed brake to 100% to slow us down. This is accomplished by pitching the nose forward to lower it, then pull full forward once the wheel touches the ground while also using the pedals beneath us to brake as required. Once we stopped, though, we still had to secure the ship and that was up to the Pilot and me. I reset the SRB SEP switch to MAN/AUTO and ET SEP switch to AUTO while the Pilot busied himself on deactivating the APU's and shutting down the OMS and RCS Systems. And once the code OPS 901 PRO was entered into the computer, our mission was finally over. Everyone cheered! YAY!

Yeah, it wasn’t perfect but it was over. Two grueling hours of hard work and we felt good about ourselves; why not, we didn’t die! Upon exiting the orbiter and regrouping with the rest of the crew on the training center floor I asked around about how many on-orbit problems we were given. There were a total of three: the OMS engine, something to do with Freon and the computer problem associated with the OMS engines. The pilot and I got more handshakes and "good jobs" then I had expected or ever got before. It was a real experience that I was glad I could be a part of! I always wanted to be the Commander of a shuttle mission (especially during Space Camp) and now that I had my chance I was flying high. I also received an extra bonus out of all the hard work: Even though I didn't have the Atlantis to command, I was able to take the shuttle Discovery and land her. I will always remember that.

A well-deserved lunch (albeit late) awaited us following the mission (boy was I hungry) and then it was out to the launch platforms to send our model rockets high into the sky.

ROCKETS AWAY! ///

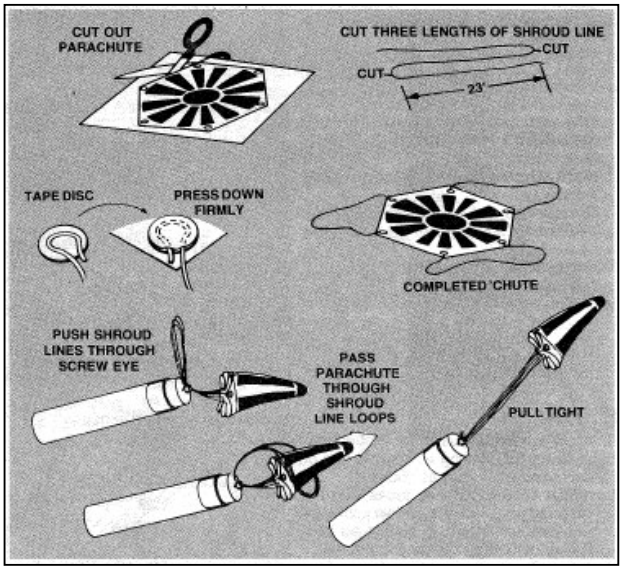
As I'm sure you're aware of by now, while at one of the Space Camp/Academy programs, one of the things you get to do is make a model rocket. The rocket itself is a simple design - nothing fancy, but you get to make it yourself. If the rocket is made correctly you have the opportunity to launch that rocket at the end of the week, usually done at the Space Camp Rocket Launch Pad near the U.S. Space & Rocket Center Campground. I remember with fondness the rocket I captured in 1988, and the one I built myself in 1989 while attending Space Camp; therefore, I rather looked forward to making another one here at Space Academy. When it came time to actually build our rockets, though, I was taken by surprise: we wouldn't be building one rocket per person; rather, we'd be making a small "team" rocket. And this is the reason I've neglected to mention the rocket up until now, because this little group project has quite the story.

Leigh Ann, our day-time counselor, broke us up into little groups with about six or so people within them. The group I was in consisted of myself, Chip, Chris Cole, Hans, Jeff (my Discovery pilot) and Kevin Richardson. That first day we seated ourselves around the Shuttle Park area and were handed the ESTES kits. Since we'd only be making one rocket per small group I told my teammates that "anyone of you can have it since I already have one from the last time I was here." So with that Chip immediately spoke up and claimed the rocket for his own. No one challenged him on it, nor did they seem to have any interest in owning it for themselves, so Chip's rocket it became.

The assembly process was virtually the same as it was on the rocket I put together for Space Camp - The kits came with instructions and all the necessary parts. All we had to do was put it together! When we started putting the rocket together as a group, Chip got up and walked off. He started talking to some of the other groups while the rest of us worked to put the rocket together. This struck us a little odd because it seemed that we were going to be putting together "his" rocket rather than he. Why should we do all the work we wondered?

It was during that moment on the ground I concocted a plan, a plan for revenge but I didn't anyone in on the secret just then.

The following day, as we sat round the training center area (near one of the side doors leading out into the Rocket Park – near the snack center and restrooms) putting the finishing touches on our rockets, Chip once again left the small group to talk it up with those around him. So when he went off I put my plan into action: I spoke to my teammates and said "we should sabotage the rocket." Curious, they wondered how that goal could be accomplished. I told them not to worry, I had the perfect idea, but they baulked, too chicken to do anything. So I did it all myself. The trick was, though, to make sure Chip didn't see me or realize anything was amiss with the rocket itself.



So, I couldn't just break off a piece of it and leave it loose - that would be a dead giveaway. No, something sneaker had to be done and as I said, I had the perfect idea. The rocket itself is a two-stage rocket and consists of two engine segments around the tail. This meant that one engine sat below the other and the segment connecting the two was a fall-away piece. What I did was glue the two stages together (which you are NOT supposed to do), and then cut the majority of the strings to the parachute. I didn't cut all of the strings mind you, but most of them, knowing exactly what the rocket would do once the parachute was deployed – err, mayday, mayday!

With those two things sabotaged, the rocket was ready for launch.

We walked out to the launch complex (which is a good hike from the space center to the camp ground by the way) and waited to place our rocket on the pad. We knew ours was sure to make a BANG and therefore waited our turn somewhat impatiently. Other teams were already there and their rockets were going sky high. The only thing we could do was sit in anticipation. Once our turn came up, though, we told Chip "since it is your rocket, you take it out there." So like a good little person, he carried his rocket out to the pad and would watch the launch from there. Meanwhile, Chris, Hans and I were behind the safety stand in hysterics. Jeff looked on biting his nails and Kevin didn't seem to be concerned one way or the other, but I caught him looking.

A few moments later the rocket lifted off the little pad and went straight up without incident. Then as planned the second stage ignited and all hell broke loose. Here the first stage should have dropped out at this point giving full range to the second one behind it, but because I glued the two stages together, it inhibited the second stage, causing the first to shatter and sending the rocket not straight up like it was supposed to do, but had it turn sideways and shoot towards the Marriott Hotel!

WOOOOOOSH, BOOOM!

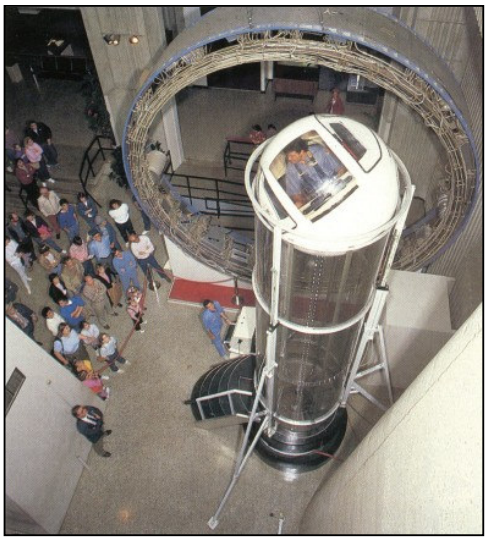
The sound it made when the second booster ignited compared to the sudden change in direction made the three of us fall to the ground in a hysterical fit. By this time Jeff had his hands on his cheeks, stunned, and Kevin cracked a smile. It was a riot! The final blow came when the second engine expired. This would then tug on the parachute for the rocket to float down nice and easy to the surface again. Well, when it came time for the parachute to deploy, it came out all right but there was no nice float in store for that rocket. It fell out of the sky like a lead balloon, crashing down at the Marriott Hotel Parking lot.

PLOOOOP!

By now everyone there was hysterical - us three, the entire BDM team and everyone else who was there (whether they were on our team or not). Chip was just standing there astounded, not sure what had just happened. Chris, Hans and I were giving each other high-five's to celebrate our win. And when the counselors asked us if that was planned, all we could do was laugh. I think they got the point. By that time I had to tell the team what was up and they all got a kick out of it - including my roommates! It was a blast! As for Chip, he still wanted the rocket so he went running after it with Chris and Hans in tow. I couldn't believe how perfect everything turned out and I can still see that rocket shatter and sharply change its direction – even hours after!

All of this was done for a little revenge... isn't it sweet?

* * *



Following the walk back from the rocket launch pad, and our general re-assembly underneath the Saturn IB at the Rocket Park, we embarked on one of our last training apparatuses of the week – the Maneuvering Pod. This piece of equipment, which appears to be nothing more than a circular pod (or capsule) inside a long upright metal tube, can be found just outside the Museum doors to the Rocket Park, tucked away into one of the corners as if to say... go away! But we did not go away; we embraced it! But just what were we embracing? The Maneuvering Pod simulates weightlessness through the use of powerful blasts of air. You strap yourself inside the capsule (pod, or ball) and ride a gust of air to the tube's top. After being suspended there for a few moments the air is suddenly cut off, allowing you – the rider – to experience free-fall, or, weightlessness. Before you hit the bottom another blast of air squeezes out, cushioning your fall, then blasting you back up again!

It really is quite the awesome little apparatus, which does simulate weightlessness quite well, but there is one drawback to the machine: it's small! Sitting in there amongst cramped quarters – even by yourself, as there isn't room for a co-pilot – isn't the most fun thing

to do... but bouncing up and down and feeling what it would be like in orbit (even for a moment) is priceless and worth every ache, pain, bump and bruise!

With our feet firmly planted on the ground once again, we spent the rest of the afternoon in the Museum, getting a little more time to ourselves, then re-assembling as a team (with other teams) in the lecture room to give the presentations on our space station designs. Since these presentations were long, drawn-out (a.k.a. boooooorrrrrring!) affairs, I won't hang it long except to say: who thought it was a good idea to put this activity before we ate dinner? Who could have paid attention to what was said while our stomachs were growling?!

A movie in the SpaceDome followed dinner and then we were cut loose.

And since we've got plenty of time this evening, some of the guys and I are going to see about getting another basketball game going – who's ready?

Day FIVE – GRADUATION DAY
FRIDAY | JUNE 21, 1991

Greetings Camp Graduates!

Yes, sadly, that day has come – graduation day. The day where we earn our wings, obtain our completion certificates and for those lucky few of us, collect the awards celebrating our achievements both in team play and as individuals. While that time has come and gone for me – I'm now in my grandparents Winnebago and we're currently on the road for Sevierville, Tennessee (our home-away-from-home for the summer) – I leave feeling fulfilled, but with mixed feelings. Not to mention tired off my arse! So what was it like?

* * *

According to the schedule, Space Academy graduation would take place around 11:00am, under the auspicious Pathfinder in the Shuttle Park, amongst our family members. A fitting end to our week long ordeal, or so it was billed. It was a date I couldn't wait for. The program was a grueling five days and while I did hate to see it end, I knew it must and I was ready. Sure, I had fun and enjoyed every minute – how could I not? – but there comes a time when you've just had too much. These really long days had finally gotten to me... and the early wake-up calls, which they didn't suspend this morning even though we were leaving! And I also knew that graduation itself would be rather long, which wouldn't help matters any. Why? Each team would have to be called up separately so that its individuals could be handed their certificates and wings and, of course, be seen by their family. All of my immediate family was in the audience waiting for me (my mom, dad, grandmother and grandfather) – just where at first I did not know – but somewhere amidst the sea of heads. And being positioned behind the "Pathfinder" shuttle in the Shuttle Park, there really wasn't anything for us to do but wait, and wait, and wait.

Chris, Hans (right) and Chip (far right), my Camp pals, waited with me as it was a day of triumph for us all. As I sat there looking at them I couldn't help but reflect how our little group formed and how the dynamics changed over the five days. First and foremost, while the four of us found one another at the orientation tour, it was Chris and Hans I bonded with more (that probably because I bonded well with Chris and Hans and Chris became fast buddies), which left Chip the odd-ball of the group and at first we kind of shunned him – I know! Chip was picked on quite a bit as he didn't seem to grasp anything that happened (and you might remember my frustration during the Discovery mission as he entered the cabin with a loud bang).

Although by that time he was more welcome in our little three-some, that wasn't always the case. And it wasn't until we were walking through the Habitats one afternoon that I remembered something from my Space Camp experience that helped me realize that he was going through the same basic thing I went through in Camp. Even though I wasn't picked on; we were becoming to Chip what Mark was to me - a pain in the side. Once I made that realization we all mended our ways, even if Chip was still clumsy and annoying at time. He, I'm sure appreciated the change but said nothing of it.

It's a different story what happened between Hans and I, and sitting here at graduation I can tell he's still smarting about it. In fact he's never quite been as jovial with me since, but what is done is done. What did I do? Well, I kind of defended myself against an attack!

It happened the other night while we were leaving the Habitat Complex to visit the Space Dome for our nightly movie. We hadn't gotten into the hatch between Hab I and Hab II when I felt a kick at my feet. I stumbled, of course, and turned around to curse out the one responsible. I was shocked to see Hans (who I sort of nicknamed "Shorty", yes because of his size) there, so I asked him not to do that but he didn't heed my warning; he tried to trip me again, and again, and again. After a little while longer I had just about had all I could take of it – it's all in good fun unless you press on after being asked to stop – so I gripped my Space Academy manual tightly between my two hands, turned around and sharply smacked him right on top of the head – BOOM!

I stunned him and he dropped to the floor. Stunned by this sudden outburst from me Chris (who was walking right next to him) yelped "Why did you do that?" to which I promptly replied, "That's what he gets... I asked him plenty of times to stop and he did not." Hans got up and continued about his way – was he playacting? I'm not sure – and then rightly so began complaining about a headache.

Although I tried to joke it off by kidding about his head, I felt bad about it because I hadn't meant to strike him that hard. As I said I don't think he liked me quite as much afterward, but we pulled together to finish out the week and that's all that's important.

Beyond my feelings, one of the nuttiest things happened while we waited for graduation to begin – we were all entertained by some peculiar musical selections! Most of the music was from the fifties and sixties – music I unbelievably know well – but if you listened more closely to the lyrics of these songs you'd discover they weren't the originals the world knew and loved: they were subtly changed to include a little space fun. An example – the Beach Boys' 1964 classic "Fun, Fun, Fun". The chorus of the song: "and she'll have fun, fun, fun, until daddy takes the T-Bird away" was replaced; the word "Shuttle" was substituted for "T-Bird". At first I wasn't sure I was hearing it correctly, but before the song was over there was no mistaking the substitution!

Eventually counselors called for us to sit down and get quiet. A murmur broke out amongst the campers; we knew that meant the ceremony was about to begin. But even then the wait was almost unbearable. While we sat there, the director of the USSRC spoke, a number of the support staff came up for a few words, then one-by-one, counselors were called up to introduce their teams. It seemed like an eternity passed us by before it was our turn, BDM's turn. Leigh-Ann approached the podium and began: "I have had a very energetic team this week and they work well as a team and I was very proud of them." Then she called us one by one to receive our certificate, wings, and session group picture. And where do you think my parents were seated? Right up front, of course.

After all the teams went up, some other guy took the center stage and began to explain the individual awards that he would be giving out to various trainees. Now was time to pay attention - our team could win some of these awards!

He started out, "At the beginning of the week, we promised these (meaning awards) to the trainees as well. Some of them were slightly motivated by the competition. Some of them and the majority of them were motivated purely by doing the best they possibly could. And it seems that is a characteristic that all of them have and I hope that they carry that on throughout life. So long as they do their best, you guys will get what you want."

Yeah, yeah I thought, let's get on with it! I want to know who won these awards!

He continued and announced that the first award was the Best Space Station award. He explained it as, "Now, on Monday, I talked to all the trainees and I asked them to use their imagination. I asked how many of them had ever daydreamed. All of them have. I asked them where? School. (laughter) I told them, since they were all talented in that area that we're going to use that. We're going to use that dreaming, that imagination. They had to design a space station for the year 2080. 2080 is a very hard time to think about. What's the world going to be like, what's space going to be like? What are the needs of the people alive, during that time going to be? This is something that the trainees had to figure out for themselves.

"We gave them a few constraints. We told them that they could only use the shuttle 20 times. We told them that they had to support life, and all the details that went into that had to be discussed. On Thursday night they gave an oral presentation of their space station ideas. And the night crew evaluated that. They then turned in a written report detailing their ideas with diagrams drawn up. These were also evaluated. Out of the 34 space station ideas we had this week. There were about 17 that were absolutely excellent. We had a very hard decision to make on which one would be the most feasible; which one we thought was the most thought out. You want to know who won?" – he motioned back to us – "They're going, get it over with! This week, I would like to proudly give the best space station award to Boeing Even." Boeing Even! No way! Not them, what about us! Ours was good. Wasn't it? But we didn't win... there were plenty left to go, though.

"The next group award is called the Best Mission award." Oh yeah! We should win that one, I thought. "The Best Mission award was introduced to them on Sunday evening, once again on Monday, and probably again on Tuesday, then again on Wednesday and then last night for the last time; all of them buying for this one award. All week long the trainees have been striving to be the best team. They also ran two mission simulations, both of them two hours in length. Prior to going in and running these simulations in the shuttle, they went through training. All of the teammates were positioned. Then our SIMMS crew taught them the procedures. However, we did not base this award completely on how well they did their missions. We looked for the perfect team all week. When the counselors pick a best mission team, they're picking a team they would feel comfortable in sending to do just about anything. Because they can work together, have fun together, and can overcome any of their problems. [It was] a very tough, tough decision once again. However... the best mission award goes to...

“One of the 17 teams back there.” (laughter).
“I got to go somewhere.” (laughter again).
“Ladies and Gentlemen, help me congratulate the Lockheed team."

DRAT! We didn't get that one either. And with just one more left our chances looked grim; this one was a good one though - the Mission Patch Award – and with Wim’s design we were sure to win.

"The next three awards that we give out are individual awards," *oops, I guess not the patch award.* "These awards go to trainees that have shown themselves to be excellent teammates, leaders in the team. All our trainees meet these requirements, usually. It's a very difficult decision.

The counselors and the SIMMS crew are tasked with having to notice trainees that sort of stand out. We give out two awards called the Right Stuff Award. Of course it was named after the term given to the first astronauts that were chosen. They were said to have the right stuff. They had what it took. The team leaders nominated these people. The SIMMS crew the noticed them and democratically voted on these people. This week our first Right Stuff Award winner comes from the Lockheed team: Caroline Mitten."

Darn, past me up that time. Maybe I'll get this next one?

"The second Right Stuff Award winner comes from the Columbia team: Matt Hilley." AAAAARGH! "Out of all the nominations that were received, we had to decide on the Right Stuff Award winners. But there was one person--and the final award that we give out is called the Outstanding Trainee Award. It's a very difficult award to decide upon, because there are 340 outstanding trainees, but in talking to the crew about the nominations, this person is said to be the ultimate teammate, the person who carried the team, the holder of the team spirit. This person is said to have an unquestionable thirst for knowledge. This person comes to us from the TRW team: Jose Alvarez."

And that was it.

No Mission Patch award either, but that suited me just fine. The only reward I really needed was the knowledge that I had completed the program; that I had participated in fulfilling yet another dream. I’m not so sure some of the other members of my team agreed; however, they all came to the consensus that they were happy enough not to hear me say “Welcome to the Space and Rocket Center, home of Space Camp. New for 1990: Aviation Challenge! Columbia, Atlantis, Enterprise, Endeavour, Discovery”, the phrase on the info board next to the cafeteria, anymore. And I guess that was reward enough.

I discovered my parents in the first row; they congratulated me and took lots and lots of pictures (to make up for the camera failure last time, no doubt). We cornered Leigh-Ann, my daytime counselor, and a couple of teammates, and then we were off to the Habitat to pick up my things.

Once they were secured in the car we toured the Rocket Center and had lunch, then took in the IMAX film “Blue Planet”, which I had seen earlier in the week (I’m so happy I got a chance to see it again before I left). The movie ended about 45 minutes later and we toured the museum after. And then it was time to depart ourselves: my parents left for home in Sebring while my grandparents and I left for Tennessee. And I wondered then... would this be the last time I saw the Habitat, the US Space & Rocket Center or Space Camp?


UNITED STATES
USARMY
WEEK #
24

SPACE CAMP MEMORIES

Adult Adventures

prologue

"THE LONG ROAD BACK"

Invariably, every story begins with a forward, an introduction that serves two purposes. One, it begins the narrative, setting the stage for whence the story is staged, and two, serving to bring the reader into the world the author has created. For a non-fiction piece such as this, and even more-so for the story told within, an introduction that details how the event has come to pass is equally important. Therefore, let me begin by offering this: the event in question is returning to the US Space & Rocket Center for an Adult Space Academy program, and the story is the adventure that unfolded therein.

But my introduction is somewhat different. It's unusual because *Space Camp Memories: Adult Adventures* is a continuation of a story that began in a collection that chronicled two previous voyages to the Space & Rocket Center in my youth - *Space Camp Memories: Youth Programs* – where I participated in the Space Camp and Space Academy Level I programs. Like Space Camp Memories of my youth, the Adult Adventures detail Space Camp experiences I've had as an adult, which began in September 2003 with a three-day program for ages 19 and over, continued in June 2007 as Space Camp celebrated its 25th anniversary, and stopping (for the moment) in June 2012 as Space Camp once again celebrates an anniversary, this time it's 30th.

* * *

In 1950, when Dr. Werner von Braun arrived in Huntsville, the city boasted a population of only 15,000. Then the town was known as the "Watercress Capital of the World" but today it has been forever forged into the history books as *the* place where America's space program began. How does Alabama fit into the Space Race equation? Although the astronauts launched from Cape Canaveral, Florida and missions were controlled from Houston, Texas, the rockets that were developed to put the first US satellite into orbit and set men to the moon, where the power for today's space shuttle was developed, where the modules for the International Space Station were designed and built in Huntsville.

But how do we go from developing America's rocketry to housing a summer camp for space enthusiasts?

During the final months that von Braun and his team of scientists were refining the giant rocket that sent Apollo astronauts to the moon, he was also preparing to launch another important project: a permanent exhibit to showcase the hardware of the space program. Von Braun thought that since there was Disney World and Amusement Parks, a park-like attraction focusing on space and science would be of interest to the general public, especially as a way for the public to see things that only those inside the gates of the Army's Redstone Arsenal got to see and work on. Today, the U.S. Space & Rocket Center houses thousands of artifacts, including: the charred Apollo 16 Command Module, a rock brought back from the moon, an original Saturn V lunar rocket vehicle and a full-sized space shuttle mock-up.

But von Braun didn't stop there. As Director of the NASA Marshall Space Flight Center, Dr. Braun began to cultivate an idea to expose young people to science and math using the space program as the focal point of a course of study. If the country had baseball and football camps, why couldn't science have a camp to encourage interest in the space program? He began to work on the Space Camp idea in the mid 1970s with fellow NASA employee later turned US Space & Rocket Center Director Ed O. Buckbee, who saw the idea through to fruition following von Braun's death in 1977.

Space Camp's first year – 1982 – was very much like early space travel: a step into the unknown. But 747 students signed up to find out about the excitement of space travel in von Braun's summer-camp environment. The following year that number rose to 1,400. The next year it was over 2,000. Then 3,000. 5,000. In 1986, with the release of the movie "SpaceCamp", filmed on location at U.S. Space Camp in Huntsville, Alabama, attendance shot to over 12,000. The word was now out.

That's how I found out about Space Camp, through the movie.

SpaceCamp: The Movie is a thrilling contemporary adventure about a group of teenagers whose summer at a camp for future astronauts turns into an unexpected space shuttle voyage. The film stars Kate Capshaw as Andie, a camp instructor and astronaut who has not yet fulfilled her dream of space-flight; Lea Thompson as Kathryn, a serious-minded young lady who is determined to become the first female shuttle commander; Tate Donovan in his feature film debut as the brash but likable Kevin, who discovers the spirit of team-work; Kelly Preston as Tish, a lady with a photographic memory and a passion for the fashions of Cindi Lauper and Madonna, who proves to be less frivolous than she first appears; Larry B. Scott as Rudy, a young man for whom Space Camp provides the key to self-confidence; Tom Skerritt as Zach, a former astronaut and head of Space Camp; and screen newcomer Leaf Phoenix as Max, a star-struck youngster whose dreams of space adventure come true in a way that exceeds his wildest expectations.

I was hooked. Already a self-described “space nut”, and just beginning to reach for the stars myself, this was a fantastic adventure to behold. The film would quickly become my all-time favorite (even surpassing “WarGames”; when I found out that Space Camp was a real place – I wanted to go as soon as possible! But what really is Space Camp?

Space Camp is a five-day adventure for kids in the 4th, 5th and 6th grades, and it provides the opportunity for enthusiasts to take part in the building of their own model rocket (which is launched later in the week), tour the USSRC’s Rocket Park, take off-campus trips to the Marshall Space Flight Center, and see amazing IMAX films such as “To Fly”, “Hail Columbia” and “The Dream is Alive”. The week long adventure would also be full of training, in which cadets would learn to use such equipment as the Moon Walker (simulating the sensation of walking on the moon), the Centrifuge (simulating the 3 G's the Shuttle astronauts experience at lift-off), the Space Shuttle Liner and the 5DF (Five Degrees of Freedom) Chair. The week also has trainees take part in a practice splashdown rescue operations (for emergency egress purposes) as well as teamwork skills tests. All of which to prepare the cadets for the grand finale: a two-hour Space Shuttle mission simulation, which will use all the techniques and skills learned throughout the week.

I attended *Space Camp* from June 11th through 16th 1989.

It took two years for the Space Camp Foundation to conceive, create and put into action a more advanced program for more advanced youth following the Camp’s original creation in 1982, but by June 1984, Space Camp Level II (later “Space Academy, Level I”) was born. This five-day program open to kids in the 7th, 8th and 9th grades would intensify academic study with an increase focus on Space Shuttle operations. Throughout the week, trainees would use such equipment as the 1/6th Gravity Chair, Multi-Axis Trainer, the Space Station Mobility Trainer, discover weightlessness in the Maneuvering Pod, and use the GMMU to train for satellite docking. Two, two-hour Space Shuttle missions (undertaken in highly accurate simulators) would comprise the use of such mock-ups as the SpaceLab, the Space Station Freedom module, and the Hubble Space Telescope.

I attended *Space Academy, Level I* from June 16th through 21st 1991.

From the moment I graduated from Space Academy in 1991 I wanted to do it all over again. By proxy that was supposed to happen in 1993 with the next level program at the time, then simply referred to as Aviation Challenge - today there are three levels: Mach I, II and III depending on your age (similar to Space Camp, Academy Level I and II). Aviation Challenge offers kids the chance to train as a fighter pilot rather than an astronaut, but as I stated at the end of *Space Camp Memories: Youth Programs*, I based my decision not to attend on the militaristic nature of that program. Rather, I wanted to continue training as an astronaut than wear camouflage and get bossed around. And while that was mostly true I was also beginning to lose interest in the bigger picture. Most of the magazines to which I had subscriptions were canceled (Odyssey, Astronomy, Deep Sky, National Geographic, etc.) and my outlook on becoming an astronaut changed. By the time I had entered High School, Space wasn't the most important thing in my life.

By 1994, as I was finishing up my junior year, a little spark set off a small flame, and for a while it seemed that I might complete the journey after all (by attending Space Academy, Level II – now called Advanced Academy – the highest and lat program in the space track to master). I'd thought about doing it all winter, got excited and reared to go, but by spring the desire to spend all that money was gone, and later the chance missed. But something special did come of it: the birth of a self-celebrated "Space Camp/Academy Awareness Weeks" – a period of reflection from June 11th through 21st during which I could celebrate the memories of and time spent at Space Camp, with an all-inclusive date on June 16th. The 16th was selected as the crux of these days because it was the only calendar day both Space Camp and Space Academy experiences overlapped (Space Camp from June 11-16, 1989 and Space Academy, Level I from June 16-21, 1991).

The summer of 1994 also brought fourth an audio recording in which I fondly discussed my memories of both programs for posterity. Curiously enough it was entitled "Space Camp Memories" and it became an instrumental tool in the creation of *Space Camp Memories: Youth Programs*, the prequel to the adventure you're reading here.

I turned eighteen and graduated from high school in 1995. With the newfound freedom that came with coming of age, thoughts once again fell upon returning to the Space Center. Although the window to do so as part of a youth program had closed, that summer, on June 16th, I drove from my grandparents house in Sevierville, TN all the way to Huntsville, AL just to relive a few memories and to claim that I'd stepped foot on the grounds once again.

The journey was both satisfying and discouraging, as many changes had occurred between the years, transforming the campus and training center facilities beyond expectations. I remember thinking poorly of the state of the Space Camp training facility and the darkened conditions of the museum, but at least I had made an attempt to return in some fashion, right?

Visiting in such a limited fashion didn't quench the thirst to be part of the action though, as there was one point to the 1995 visit that rang true: I was just a tourist, not a trainee, and if I ever wanted to step foot on the Training Center Floor, or see the inside of the Habitat (which I so desperately did) again, I had to set aside any and all personal fears and go. The next two years followed pretty much the same path. A change of employment in early 1996 negated any vacation opportunities that year. In 1997, I planned to use one of my two vacation weeks attending the Adult version of Academy Level II, but when all was said and done I didn't make it. October 1997 held another special event in my life: #LionKing'97, a meeting of friends at Walt Disney World. Moving in 1998 so I could attend the University of Central Florida put the kybosh on attending then. And the next year was the same.

Can you see a pattern?

Every year that I had plans to return something would crop up to foil them. I seriously began to wonder if I'd ever manage to go back again! Then, on August 12, 2002, everything changed. That autumn I discovered a group on the Internet dedicated to celebrating the entire Space Camp experience. The folks conglomerated at a website called Hab1.com and before I knew it the dream was alive again. For the first time I was connected with like-thinking individuals, discussing at length the Space Camp experience, learning about new and exciting things, and discovering all the change that had occurred since I was last there. A dream had come true!

I met Kim, an interesting young woman who I connected with far more than any other, during one of a myriad of discussions. Call it fate, call it coincidence - call it what you will - but as our friendship grew we came to realize that she and I shared a unique experience that some might say qualifies us for the Twilight Zone. See, Kim and I were actually at the Space & Rocket Center at the same time... going to Space Academy at the same time... in 1991... and we didn't even know it. She was on the Martin Marietta team (with Keith) while I was on the BDM team, but as fortunes would have it both teams were present in the same group photo. Wouldn't you know that we were seated three people apart?

I've always maintained that the Internet is a wonderful way to meet people (it's how I met my fiancée, Nicole) and certainly this chance meeting showcases that fact. We spent nights regaling our tales about the fire drills, the bad food, people we knew and the memories we shared until a fantastic idea formed:

Why not go to Adult Space Academy together? Yes! What a wonderful way to showcase a budding friendship and to relive the memories than to return where it (could have) begun (if we had only known)! Soon we began to make plans, picking out a week in October 2003 for Adult Advanced Space Academy, the moniker for the adult version of Academy Level II. It would mark my overdue return to the Space & Rocket Center and fulfill yet another dream... to return as a trainee.

But fortune did not fall upon this reunion. Over the Columbus Day holiday, a mere two months after we met and began our plans, I was given the pink slip at my workplace. Up to that point I had given them almost seven years of loyal service but that didn't seem to matter. By year's end (on Friday, December 13th) I would be out of a job and in one swift moment become yet another statistic of the poor economy following the September 11th Terrorist Attacks in the United States. With that life-changing event on the horizon I found myself reviewing all future plans whether I wanted to or not.

Throughout this tough time I maintained the notion that no matter what happened I was going find a way to return to Space Camp in 2003. I had hoped it would be with Kim and for a time I continued down that path. But it became painfully obvious that I could not afford the $900 price tag attached to it especially not after spending a month traveling across Europe (the Europe trip was planned prior to being laid off... I just extended it another couple of weeks...)

So, where did that leave me?

It left me out in the cold. As the months of early 2003 began to tick on I began to wonder again whether I was destined ever to return. It certainly seemed that way. Regardless of what plans I had made over the years they always seemed to fall through. But then as I began to piece back together my career following a month-long back-packing trip across Europe, I decided: as a reward I would make the attempt. Rather than try for the hugely expensive six-day or longer program, why not wet my feet (and whet my appetite) with a shorter three-day program? And so it happened: by summer I was registered for an Adult Space Camp three-day program, with just me, for September 2003. And it was the best thing I could have ever done.

Continue the journey with me now...

Adult Space Academy
Session 52
September 26 - 28, 2003

Day One – ARRIVAL DAY
FRIDAY | SEPTEMBER 26, 2003

I have returned!

Though that may be the case, last night was a rough night.

Winds ruffled every leaf on every tree, howling merciless against the sands of time. Rain fell from the skies, pelting every window, every door, and just about every unprotected surface of the house... pitter-patter... pitter-patter in an ever increasing monotone. Every few moments, an electric spark flashed across the sky, knifing through the darkened clouds in an unforgiving display of anticipation and release; its advances illuminating the chaos created below. The display of light and power was immediately followed by echoes of thunderous roars of anger, becoming ever so expedient with each violation. Limbs crashed to the ground and lights flickered on and off as the skies opened up, releasing its pent up frustrations on the inhabitants below...

Yeah, it was a rough night to say the least. A storm of surprising dimensions passed through in the afternoon and continued into the evening hours. Just when I thought it was gone it came roaring back full force. Having your room illuminated fully by lighting every couple of minutes is not the most fun way to spend an evening, especially an evening before traveling. It made for a restless night. But that's all behind me now. I'm here on the grounds of the US Space & Rocket Center again after an eight-year absence and it's been a fantastic day!

Wow, eight years. Yeah, it's been that long since I've been here; twelve years since I've attended a Space Camp program – one in 1989 (Space Camp) and the second in 1991 (Space Academy, Level I). I've dreamt of this day, to know what it would be like, what had changed, would I like those changes, what I would do first and what I would do second. And though I might have been a bit anxious upon arrival - my insides shaking like a leaf - no longer do I feel this way. I'm not shaking because of apprehension; I'm shaking out of pure excitement! I'm here! I'm here! I'm here fulfilling a promise to myself made then and years past – to return. It's only for the next couple of days but in these days I know I'm going to have an experience that I will cherish for a lifetime.

And it's already started! It's been a fantastic day filled with adventure, memorials and flat-out fun. But I don't want to get too ahead of myself in detailing here or get too excited. We've just ended our day – it's time to settle down – but I find I can't quite go to sleep... not just yet.

Want to hear more?

GETTING TO KNOW YOU ///

Things couldn't have happened any better if I had planned them.

On the flight out to Huntsville this morning I passed over Disney World and for the first time I was able to see the vacation destination from the air. In all the times I've flown I've always managed to be on the wrong side of the plane, or on the wrong flight path, or just wrong. Perhaps it was fate then that as I indulged one fantasy I was able to fly over another. I love going to Disney World, but Space Camp calls!

I arrived in Huntsville about 9:00am where a wonderful smiling counselor from the Camp greeted me as I walked off the plane. She explained that a bus was waiting outside, beyond the baggage claim, and I could board it after picking up my bags. The bus then would take me to the Space and Rocket Center where I could, probably, check-in. (Probably... as I was coming in real early). I followed the signs and met the bus. The bus driver was a nice old fellow whose name I didn't happen to catch, but as he and I were the only ones on the bus, we struck up a conversation about this and that, the detritus isn't that important. In fact, it didn't take long to get from the airport to the Rocket Center -- about 15 minutes or less -- but in that time I was able to relax, think about what I would face and prepare for the onslaught of memories.

He dropped me off at what they call the "Bush Room", which is nothing more than a security office, tucked into one of the sides of the museum building. Since I had arrived quite early he wasn't sure whether or not I'd be able to check-in right away, but he wished me luck and welcomed me back just the same. I pushed through one of the glass doors and announced myself to the guard there. He was just as nice and ushered me forward. Part of my plan, at least, was to just arrive early. Since I had done that the next step was going as I had conceived it: allowed entry so I could wander around the museum, Rocket Park and Habitat while I waited for the official check-in time.

Thankfully, the nice gentlemen in the security office were able to direct me to the "side-door" of Habitat I, where someone would be able to further assist me. Now, let me take a moment here to explain the quotation marks of "side-door". I do this because, back in the day (and I'm talking my 1989/1991 experiences), this particular door was the main entrance to the Habitat. But now, here in 2003, it is nothing more than a simple side entrance that is hardly ever used, unless a trainee wants to slip out to a place called Otters, but more on that later. It's not well marked anymore; rather, it has the feeling of "GO AWAY" written all over it (even if "H A B I T A T I" is stenciled across the entranceway). But I wasn't going to go away. Oh no.

I arrived at Habitat I's "side-door" and steeled myself. Not against pain or embarrassment, but for posterity. It would be, for me, the first time I'd be stepping through this door in 12 years. And it seemed fitting that my first entrance into the Habitat was through this door; it's the same door I stepped through back in 1989. Even after all this time the Habitat still thrilled me. Why? Because it epitomized what I always wanted -- to live in space. The Habitat Complex simulates that to a certain degree.

There are two Habitats.

Habitat I is a simulated Space Station environment, built to house up to 800 Space Camp and Space Academy trainees during these week-long adventures. This unique structure, an addition to the Space & Rocket Center grounds in late 1988, features individual compartments for six persons with built-in sleep stations, computer work areas and storage compartments (lockers). Habitat I has a towering four floors, which opens up to a central atrium that is used for registration and various assemblies throughout the week. Down in the atrium is where registration would be and where, during the youth programs, we met in the morning before marching off to breakfast.

Designers incorporated many aerospace concepts in this four million, 328-foot Space Habitat. For example, it has hatches for doors; ports instead of windows; and benches instead of chairs (which, of course, would float in space. These items extend the atmosphere of living and working in a weightless environment, which I totally love.

Original	Became
Bathroom	Waste Management
Heating and Air	Life Support System
Maintenance Room	Enviro Control
Window	Earth Study
Elevator	Transport
Water Fountain	H20 Dispenser
Emergency Exit Plan	Emergency Egress
Hospital	Sick Bay
Snack Room	Galley
Room	Bays

Structurally, the Habitat's exterior is comprised of over 45 curved metal panels, which give the building its cylindrical appearance. The "tubes" of the Habitat are longer than a football field and are divided up into 66 bays, which are our rooms. Ten corporations, each of which contributed at least $100,000 toward construction of the $3.65 million Habitat I building, receive special recognition. At least one section of the habitat is named for them: Lockheed, Wyle Laboratories, Rockwell International, The Coca-Cola Co., Teledyne Brown Engineering, Morton Thiokol, Grumman, The BDM Co., Boeing and Martin Marietta.

Habitat II, or Hab II as it's called for short, is more of an Earth-based environment: large bays filled with bunk beds, various assembly rooms, a sick-bay and other necessities. The two, Space Station (Habitat I) and Earth Station (Habitat II) make up the 64,000 square foot Habitat Complex. It's too cool!

Pulling myself together I walked through the door and into the main atrium of Hab I, a sprawling open space with four floors ringed above it. There I met a counselor by the name of Jay, who was nice enough to help me. Advising him of my dilemma (my early arrival), he understood and let me set down my bags, get my ID badge, and then set me loose amidst the grounds of Space Camp. I couldn't check-in though, nor could I go to my room (bummer, as I wanted to get there as soon as possible), but I could at least see the grounds (and perhaps the Museum if they would let me in). So that's what I did! I meandered around both Shuttle and Rocket Parks (taking scores of pictures), wandered through the Museum (wow, even more changes!), visited the gift shop (where I purchased two old-style Camp shirts with Lockheed Martin and BDM logo's on them – to wear later), and had lunch in the public cafeteria (space corn dog?).

By then it was time to check in.

TEAM: DISCOVERY ///

By noon-thirty the counselors back at the Habitat were ready to begin processing adult check-ins. I took advantage of the earlier-than-normal time to be the first, or at least one of the first, to be processed and given my room assignment. As adults we were given a choice: lodgings at the nearby Marriott hotel (on the grounds, just behind the Habitat Complex) or a bunk inside the Habitat. Naturally I wanted to be inside the Habitat, who wouldn't? And I'll admit there was a high-level of curiosity there: to what room and floor would I be assigned? In the two years between attending in my youth I wondered whether or not I would get the same room. As it turned out when I reported back in 1991 I was assigned the room right next door to the one I occupied in 1989 ("308" in 1991 vs. "310" in 1989). And through the long years since I'd often dreamt of getting either room when and if I ever returned, so to be faced with the question in real life was certainly intriguing.

It wouldn't be long before my curiosity was served.

The nice counselor behind the folding table laid sideways across one far wall of the atrium (and partially hidden behind a stack of Adult Academy T-shirts of all sizes) dealt out my assignment: I was a member of "Team Discovery" and I would bunk down in HL-317, in the BDM Section. She advised me to pick up my T-shirt and bedding.

"Do you know where you're going?" she asked me.

"Oh yes," I replied with a smile. "Don't you worry!"

Ascending the now-silver-colored stairs to the third-floor was a surreal experience, as I had dreamt about doing so for many, many years and there I was doing it. Within moments I arrived at the threshold of my hatch, with the letters BDM proudly displayed above it and the number 317 scrawled in thick, black lettering beside it. I wasted no time; I pushed through.

At first glance the room wasn't in too bad of shape (as it had seen thousands of hyper-active kids over the years), empty (I was indeed the first!), and quiet. I selected a bunk – the one farthest from the door over a set of lockers, my traditional space – and began to unpack. The only difference here: the room was laid out oppositely from those I had inhabited in the past. Or, rather, it was a mirrored image of 308 and 310 and though it would take a little getting used to, I figured it wouldn't be that big of a deal.

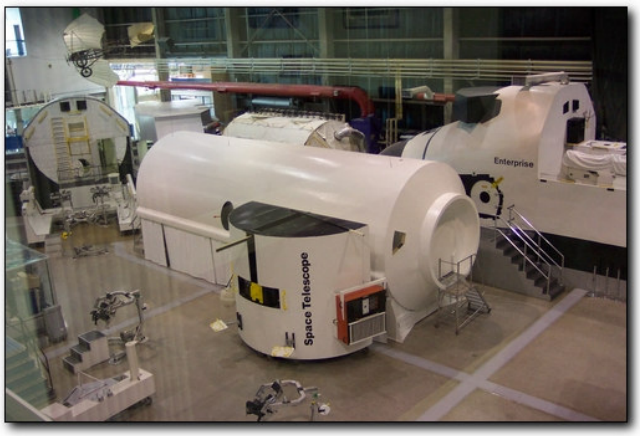
As I was getting settled I met one of my roommates – later to be three – then we all assembled down in the atrium to meet the rest of Team Discovery. They were: Reverend Paul Sweet, Howard Hitchmough, Matt Hill, Virginia Lee Miller, Scott Lorabowski, Laurie Keco, Lynn Ward, Amy Hannon-Drew, Bob Barrett, Rachel Homme, Ron Harris, Hal Taylor, and Tom Tietjen – all from different backgrounds and walks of life. Most of the attendees are older than I (in their 40s and 50s) but there are a few that are around my age.

Once we met and greeted one another, we met our counselors – Kim and Jay – and then the experience kicked into high gear.

ORIENTATION & BRIEFINGS ///

Upon meeting the other thirteen members of Team Discovery – fourteen of us in all – in the atrium of the Habitat, and our counselor (NAME) we left our home-away-from-home to begin our first task: Orientation. Rather than holding Orientation right there in the Habitat, or even at one of the team rooms therein, we trekked all the way across the campus to the Training Center, up to the second floor offices (generally reserved for Advanced Academy cadets, and into one of the Corporate classrooms. There, as with the youth programs, we learned what to and not to do, what we could and could not do, and what we should and should not do. Even though we would be given freer rein with the grounds and allowed to step away from the Habitat at night, there were still other groups in-house and safety as well as security was paramount. We couldn't traverse certain floors still, and were advised to just stick to our end of the habitat.

No problem!



We wasted no time following up that lecture with another – this one on the Space Transportation System, or STS for short. You might know it simply as "The Shuttle" but it's an amalgam of four different systems all working in tandem: the Orbiter (the plane-looking thing), the Solid Rocket Boosters (the white rockets attached to the side), the External Tank (the orange-colored gas tank attached to its backside) and the Space Shuttle Main Engines (or SSMEs, these are the triad of engines at the bottom of the orbiter).

Together these systems propel Astronauts into low-earth orbit, and perhaps one day to platforms that will take us back to the moon and on to mars! In the meantime they take us to the space station; the missions we'll fly here this weekend will also take us to the space station. Most of the material presented here was general and known to me, so I'll spare you the lecture.

After, the team was invited to THE SPACE DOME, a 67-foot hemispherical OMNI-MAX screen that provides viewers with breathtaking panoramas of space as experienced by shuttle astronauts. When you sit back in your seat, the action explodes all around you! IMAX accomplishes this by increasing the resolution of the image by using a much larger film frame. To achieve this, 65 mm film stock passes horizontally through the cameras. Traditional cameras pass film vertically. 65 mm film has an image area that is 48.5 × 22.1 mm (1.91 × 0.87 in), in IMAX the image is 69.6 × 48.5 mm (2.74 × 1.91 in) tall. In order to match standard film speed of 24 frames per second, three times the length of film moves through the camera.

IMAX uses "ESTAR" (Kodak's trade name for PET film) base. The reason is for precision more than strength. Developing chemicals do not change the size or shape of ESTAR, and IMAX's pin registration (especially the cam mechanism) does not tolerate either sprocket-hole or film-thickness variations. The IMAX format is generically called "15/70" film, the name referring to the 15 sprocket holes per frame. The film's bulk requires platters rather than conventional film reels.[10] IMAX platters range from 1.2 to 1.83 meters (3.9 to 6.0 ft) diameter to accommodate 1 to 2.75 hours of film. Platters with a 2.5 hour feature film weigh 250 kilograms (550 lb). An IMAX projector weighs up to 1.8 t (2.0 short tons) and is over 178 cm (70 in) tall and 195 cm (77 in) long.

The first film of the weekend was: Space Station, a 2002 documentary about living and working aboard the International Space Station. Narrated by Tom Cruise, the film takes audiences 220 miles above the Earth at 17,500 miles-per-hour to experience "the greatest engineering feat since landing a man on the Moon." "Space Station is the story of this unique partnership of 16 nations building a laboratory in outer space -- a permanent facility for the study of the effects of long-duration exposure to zero gravity and the necessary first step towards the global co-operative effort needed if man is to someday set foot on Mars. It is a story of challenges, setbacks and triumphs... and ultimately, the shared international victory of men and women whose dreams exceed the limits of life on this Earth."

Following the movie we assembled outside for the group photo – taken underneath the Pathfinder Shuttle stack – then re-convened inside to discuss the missions we will perform tomorrow and then broke for dinner.

But the fun didn't stop just because it was dinnertime.

Immediately following dinner we were handed our mission assignments. For the first mission – ENDEAVOR ALPHA – I was assigned a role on the ground team, at Launch Control, as Weather Tracking Officer. And my job here, as it was explained, was to monitor the weather conditions at the launch site, giving a go/no-go for launch based on the conditions. If there was bad weather at or around the launch site, near any of the landing zones or at any of the abort locations spread all over the globe, I'd have to abort the launch. Of course my duties would extend beyond launch (landing would require my go-ahead too) but otherwise it was a thankless job. For the second mission – ENDEAVOR BRAVO – I was assigned to the Space Shuttle as a Mission Specialist and I couldn't help but smile widely upon hearing my tasks here: I'd be up against my old friend the Hubble Space Telescope mock-up, repairing it whilst swinging madly in one of the 5DF chairs.

That’s going to be a hoot! (The Hubble Repair Mission is the very same one I flew at Space Academy in 1991!)

We actually did a mock trial of a bit of the first mission following our assignments, just to get us used to the equipment – it was terrible. The voice systems weren’t working properly and being in the glass box that surrounded Endeavor MOCR was strange to say the least. I’m used to hearing the thrums of activity from the Training Center Floor and within this glass menagerie we could hear absolutely nothing. And I, being the WTO, was also not quite clear on what my duties were at the post. Although a thankless job, it came down to me to start the mission: yep, I get the first line in the script! Even though the run-through seemed nothing short of a complete disaster, it turned out to be a lot of fun.
I’d never had the opportunity to use Endeavour or its Mission Control in either of my previous two Space Camp experiences so it was truly a first.

What makes Endeavor different from the rest of the shuttle simulators is that, because it was constructed for Space Camp’s use, it is one of the least complete of the simulators as far as switches and knobs are concerned. Oh, a good portion of switches are in place to flip – all the important ones for the mission to be flown to be sure – but mostly everything else is just a plastic panel in place for decorative purposes. Same for mission control. Why? To keep the kids from breaking non-essential switches and knobs of course! Why go through the expense of installation and upkeep on a simulator when the detail will be better represented (and appreciated) in simulators used by the older, and by proxy, more behaved kids?

Although why we’re using Endeavour is unknown... does that mean Space Camp sees us adults as no better than children?

INFILTRATING AREA 51 ///

Before concluding our first day we completed two further activities. The second was taking a spin in a couple of the simulators over at the AstroTrek building (which I'll expound upon more in a moment), the first, however, was a team-building exercise called "Area 51". And although I had heard about similar "Area 51" experiences, I didn't know just how much fun it would be!

With two different exercises to undertake, we broke up into two seven-man (and woman) groups. The group I was part of was immediately pulled aside and explained our task: we are stuck aboard the space station and need to evacuate; however, our path is blocked by a series of laser beams (yeah, just go with it) that are protecting us. In this case, however, they're hindering our escape. "What you must do as a team," our counselor continued to explain, "is get everyone from one side to the other without a) touching the laser beams (here simulated by a bungee cord) and b) leaving anyone behind. If anyone touched the "laser beams" they were immediately disqualified (read: dead). And since time was of the essence, we had to get all of us over the threshold as quickly as possible!

It took us a few moments to figure out just how we'd accomplish our task. The "laser beams", especially those within stepping-through height, neatly tied off all the obvious avenues of progression. How were we going to get seven people from one side to the other? We couldn't jump over or through the blockage, nor could we shimmy below it. And walking around the poles was simply out of the question as well. What we really needed was someone on the other side who could act as a go-between, someone who could be there to help bring the person from one side to the other. But the problem was... how were we going to get them over there?

"I'll dive in through the barrier," one of the guys said, and when all agreed he could do it without hurting himself we were in business. With someone on the other side of the barrier, we could then begin passing people through the barrier – vertically – supporting their weight on one end until enough of their body was on the other side to fall through. Thankfully I was not the guinea pig on this little endeavor but the process turned out to be sound. It sure was interesting being picked up by a hand-full of your teammates, hoisted up to waist level, and inserted through the barrier like you were simply a credit card or some other kind of thing, then being picked up by those on the other side and hoisted through before being allowed to return to your own power.

But it worked!

Within minutes we had the entire team over to the right side of the barrier – proving that at least half of Team Discovery could work together to solve a crisis. The other half of the team building exercise involved having both of your feet anchored to a plank of wood and being unable to remove it, and find a way to connect yours to your neighbors and make some kind of path. I wasn't exactly sure of the purpose of this exercise and by the time our group got to it we were a little frazzled, so although we did come up with a solution I'm not sure any of us really understood what we did, or why!

TUMBLING AT ASTROTREK ///

Our second, and final, task of the night was taking a spin in a couple of the simulators over at the Astrotrek building – a tent-like structure that now housed many of the training simulators once found on the Training Center Floor, such as the Multi-Axis Trainer, the 1/6th Gravity Chair, the Five Degrees of Freedom Chair, the Grounded Manned-Maneuvering Unit and others. Astrotrek was built in the late 1990s following the need for the program's expansion – with more kids than ever before coming to Space Camp more and more shuttle cockpit simulators and space station modules had to be built. And where could they house them but on the training center floor!

Be that as it may, our apparatuses tonight would be none other than the Multi-Axis trainer and the 1/6th Gravity chairs.

The first of the simulators was the 1/6th Chair exercise. The 1/6 Chair, usually referred to as the Moonwalk trainer, is modeled after one the Apollo astronauts used for moon walk training. The simulator is called the 1/6 chair because it is designed to simulate the Moon's gravitational pull, which is 1/6th that of Earth's. For example, a person who weighs 150 pounds on Earth would weigh 25 pounds on the Moon. Hence, the chair gives trainees a realistic feeling of walking in the reduced gravity of the moon. It is suspended on a long bungee like cord; upon sitting in the chair, your weight is balanced against the tension of the bungee cord. Once properly balanced you're set off on your task. If you step too hard, you'll end up in the ceiling, so for the most part the counselors keep a hold of you. Once strapped in you're asked to do a variety of things. First it's a side-to-side walk, then a bunny hop, and on to whatever other steps you think might propel you across the floor (like a slow motion jog). After about three or four walks around you're done! And you get an understanding of what walking on the moon felt like. Everyone had a blast with this one.

The second was taking a tumble in the Multi-Axis Trainer.

To quote from SpaceCamp: The Movie, the Multi-Axis Trainer is a machine in which "three concentric circles [spin] in opposite directions simultaneously; object is to stabilize from central point, utilizing hand controls". Let me tell you, it isn't that easy. In fact it's impossible! The Multi-Axis Trainer (MAT) simulates the disorientation one would feel in a tumble spin during reentry into the Earth's atmosphere. The MAT is patterned after the MASTIF (Multiple-Axis Spin/Space Test Inertia Facility), a series of cages within cages, used for astronaut training during the Mercury program. The astronauts used this to condition themselves for disorientation that might occur in emergency conditions during flight. The MASTIF had a joystick, which allowed the astronaut to control the device. The MAT has no joystick (thus the joystick on the MAT in SpaceCamp: the Movie was just a prop!) but the general idea here is to experience the disorientation without actually getting killed.

Because of the prominence of this apparatus in SpaceCamp: The Movie and as a plot point toward the end of the film, when I came to Camp in 1989 I really, really, really, really, really wanted to take in a spin. Unfortunately kids of that age were deemed too young and my hopes were dashed.

They were finally realized two years later during my time at Space Academy Level I in 1991 and as I sat there watching adults into their forties, fifties and sixties work up the nerve to take the ride, I looked on fondly, remembering my first time with the Multi-Axis Trainer:

I watched excitedly nervous while some of my other teammates tumbled head-over-heels in the contraption, but when it came my turn I didn't hesitate to hop right up in the seat, and begin to strap myself in (thanks to watching the movie uncountable times I knew exactly what to buckle, where and when!). Leigh-Ann, my day counselor, explained what was going to happen as I busied securing myself and although I tried to tell her I already knew and had been waiting for this moment for more than four years, she prattled right on. And soon as she was done, she closed the metallic swing "lap" bar and let the first ring go – SWOOSH! I bet if anyone had a camera and took a picture of me there'd be a smile of immeasurable proportions visible on my face. I could hardly believe I was there, strapped in and buckled up just like Kathryn was from the movie, you know? The only difference between her journey and mine was the lack of a joystick – there was no critical test for me to master here!

Just then, as the apparatus began to move, I took hold of the bars above my head – something I didn't need to be told to do (even though the counselor did say so). Thus with a groan and a whir I was in motion; round and around and around I went! WAHOOOO!! It's an interesting experience really because you never make the same turn twice; you're never in the same exact position from one spin to the next and I suppose that is what makes the Multi-Axis Trainer a valuable tool (or at least a valuable experience to be accustomed to, in case your spacecraft does end up in a flat spin). Though it was a short ride, a lot shorter than I had wanted or hoped it would be my time with the MAT was done. But it was well worth the wait!

And as those of Team Discovery who battled their own inner demons to take the ride found out: it was pure fun!

* * *

Our first day here at Adult Space Academy came to an end at the AstroTrek building, and though I’m a little tired at this point in the day, I’m sad to see the day’s adventure come to an end. Area 51 was just too much fun and taking a spin on the Multi-Axis again was neat as well.

All in all it was a very good day. Some of the members of our team took the counselors up on their permissions to sneak away from the Habitat to Otters, the lounge at the Marriott, for a few drinks, but I decided not to join them. Instead I took a shower and plan to relax until it is time for lights out. Believe it or not, the showers work like they're supposed to and are a little more private than they used to be, here on the third floor. While the Second-Floor showers are somewhat the same, if not a bit more accessorized than ours. Also, apparently the 4th floor is still an all girls floor, while the 2nd floor is an all boys floor. The third floor then is uni-sexed, which is just the way it used to be.

All is well.

Day Two – MISSION DAY
SATURDAY | SEPTEMBER 27, 2003

Greetings!

We've retired to the Habitat following another full day of activities. My room companions are off taking a shower – I'll follow when they're done – which has given me some time to sit and collect and relay my thoughts about the day. Thankfully, and I can't say this enough, we didn't get the infamous wake-up call from Space Camp's counselors this morning. I guess being adults they don't bother attempting to wake us up – they just let us get up on our own. How very adult of them! So, what's this infamous wake-up call I speak about?

Back in the day, Space Camp started off with a bang, literally. Not the bang of a gun, a canon, or of a drum... but the bang of a door, your door to be exact, and the doors of everyone else on our floor. Around 6:00am the bangs would begin and you're rudely awakened by the ominous sound of your hatch (door) being flung open with such force that it slams into the side of the habitat wall – BOOM! It's enough of a thing to actually startle you out of sleep (for those who did not already hear the other trainees being rudely awakened in this manner, like I usually did.) If you weren't up and at 'em by the sound of the door then the second phase of the counselor's dastardly plans certainly would: they'd just turn on the lights and yell!

"Okay guys, it's time to get up!"

And like the booming of the hatch door, the light would burst onto the scene without warning. Then, as if to complete some kind of militaristic ritual, the counselor would turn around and leave the room, slamming the door behind them, mercilessly. And by then you had best be awake and moving as there wouldn't be another call until it was time for you and your team to assemble... and the gods help you if you were late to assembly. No worries on that front, though. So what did we end up doing?

ALPHA AND BRAVO ///

We ran both our missions today.

The first – ENDEAVOUR ALPHA – was run just following breakfast. For this mission I played Weather and Tracking Officer (WTO), a rather boring and lackluster position in all of Mission Control I think, and Public Affairs Officer (the voice you hear during a launch). The only consolation was that I had both the first and last lines of the script but that's about it. It was still fun though, and I thought back many times to my Space Camp experience in 1989, as member of Mission Control. But, really, it was a boring couple of hours. The second – ENDEAVOUR BRAVO – was run just after dinner and it was way more exciting for me. Rather than being stuck at a desk job in Mission Control, I journeyed into space aboard the Shuttle, keeping close to the action at hand. And upon reaching stable orbit I'd take part in an exciting adventure: helping to repair the Hubble Space Telescope (a mock-up of the telescope was on the training center floor) with my fellow teammate and Mission Specialist.

Having performed this particular activity during my Space Academy experience in 1991, it was one I looked forward to repeating from the moment the position was announced to me yesterday... for the memory of it if not for the activity itself. And it was a hoot! The biggest difference this time round was my Mission Specialist: my fellow Extra Vehicular Activity (EVA) companion was blind. No, really!

For most of the mission I had little to do. Sitting behind the Commander and Pilot for launch and not really having to say or do anything was quite fun, actually. I could watch and observe the goings on without worrying about checklists, scripts or other doo-dads thrown into the simulation to make it seem more realistic. Although I admit I would have rather been sitting in one of the two command chairs but you take what you get, you know? We were about a third of the way through the simulation when it was the Mission Specialist's turn to shine.

Our first order of business in the activity was to DON the EVA suit. DON is a term used within the space program to “get into or put on” your space suit. We weren't working with actual space suits, only cloth imitations, but we still had to get them on and there was an order to the madness. We were briefed about the DONing procedure while we stood outside the Shuttle cockpit module:

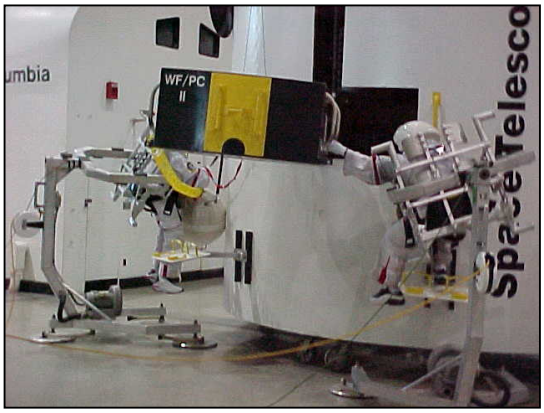
EVA SUIT PROCEDURE:

- Step 1: Liquid Cooling Garment (LCG)
- Step 2: Boots
- Step 3: Lower torso assembly (LTA)
- Step 4: Hard Upper Torso (HUT)
- Step 5: Extra Vehicular Visor Assembly (EVVA)
- Step 6: Gloves

It was easy getting the suit on but finding boots and/or other parts that would fit me was more nightmarish. Of course, finding an intact suit (with all the pieces available) was like finding gold! Thankfully, I eventually found everything I would need, and then helped my companion locate the pieces she would need. Once suited up we continued to our second mission objective: getting into the EVA chair.

The EVA part of the mission was explained to us relatively simply; our task was to simulate repairing the Hubble Space Telescope whilst using the 5DF chairs to replicate space conditions. But unlike during our training session just after lunch (where counselors kept close hold on us while we floated on the cushions of air), during the mission we’d be under our own power and supervision, which meant we could float away from our target at any time. I tell you, stabilizing the chairs wasn't the hardest part of this mission; keeping them from floating away was! You might think that the word chair means we sat in them; quite the contrary, we actually hung in them - positioned and strapped upright. In this position, we swung back and forth suspended above the floor. In this configuration there was no way we could touch our feet to the "ground" in case we needed help - definitely was just like a real space mission!

To keep us from floating away, we were each given a small set of ropes ("Tethers") to fasten ourselves to the Hubble as well as tie our tool bags to us (and it) so they were in reach. Those ropes turned out to be lifesavers... definitely. Thanks to them we could focus on our mission objectives and keep our hands free to work!



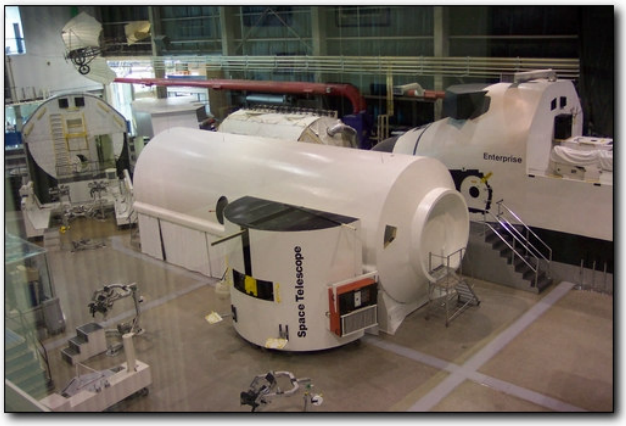
As to that work? Well... our job was to float out there, replace a few items on the telescope then return to the Space Station module as soon as possible. My task was to replace the Hubble's battery complex, which consisted of taking out the old module, placing that in my tool bag, and return to it a brand new one (which I also had in by bag). Once that was finished, my second task was to prepare the Hubble for its refueling, accomplished by turning a knob and pulling a lever. When that was accomplished we could return the Hubble to space. Mission Specialist #1's job was similar, only she had other props to work with. The difference between this experience and the one I had twelve years prior was that we both heard and were to understand the tasks to be performed on the EVA, not just our own task. That meant if one of us failed to perform as required the other would have to take up the slack.

Would you believe that after getting suited up, prepped and into the chairs our tool bags were completely switched on us? I had immediate flashbacks to the 1991 Academy experience as something similar happened there. Rather than panic or cry foul, I radioed over to my fellow teammate that we had a problem and switched tool bags. Of course, getting her and me to meet in the middle was a task in and of itself, but we did it, we really did! Once we re-secured our bags we began to coordinate the movement of the Hubble platform in order to perform our assigned tasks. With a prior agreement in place, I performed my tasks first, and with haste, then turned my attention to her so I could narrate not only what she needed to do but position the module in the proper location so she could do it with the least amount of help. She attacked her task like a trooper!

EVA PROCEDURE

Take Bags
Tether to HST
Drill Out Bolts
Pull Out Hubble Module
Trade Chips
Change Battery
Hose on Gas Tank
Hose to the Air Ball
Turn on Air ball
Deploy "communications array"
Take off hose, pass it to MS1
Return Hubble Module
Done!

In no time it all it seemed we were done. We hopped out of our 5DF chairs – with help – and claimed victory. She was happy as a clam and so was I. Not only did we overcome a physical issue by coming up with our own system to work with her blindness, we also overcame the switch-up in tool kits without panic or protestation, completing the task as quickly and efficiently as we could. Who could ask for anything more? We did it!



The exercise this time wasn't nearly as tiring, or taxing, as it had been in 1991. Although I was sweaty and rather tired from the exertion, I bounded back to the Shuttle with glee. We did have one task left to us before we could enjoy the trip home: checking our vitals. Prior to leaving the Shuttle both Rachel and I took a small sub-set of vital signs, just to see how our bodies reacted to the vigorous activity of Extra Vehicular Activity. Before the EVA my heart rate was 80, temperature normal at 98.6 degrees, blood pressure was a little high (thanks to anticipation) at 142/96 and lung volume sat at 3200 cubic centimeters. Immediately after my heart rate was 89 beats per minute, 100-degree temperature (I was hot!), had a blood pressure of 152/100 (wow!) but an increased lung capacity of 3850 cubic centimeters.

With my part of the mission now complete I could sit back in the cockpit and relax again while the Commander and Pilot finished their duties.

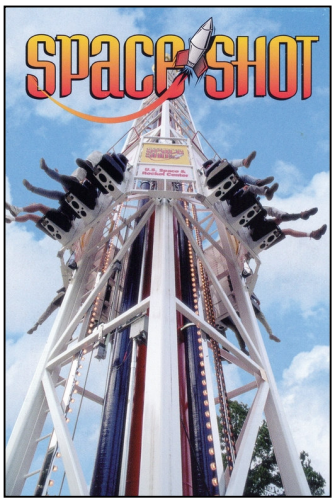
It was a great.

SPACESHOT! ///

Other activities of the day included a walk through the museum, a lecture on Crew Systems (those which keep the crew alive aboard the Station and Shuttle), and exploring the Rocket Park, all of which I have experienced before. The only thing I had not yet experienced out there in the Rocket Park was Space Shot, the drop tower type attraction that uses compressed air to rapidly propel riders up the tower then gently lower them with a series of air-cushioned bounces back to the loading platform.

The mechanism consists of a central tower around which rows of seats are placed with the riders facing outward away from the tower. In the center of the tower is a large columnar pipe system. Threaded through the main pipe column is a cable that is attached to a piston on one end, looped over a pulley at the top of the tower and attached to the seat carriage on the other.

In the loading position, the seat carriage is at the base of the tower and the piston is at the top of the pipe column. Once the ride has been loaded, the seats are lifted slightly off the ground and loaded seats are weighed in order to calculate the amount of air pressure needed to safely propel the seats up the tower. Upon charging the air system to the correct pressure, compressed air is injected into the central column pushing the piston rapidly downward. As the piston moves down, it pulls the cable downward over the pulley at the top, propelling the seat carriage up the outside of the tower.



Upon exhausting the air from the pressure system, the carriage descends, drawing the piston back up the pipe column. As the piston moves up, the air inside the pipe column alternately compresses and expands, causing the carriage to bounce several times. With each bounce, a pressure relief valve at the top of the pipe column releases some of the compressed air making each successive bounce smaller until the carriage reaches the loading platform.

Space Shot “rockets” you 140-feet straight up in 2.5 seconds, giving you the experience of 4G’s of force on launch and 2 to 3 seconds of weightlessness. And it’s an experience to rapidly find the entire grounds of the Rocket Center below your feet as you dangle them over the edge of your seat.

MUSEUM MUSINGS ///

Following my space shot, I explored the rest of the museum, finally getting a hands-on look at some of the more important changes.

The Space Center houses more than 1,500 pieces of rocket and space hardware valued in the tens of millions of dollars. Dozens of active exhibits involve visitor's participation, prompting one official to note: "Here, everyone can be an astronaut for the day." The museum serves as a major repository for the Smithsonian Institution's National Air and Space Museum in Washington, having some 300 major artifacts on loan from that institution. The space museum is also the visitor's information center for the Marshall Space Flight Center and for the U.S. Army Missile Command at Redstone Arsenal (which you can no longer visit following the September 11th terrorist attacks in New York City).

Each historic moment of the U.S. space program is captured at the U.S. Space & Rocket Center, from the Huntsville built Redstone rocket that launched America's first satellite, to Pathfinder, NASA's full scale mock up, which was used for testing during the shuttle development program. Shuttle Park features Pathfinder, which has the same exact dimensions as a shuttle orbiter. Built in 1977, it was used for testing equipment at MSFC and the Kennedy Space Center in Florida. It is mated with a shuttle external tank and two solid rocket boosters making it the only complete launch configured shuttle on permanent display.

In Rocket park, at the rear of the museum, is a collection of Army missiles and NASA rockets unrivaled in the world, with dominant objects being the Saturn V and a vertical Saturn I. On its launch pad, the Saturn V moon rocket stood taller than a 30 story building. Displayed horizontally at the Space Center, it stretches the length of a football field. Designed to lift man clear of Earth's atmosphere and carry tons of cargo into space, the Saturn V successfully launched 13 missions, including Apollo flights and one flight which carried the Skylab space station into Earth orbit.

By displaying the three stages and Apollo spacecraft of the Saturn V parallel to the ground, visitors can walk the length of the largest rocket in America's space program. The rocket on display was used for ground testing at MSFC and was the first to be publicly displayed; others are now shown at Kennedy Space Center and Johnson Space Center.

Early Huntsville rockets, such as the Redstone, Jupiter, and Mercury Atlas, are overshadowed by the taller Saturn I, which is the landmark of the complex.

Huntsville's massive involvement in rocketry has not been limited to the outer space variety. Redstone Arsenal has been the Army's leading center for research and development of defense missiles for decades. Rocket Park is a showcase for Redstone produced systems up to the newest missiles and systems in the field, such as Pershing II, Chaparral, Hawk, Lance and Avenger. Others included are the Sergeant, the Nike family, Sprint, Spartan, Honest John, Hermes, Corporal, and a Multiple Launch Rocket System similar to those used in the Persian Gulf War. Additional military hardware, including a TOW and a Patriot missile, is housed inside the Space Center.

A SR 71 Blackbird jet rests just outside the main entrance to the Space Center. The U.S. Air Force reconnaissance plane found a new home in Huntsville after the fleet of Blackbirds was initially retired from service in 1990. The SR 71 is capable of flying at three times the speed of sound and holds the coast to coast speed record of just over 67 minutes. Called one of the safest planes ever developed, the SR-71 on display here is actually an A-12 model, and the seventh vehicle of its type built.

While the spectacular hardware outside the museum staggers the imagination of visitors, exhibits inside are literally on the level of guests for their enjoyment and participation. Visitors are introduced to the events and people who put America in the space race. A giant, gold foil covered moon landing craft dominates the main hall that houses the historical items, which figure so prominently in the early space program and are the emotional heart of the museum. A lunar sample from the Apollo 12 mission is nearby. Sample #12065 was picked up by Alan Bean and Pete Conrad as they explored the “Ocean of Storms”, a vast lunar mare. Although visited by Conrad and Bean, this area of the moon was also visited by a hand-full of robotic explorers: Luna 9 and Luna 13 from the USSR, and Surveyor 1 and Surveyor 3 from the USA. The moon rock is approximately 3.3 billion years old.

Sprinkled around the moon rock and lunar lander is a time line of individual exhibits highlighting each of the Apollo missions, from the tragic fire of Apollo 1, to the historic first international docking in space with the Soviet Soyuz spacecraft.

A few steps away is an exact copy of the Gemini spacecraft that carried two man teams into space.

The coal black model was used for training Gemini crews. Near the Gemini trainer, and perhaps the crown of the exhibit, is the rust colored Apollo 16 Command Service Module (“Casper”), which carried three astronauts to the moon: Charles Duke, Thomas Mattingly, and John Young. The mission launched on April 16, 1972 and landed 11 days later. Recovered after splashdown of America's next to last moon mission, its exterior is charred from the temperatures of up to 5,000 degrees that it encountered during re entry into Earth's atmosphere. The mission included the first operation of a remote controlled television camera, which recorded the liftoff of the ascent stage from the moon's surface.

Few who watched the triumphant return of the Apollo 11 crew from the first trip to the moon can’t forget the scene of President Nixon standing outside the quarantine chamber to congratulate the crew. The Airstream van fitted for Neil Armstrong and his crew is in the main hall. The original purpose of these vans was to keep all the nasty germs on the moon from contaminating us. It was a simple but futile measure as there is no oxygen on the moon and therefore no germs to bring back. This van was also in a ticker-tape parade in honor of the astronauts’ return.

Parked nearby is one of NASA’s LRVs (Lunar Rover Vehicles). The “Moon Buggy”, as it is more commonly and affectionately known as, was designed at the Marshall Space Flight Center to allow astronauts aboard the later Apollo missions (15, 16 and 17) to venture out farther from their LEM than ever allowed before. The LRVs allowed the astronauts to cover over 56 miles and achieve a distance of 4 miles from the LEM.
Among the Rover’s features are: direct radio communications with earth, a television camera, a 15mm cine-camera and its magazines, a 70 mm ordinary camera, a drill, a magnetometer, pincers for taking samples, miscellaneous tools, storage closets, drawers beneath the seats and various other items. By all accounts the Moon Buggy was very successful.

Bringing an end to the Apollo era is the Skylab exhibit. Here you’ll find the Skylab Space Station Astronaut Training Mock-up (which was constructed and used to train the astronauts on how to successfully live in the structure – it’s a walk-in). Skylab, America's first space station, orbited the Earth from 1973 to 1979. It was home to four missions before re entering the Earth's atmosphere over Australia. The largest fragment to survive, a fibrous oxygen tank, stands in the museum near a model of the craft.

Also in this area are dozens of "hands on" exhibits which encourage visitors to experiment with acoustic levitation, to fire a live rocket engine, attempt a computerized landing on the moon, spin a gyro chair, use a remote manipulator arm, step on a special scale to find out what they would weigh on the Moon and Mars, or try the Shuttle Adventures computer to learn about shuttle missions and astronauts. Or even simulate a mission to the moon in the museum's Apollo capsule mockup – how can you resist getting in a capsule and flipping all those switches? (You can't, and neither could I.)

For those looking for even more "hands on" involvement, several simulated space flights are offered (beyond "Space Shot"). There's "The Centrifuge", which takes 46 passengers on an astronaut training session while experiencing triple the normal pull of gravity. Passengers feel the pressure build while watching the solar system and planets pass overhead on a planetarium dome. The centrifugal spin in the rotating theater provides the extra gravitational pull. "Mission to Mars" carries up to eight passengers from a space station to the red planet and back again. Motion in the simulator adds the element of the unexpected to the space travel experience. "Journey to Jupiter" carries 30 sightseers on a motion based futuristic passenger shuttle on a guided tour of our solar system's largest planet. The Helix Catapult hurls the craft into deep space, for a study of Jupiter's moons, the planet's surface, and an unexpected encounter with an asteroid.

You can also test your flying skills in "Land the Shuttle". This simulator offers a chance in the pilot's seat, and the opportunity to set down a shuttle traveling at several hundred miles an hour. Living and working in space is the subject of Outpost in Space: The International Space Station. The theater presentation becomes interactive when a volunteer from the audience demonstrates how astronauts sleep, use the bathroom, shower and conduct experiments in micro gravity.

In between the two missions we flew, meals and wanderings through the museum and Rocket Park, we also took in another movie in the OMNIMAX Dome; this one titled "Straight Up: Helicopters in Action". As described: Helicopters save lives every day.

These unique machines pick up injured people off roads, save them from sinking ships, pluck them from burning buildings, and pull them out of raging floods. Rotorcraft, including helicopters and tilt-rotors, perform widespread critical public-service operations including search and rescue, law enforcement, resource development, and priority transportation. Millions of people owe their lives to the special capabilities of these aircraft. “Straight Up: Helicopters in Action” takes audiences on a series of aerial adventures. We’re beckoned to fly along with skilled helicopter crews as they carry out sea and mountain rescues, apprehend drug smugglers, repair high voltage lines, save endangered animals, deliver humanitarian aid, and undertake a reconnaissance mission.

Of course, what all this has to do with space exploration is beyond me, but it was an interesting film to see never-the-less.

* * *

So, yeah, that’s pretty much been the day. Not as exciting as I would have thought but busy enough to keep us from being absolutely bored. I suspect I’m a little uninterested at times because I’ve done all of this before although don’t let that statement convince you that I’m not having fun, because I am, I’m just not experiencing anything new at this point. Alas the journey is almost over here. Tomorrow is graduation and then it’ll be back to reality. This weekend certainly has gone quickly. I can’t believe that it was just yesterday that I arrived here.

Huh...

You know what? I’ve just been thinking that another couple of things we adult cadets don’t have to worry about are morning PT and room inspections. Halleluiah!

Okay, so my flatmates are back from their trip to Waste Extraction (which also doubles as the location for the showers), so I’m going to conclude here until tomorrow and hop a sonic shower! (Alright, so, it’s not a sonic shower... there’s only so much they could do here...)

Day Three – GRADUATION DAY
SUNDAY | SEPTEMBER 28, 2003

Just like that it's over.

The experience I've waited twelve years to have again has come and gone. Yep, graduation occurred a little bit ago and though I am the proud owner of a certificate of completion and another set of Academy wings, they come with bittersweet emotions. It's been a fun weekend, there's no doubt about that. It was also nice wandering about running into ghosts of the past. However, I never did seem to recapture the same level of excitement, wonder and awe I felt during my last experience here. Could it be I've outgrown Space Camp? Could it be that I've entered that age of not believing?

No, I don't think so. I think it had something to do with the other adults on my team. Some of them were really interested in the program – a bit too serious in my opinion – while others were rather flighty, not taking the experience serious enough. There didn't seem to be a good middle ground in this group and so it made navigating the various eddies more difficult than I would have realized. But I've done what I set out to do – become re-engaged with Space Camp – and now I can move on to Adult Advanced Academy sometime in the near future. I know those who attend those sessions are somewhat more engaged in the program, especially due to the price the program commands, so I'm sure I'll find excitement there.

In the meantime, although this was our last day of Camp, and our missions had been completed, we still trained... a little.

ASTROTREK & SPACEBOWL ///

At the Astrotek building the team got a chance to ride in the Five Degrees of Freedom (5DF) chair. As most physicists know, there are really six degrees of motion, but unfortunately here on Earth, only five can be simulated at any one time – and to do that you need this chair. The five directions are: Forward and Back, along the Y-axis; Left and Right, along the X-axis; Pitch, Roll, and Yaw. The sixth degree is the Z-axis, which more or less is up and down. The 5DF chair rides on a cushion of air rendering the forces we take for granted - inert. As you sit in this suspended chair, the simulator will allow movement in any of the five different directions depending upon your initial push off, simulating the frictionless environment of space. Such free movement allows an astronaut to practice tasks here on the ground that would need to be completed in microgravity once the mission begins.

It's also a fun demonstration of Sir Isaac Newton's Third Law of Motion: *For every action there is an equal and opposite reaction: or the forces of two bodies on each other are always equal and are directed in opposite directions.*

It's really quite zany to be floating about without much control over where, when and how! The only bad thing about this simulator is the way you're strapped in. If you're a guy, it's really unpleasant as one of the straps is threaded between your legs to prevent the occupant from sliding out when the chair is being moved about. When the instructor pitches the thing down you get quite the wake-up call. Thankfully nothing of the sort happened this time but I couldn't help but chuckle at a memory from Space Camp – Matt, a kid from Tennessee, became the first of our group to experience the 5DF chair and his genitals paid the price!

The second activity was practicing a Satellite Docking Maneuver. This task was accomplished using a specially equipped MMU trainer – called the GMMU, or Ground Manned Maneuvering Unit, to "dock" with a "satellite" on the floor. The "Satellite" was nothing more than a mock-up apparatus on a rotating wall affixed to rollers on the ground, with a hole in the middle of the dish structure made to look like a docking clamp. The task: maneuver the MMU chair (which itself was attached to a 5DF Chair) with a special docking prod attached to the front of it across a small patch of floor space and, by using the probe, achieve a hard-dock by using the system's non-androgynous method (which is to say you use the "male" "probe" to "insert" and "mate" with the "female".

It seemed rather simple looking at it and watching a nearby counselor demonstrate the process; performing it first-hand was a little more harrowing. What made it so difficult? Being on the 5DF's cushion of air and using regular MMU controls to navigate the contraption to the target. It took a number of approaches from quite a few of us... myself included... to bring the two spacecraft safely together in a secure dock. Still, it was a valuable lesson to learn in not only docking mechanics but also in mobility with the MMU, even if we couldn't move along the Z-axis.

Later we assembled in the Challenger Room (the old Team Room) inside Habitat II for "Space Bowl", a game similar to Family Feud in which a question is asked of two participants and the first to buzz in gets the opportunity to answer. Should the person get it wrong the other contestant has the opportunity to provide the correct answer, then two more contestants come up to the podium. And so on and so forth. We played the game for about an hour – split in half just like we were during the Area 51 exercises – and though my group lost we still had a lot of fun. Competition was fierce and there was no forgiveness! Questions were also tricky. One of the questions I was asked (and got wrong) was: "What is the closest star?" I answered Alpha Centauri, as it is the closest star to ours at 4.3 light-years distance. The correct answer though was The Sun, because that IS the closest star to us. See... tricky!

Immediately following “Space Bowl” we made our way over to the Training Center Floor where Graduation commenced and our weekend at Camp came to a close. We were each handed certificates showing completion of the activities and a set of wings. With a few pictures of our teammates we all dispersed shortly thereafter.

Since I didn’t have to be to the airport until much, much later, I decided to take a more leisurely stroll around the Rocket and Shuttle Parks, while some went back to the Habitat to pack and others meandered about the Museum until their departure times came.

THE ROCKET PARK ///

What John Glenn calls “the finest rocket collection in the world,” the Rocket Park salutes the work of Doctor Von Braun and his team by tracing rocketry's evolution throughout the years. The Rocket Park has been a host to an Apollo 10th Anniversary celebration reenactment of the Lunar Module landing on the moon and is currently a home for the United States Army Missile Command's contributions to national defense throughout the years.

Besides the rockets and missiles on display, there’s also a Moon Buggy (a six-wheeled early design built to test the possible configuration for a mobile vehicle for exploring the surface of the moon. One important design factor that carried through to the final design used by the Apollo astronauts was the wire wheel) and a Mobile Laboratory (initially built as a study of the type of vehicles that might be used to explore the moon’s surface. After NASA completed its studies, the lab was used by the Department of the Interior for direct application in the field of geology.)

There is, of course, no mistaking the Saturn I, the centerpiece of the display. The Saturn I was the first large space vehicle developed solely for space exploration; it was designed and developed at the Marshall Space Flight Center. Saturn I operates at a top speed of 17,000 miles-per-hour and can launch 11 tons of man and equipment into orbit. A rocket similar to this one launched the first unmanned Apollo spacecraft and three Pegasus satellites for meteoroid detection in space into orbit. An updated version of this rocket, called the Saturn IB launched Skylab astronauts into orbit. This particular rocket is a Saturn I – Block II.

Surrounding the Saturn I are the various rockets we took in our attempt to reach the stars, such as the V-1 Buzz Bomb rocket (a German cruise-type missile called the "Buzz Bomb" because of the unusual sound made by its engine. It is powered by an aero-pulse engine, which burns any gasoline-type fuel and produces 900 pounds of thrust. Approximately 20,000 V-1s were launched against England and Belgium during 1944-1945. Over 1,200 US built copies, called the JB-2, were tested by the Army and Navy. The concepts of the V-1 lead to the V-2, which proved that the basic theories of rocketry were correct. First launched on October 3, 1942 at Peenemunde, Germany, the V-2 broke all records of height, weight, speed and range. The V-2 was brought to the United States following the War and inaugurated the US Missile Program.

The Missile Program began by Von Braun and his associates gave us the Redstone, Jupiter and Juno.

The REDSTONE, known as "old reliable" because of the many diverse missions it fulfilled in the early days of the space race, begat three versions: a military, satellite, and manned version. The one on display here is the military version, designed to transport nuclear or conventional warheads at ranges of up to 200 miles. Its power plant burns liquid oxygen and an alcohol-water mixture producing 75,000 pounds of thrust. JUPITER C, the US Army's second version of Redstone, launched the first US Satellite – Explorer I – on January 31, 1958. Another Jupiter rocket launched two primates named Able and Baker into space for the US Army in 1959.

That experiment proved that living creatures could pass through lift-off and re-entry and return safely to earth. The Jupiter generates 150,000 pounds of thrust. The celebrated Miss Baker, who retired from the “monkeynaut” corps and used to reside here at the Space & Rocket Center, was a passenger on a Jupiter just like this one. The JUNO II, also on display here, was a modified Jupiter with an upper stage added for launching space probes. A rocket like this one launched the first Pioneer and Explorer series of satellites.

These rockets were great at launching smaller payloads such as monkeys, satellites and interplanetary probes; however, bigger, more powerful rockets would be needed to lift man and machine into orbit, and beyond. These are the Mercury-Redstone, Mercury-Atlas and Gemini-Titan derivatives.

The third version of the REDSTONE was the first of a series of rockets used in the US manned space flights. In May 1961, a MERCURY-REDSTONE rocket launched Alan B. Sheppard on a sub-orbital flight aboard Freedom 7. Thus Sheppard became the first US Astronaut to ride a rocket. The ATLAS space launch vehicle was originally designed as a weapon and later modified to launch manned and unmanned space hardware in 1962. The ATLAS launched John Glenn, the first US Astronaut to Orbit the Earth, into space aboard the Mercury Friendship 7 spacecraft. ATLAS rockets also launched the Ranger, Surveyor, Lunar Orbiter and Mariner spacecrafts, visiting the Moon and Mars. And then there’s TITAN, the US Air Force rocket that was initially developed for defense. TITAN II was used by NASA to launch the two-man Gemini spacecraft, a role the rocket performed very well. A stage recovered from a Gemini-Titan V launch is on display. It’s the largest piece of a rocket stage ever recovered from a manned flight – the forward half of the first stage. The complete vehicle boosted Astronauts Gordon Cooper and Charles “Pete” Conrad into earth orbit for an 8-day mission aboard Gemini V on August 21, 1965.

But perhaps the most exciting to see is the Saturn V moon rocket, displayed on its side out back.

The Apollo Saturn V was designed to transport man to other planets (although the Moon was as far as they got) and lift tons of cargo into space. The Saturn V has five Rocketdyne F-J engines, the center one being fixed with the surrounding four being on gimbals (meaning they can move). These engines consume 5,000 gallons of liquid fuel per second producing the 160 million horsepower power the FIRST STAGE - 138 feet long and 33 feet wide – requires to lift the entire package from the launch pad. During flight the first stage burns kerosene and liquid oxygen and operates for 2 ½ minutes and shuts down at 35-40 miles altitude.

The SECOND STAGE powers the spacecraft to an altitude of 117 miles above the earth at a speed of 15,300 mph. The five J-2 rocket engines generate one million pounds of thrust and burn liquid hydrogen and oxygen. The THIRD STAGE increases the spacecraft orbital speed to 17,500 mph. After one orbit it re-ignites to push the spacecraft away from earth at a speed of 25,000 mph on a path to the moon. This single J-2 engine generates 225,000 pounds of thrust. On the last few moon flights, this stage has been guided to impact the moon in order to record seismographic information.

The INSTRUMENT UNIT serves as the central brain of the total vehicle. It is packed with computers and electronic controls designed to maintain a path of flight that will place the astronauts at the required point in space. Attached to it is the APOLLO spacecraft. The 100,000 pound Apollo consists of the lunar module, service module, command module, and launch escape system. The Lunar Module not seen here is stored with its legs folded inside the container directly behind the Apollo Command and Service Modules. The astronauts are in the Command Module for most of the flight, and this is the only part of the Apollo-Saturn vehicle that makes a complete round trip back to earth. The launch escape tower, the most forward part of the rocket, is used in the event of a failure on the pad or just after lift-off. Its rocket motor has a thrust of 150,000 lbs - twice that of a Redstone rocket.

This Apollo-Saturn V vehicle was used for ground testing on Earth, therefore, it has never flown in space. However, it is very similar to those moon rockets that have launched astronauts to the moon. Standing on the pad, the vehicle is 363 feet tall, or about the length of a football field, and weighs 3,000 tons (6,200,000 pounds) fueled and ready for launch, thrusting 7,600,000 pounds. On Space Day, July 20th, 1987, the rocket was honored as a National Historic Landmark - the only rocket in history to receive such a status! The Apollo-Saturn V rocket on display is also one of the only surviving test vehicles left and is a testament to the scientists, engineers, and technicians who designed and built this massive beast.

And for added display is a full-scale exterior mock-up of the Skylab space station. Three crews of astronauts lived in Skylab while orbiting the earth for a total of 161 days in 1973-1975. The astronauts used part of this mock-up during training inside the Neutral Buoyancy Trainer at Marshall Space Flight Center. Launched into space using the last remaining Saturn V rocket, the third-stage of the rocket (without the rocket engine and related components) was converted into the living quarters for the astronauts.

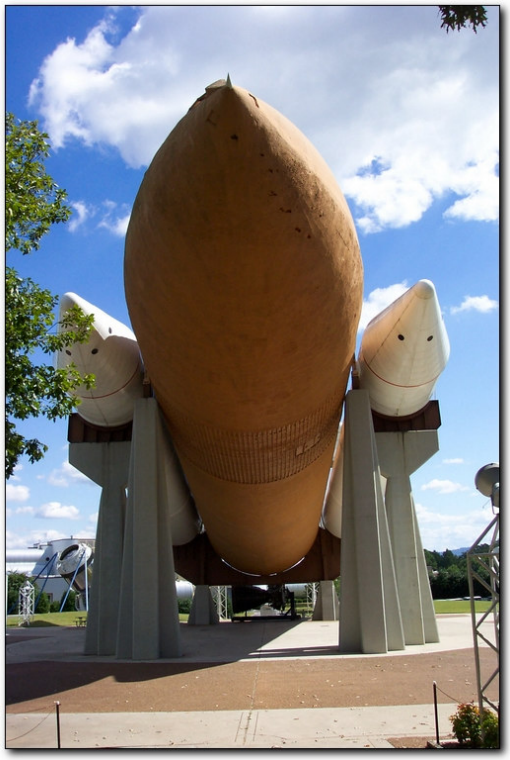
Beyond Skylab are a couple of America's X-Plane designs – the X-15 Rocket Plane and the X-24 Lifting Body.

The X-15 rocket powered plane made the first manned probes into the lower edges of space. Several X-15 pilots including Neil Armstrong earned "astronaut" rating by flights to an altitude of 50 miles in a plane such as this. The X-15 flight program also contributed significantly to the Mercury, Gemini, and Apollo projects. The X-15 was carried aloft by a B-52 and released at about 45,000 feet and 500 mph. Its rocket engine then fired for the first 80 to 120 seconds of flight. The remainder of the 10 to 11 minute flight was powerless and ended with a 200 mph glide, landing on a dry lakebed.

The Lifting Body is just a mock-up of the X-24 rocket powered airplane. The X-24 is carried aloft by a B-52 plane, much like the X-15 before it, and released at 45,000 feet. The rocket plane climbs to 60,000 feet after an initial boost from its rocket engine. Afterwards, the pilot glides the vehicle to landing. Developed by Martin Mariette, the X-24 provided research information for the Space Shuttle in its early beginnings.

PATHFINDER ///

Pathfinder (OV-098) is constructed from steel, wood and an old rocket motor, surprisingly, and was used by NASA to test roadway clearances, crane capabilities, structure fittings and how vibrations would affect the Shuttle during a launch. Though it had planned to conduct these tests with the first Shuttle it built – Enterprise (OV-101) – after landing tests that launched it from the back of a Boeing 747 jetliner, NASA chose to build Pathfinder instead. This was probably a good idea – Enterprise was a more expensive article and losing Pathfinder would the save program from embarrassment. The tests were done at a special test stand at Marshall Space Flight Center at Redstone Arsenal and were completed successfully. And like Enterprise before it, Pathfinder was sent to Kennedy Space Center in Florida so that engineers there could practice hoisting the Shuttle in the Vehicle Assembly Building (VAB) originally constructed to house the Saturn V moon rockets.



Once tests were complete, Pathfinder was returned to Huntsville, where Teledyne Brown Engineering (one of Space Camp's sponsors) rebuilt the craft for a Japanese company (who purchased Pathfinder) to look more like the real Space Shuttle. Teledyne then sent the craft on a tour of Japan, displaying at the Great Space Shuttle Exposition in Tokyo from June 1983 to August 1984, before returning it to Huntsville. Upon its second return, the Pathfinder became a permanent display at the Space & Rocket Center.

The Pathfinder, 122 feet long, 56 feet tall with a wingspan of 78 feet, weighs approximately 89 tons. Two of the Pathfinder's main engines powered the first flight of Columbia (OV-102) in 1981. Pathfinder's right-hand nosecone also few on Columbia's maiden voyage in 1981. Though nosecones aren't normally recovered after use, this one happened to land upright and floated in water.

It came here on October 22, 1986 from the Marshall Space Flight Center (where it had been stored following Tokyo) on a pair of specially designed trucks traveling the streets of Huntsville at less than 5 miles-per-hour. Accompanying the Pathfinder Orbiter is an External Tank (the first ever) built by Martin Marietta, a set of Solid Rocket Boosters built by Morton-Thiokol (advanced booster casings which were developed after the Challenger (OV-099) explosion), and three Main Engines built by the Rocketdyne division of Rockwell International.

The external tank is 154 feet long and 27 feet in diameter, weighing 33 tons. It has been involved in many test firings but has never flown in a mission – if it had it would not be here, Comrade. This particular tank was used in special Shuttle mock-up tests called the Main Propulsion Test Article, or MPTA. The MPTA included an orbiter and its three main engines. This way engineers could learn how to fuel Shuttle, run through countdown and ignite engines for testing without damaging the real article. The test itself was held at the National Space Technology Laboratory in Bay St. Louis, Mississippi. Martin Marietta Aerospace helped modify tank (MPTA-098) so it could be displayed here. It arrived by barge, covering 1,250 miles over Mississippi, Ohio and Tennessee rivers to reach Marshall Space Flight Center.

The rocket boosters were added in 1988, Comrade. These were built for NASA as test equipment, but the tips of them are actual working parachute pods (we should get look). The boosters themselves are 149 feet long, and weigh more than 50 tons each. They're made from graphite filament, which makes them much lighter than the steel encased boosters that are used in Shuttle Program today.

It is dedicated to the brave astronauts aboard STS-51L, the ill-fated Challenger (OV-099) mission of 1986.

* * *

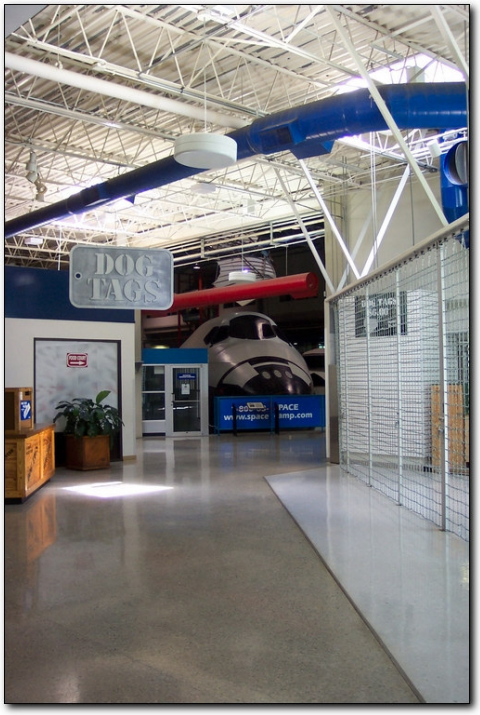
And then there are the missiles out in “Missile Row”, but I spent very little time out there – missiles don’t excite me.

So I found myself here at this picnic table under the shadow of the Center’s Saturn IB display, looking on. But now it’s just about time for me to make my way to the Habitat and pack up. I’ll need to be on my way to the airport shortly and return to the real world.

Being here at Space Camp has certainly been fun and a walk down memory lane. Despite any ill feelings I might have at the moment I know they’ll turn more rosy later. Besides, I’m also kind of depressed that the experience went more quickly than I would have hoped. And who could blame me? I did wait twelve years for this!!

Okay Space Camp... signing off.

Until next time!



"IS THAT ALL THERE IS?"

Following the brief, but relatively satisfying experience at Adult Space Academy in 2003, I didn't really expect to ever return to the program. Not that I didn't want to, really, but I had moved on to other things: I'd traveled to Japan, found a girl, and began plotting out the next steps in my life, which didn't include a return trip to Space Camp. But a fortuitous turn of events occurred in 2005 that offered up a little taste of the US Space & Rocket Center, in similar fashion to the visit I'd made ten years prior in 1995 – just to the museum for the day. It might have only been two years but the results were instantaneous: a fire was rekindled.

It didn't hurt that I decided to stay overnight at the Rocket Center's Marriott location, with a room that overlooked the Rocket Park. It also didn't hurt that I was assigned a very auspicious room number – 308 – the very same room number I was assigned in the Habitat during Youth Space Academy in 1991. It was a sign, I thought, one to heed of things to come.

Just two years later, and I had all but moved on yet again, an email delivered to my inbox changed everything: Space Camp was set to celebrate its 25th Anniversary and they were planning alumni adventures in the summer of 2007. What those would entail weren't known at that time but it definitely piqued my interest. When the announcement came that Space Camp would house two four-day Space Camp sessions for alumni (one in June and another in August) I jumped. Although it wouldn't be the Advanced Space Academy experience I originally sought, it turned out to be much, much more...

Alumni Camp (25th)
Session 38
June 14 - 17, 2007

SPACE CAMP MEMORIES

2007 // Alumni Camp, Session 38

Day One – TRANQUILITY BASE HERE

THURSDAY | JUNE 14, 2007

It's a little surreal – I'm back at Space Camp. Can you believe it? We've just finished up the first of four days here at Alumni Camp and already I'm having so much fun. The group of folks attending this experience is much younger than the group I was with for Adult Academy in 2003, and as alumni to boot they're much more interested in the activities offered by the experience. That definitely makes being here much more fun – not only do they know when to take things more seriously, but also know when to have a good time. And a good time we've had today! In addition to attending a lecture about Shuttle Operations (i.e., the parts of the shuttle, how they operate, and other systems within), we were assigned our mission positions (I'll elaborate more on that later), attended a panel event with guest speakers, hit the AstroTrek building to do some astronaut training (taking the 1/6th Chair, Multi-Axis Trainer, 5DF Chair and Grounded Manned Maneuvering Unit for a spin – and I'll explain those more in a bit too), and took in the sights, smells, sounds and fun the Museum and Rocket Park have to offer.

I'm happy. And you're not going to believe the room I was assigned this year. **Habitat I**, of course, the simulated Space Station environment built in 1988 to house hundreds of Space Camp and Space Academy trainees during the weeklong adventures the Rocket Center offers. **Level 3**; Habitat I has a towering four floors, which open up to a central atrium that's used for registration and various assemblies (it's where we all met for registration earlier today).

Room 8; Designers incorporated many aerospace concepts in this four million, 328-foot Space Habitat, for example: it has hatches for doors; ports instead of windows; and benches instead of chairs (which, of course, would float in space.

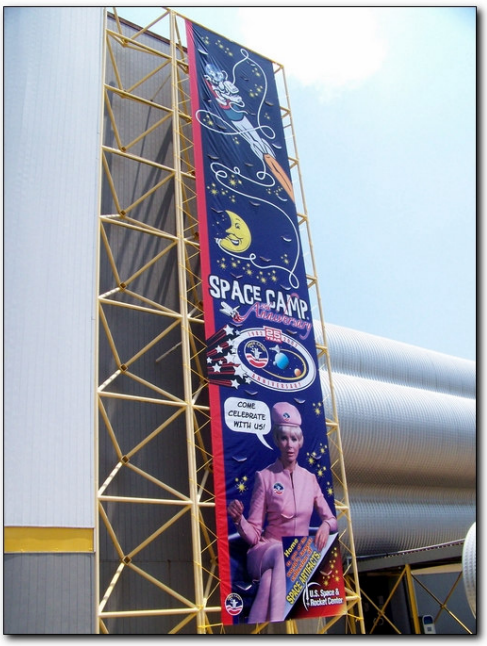
Structurally, the Habitat's exterior is comprised of over 45 curved metal panels, which give the building its cylindrical appearance. The "tubes" of the Habitat are longer than a football field and are divided up into 66 bays, which are our rooms. And I'm in the exact same room I was in 16 years ago: **HL-308**. How about that?! I've also managed to procure the same bunk too. You know the one – it's over the second set of lockers as far into the room as you can go. Totally mind blowing. And quite as I remember it too: hard to get up into and hard to make, but I'm going to have a blast trying!

But if there's one caveat to how I'm feeling right now it's this: according to the activity schedule we're going to be spending some time down at Aviation Challenge – tomorrow and again on Saturday – taking in some of the activities there. I'm not so sure how I feel about that, as I've only been interested in the space side of things, alas I'm keeping an open mind about it as a number of the alumni here are not only interested but actively keen on those activities so... who knows, it could be fun!

Getting back to today's activities...

GETTING INTO THE GROOVE ///

I was one of the early arrivers this morning. My flight to Huntsville was direct, leaving Orlando at 8:55am and arriving a little less than two hours later, around 9:40am Central Daylight Time. One of the Camp's busses was waiting for me, just like it had the previous visit, and whisked me out of the airport and to the Rocket Center within minutes. Luckily this time I didn't have to make my way through the center's security room, affectionately called the "Bush Room" (for reasons I don't really understand); rather they allowed me to walk through the main gates and into the Habitat complex unhindered. And upon arrival there I met a hand-full of counselors, checked in (although it was still rather early) and picked up my Alumni Camp package, which consisted of a classic Space Camp T-shirt, my badge and lanyard, my room assignment (HL-308 as I previously mentioned; totally geeked out) and a leather portfolio with the Camp logo embroidered on the side – all good things.

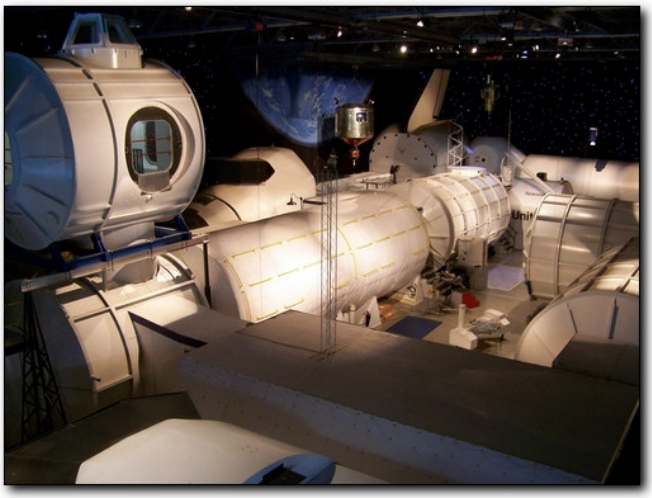


I thought since I was early I couldn't yet make the trek to my room, so I asked whether or not I could leave my luggage attended with the counselors in the atrium; however, they said I could go right on up and settle in – so I did! As soon as I pushed through the door I was met with brightness – someone else had already been here: the lights were on and there was a bag on a bunk. Thankfully the bunk I wanted was free (the aforementioned above-the-lockers bunk), so I took it and began to unpack. It was then Benjamin ("Benji") Schwartz, one of the members of Hab1.com (a discussion forum dedicated to all things SpaceCamp), came in and introduced himself and we hit it off right away, both being members of Hab1 and all. As soon as I was done unpacking we retreated back to the atrium – our plan was to go ahead and leave the Habitat and explore the center grounds but as soon as we returned to the counselors table we heard there was another early arrival so we waited. This turned out to be Diane M. ("Conan") O'Keefe and by the time she was ready to join Ben and I, another came - Lisa Jania.

Lisa had just been shopping over at the Space Gear store within the museum so she had an arm-full of goodies in addition to the ones we received from the program. Considering I had just arrived I had to admit I was curious what new souvenirs were available. I was about to bid her farewell when she decided to join me. And the two of us made our way back over to the museum to see what money we could be parted with. It wasn't hard.

There were a number of retro-tastic goodies available at the Space Gear shop. In addition to the classic Space Camp alumni shirt we were all given, Space Camp reproduced a number of the older "team shirts" from various Camp and Academy youth teams. Imagine my glee when I held an Academy shirt with the BDM logo emblazoned across the back, or a Camp shirt with the Lockheed Martin logo – I couldn't help but buy it! I also picked up a new Space Academy hat to replace the Space Camp ball cap I currently wear. So all in all a very good outing! We stopped for lunch in the old "Lunch Pad", getting ourselves re-acquainted with Camp-style food (Yuuuuck!), and prepared ourselves for the weekend ahead.

Following lunch we snuck onto the Training Center Floor for our own self-guided tour, attending to places that weren't there the last time we'd been! A number of changes welcomed us as we explored: a number of International Space Station mock-up modules, a couple of new Shuttle simulators, not to mention an intricate tunnel system to connect them together! We hardly recognized it! I took plenty of pictures – especially from the offices on the second floor. You just can't beat the view from there!



Around 3:00pm Alumni Camp officially kicked off and we met the rest of our Alumni group down in the atrium of Habitat I. There were so many of us that they split us into two separate groups: Team Columbia and Team Challenger. I ended up as part of Team Challenger, along with Lisa Jania, Diane O'Keefe, Laura Boyle, Chris Kauppi, Ben Schwartz, Leia Fleischman, Vicki Pohl and Frank Scalia. Team Columbia was made up of: Ana Lawitzke, Mary Lawitzke, James Binder, Thomas Sparrow, ShaErica Jackson, Rich Kolker, Bill Naivar, Nathan Wilson, and Chris Damsgard.

Once acquainted, our counselor – Jeramy ("Bootyshorts") Gandy - led us over to the Team Room (now called the "Challenger Room") in Habitat II for our Shuttle Operations lecture, which is intended to give attendees a high-level overview of the Space Shuttle, its components, how it all works, and how it was built – but I won't bore you with those details. Suffice it to say it was all very similar to the Shuttle Operations lectures I'd had at previous camps. Besides, I think as long as you know what the Space Shuttle is and what it means to the United States you're good. Of course the group in company knew much, much more than that so this lecture turned out to be nothing more than an academic exercise in how much more do you know than the person sitting next to you. Still, it was a nice effort to bring everyone in on the same page.

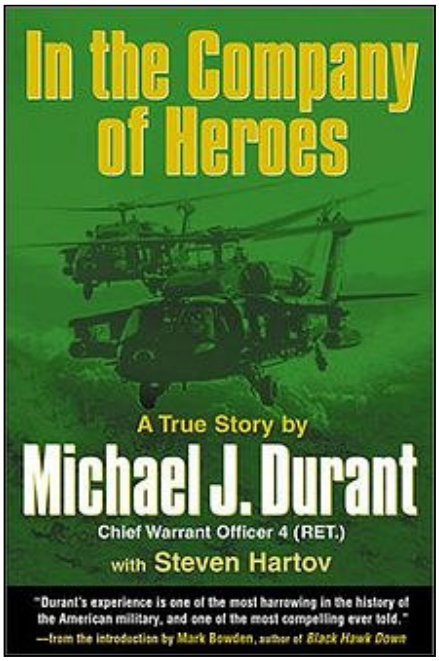
Following the lecture Jeramy led us over to the Training Center where we took on a brief tour of the facilities (very similar but not nearly as in-depth as the one we'd taken ourselves earlier in the day), then sat down with us at dinner to ask – via a questionnaire that also asked us what our favorite cartoon character was - which position we'd like to have on the Shuttle mission simulation we'd fly tomorrow. I chose and was awarded PILOT based on the fact that I had flown missions in the past as COMMANDER (Academy, 1991 for "Discovery"), as a MISSION SPECIALIST (Adult Academy, 2003), as a STATION SPECIALIST (Academy, 1991 for "Atlantis"), not to mention MISSION CONTROL twice (Camp, 1999 and Adult Academy, 2003 for "Endeavor Bravo"). Therefore, I wanted something new I hadn't done before, which I'm sure was a very tall order to fill – I'm sure everyone in the room wanted to be COMMANDER and PILOT of the Space Shuttle! But no, that's me! And Lisa, my new-found buddy, was chosen as COMMANDER. So the two of us get to fly that bird into space tomorrow!

GUEST SPEAKERS ///

Once our mission assignments were handed out we broke for dinner then re-assembled in the museum's lecture hall for an opportunity to hear Mike Durant, Jamail Larkins and Story Musgrave, which turned out to be much more interesting than I had at first thought. Although we had just eaten, the panel served hors d'oeuvres, cheeses, cakes and the like, and there was a pay bar if anyone was interested in other libations but I refrained from sampling either – I was more interested in hearing from our three guest speakers...

Mike Durant

Michael J. "Mike" Durant (born July 23, 1961) is an American pilot and author who was held prisoner for eleven days in 1993 after a raid in Mogadishu, Somalia. He was a member of the 160th Special Operations Aviation Regiment (Night Stalkers) as a Chief Warrant Officer 3. He retired from the Army as a Chief Warrant Officer 4 Blackhawk helicopter Master Aviator in the 160th SOAR after participating in combat operations Prime Chance, Just Cause, Desert Storm, and Gothic Serpent. His awards include the Distinguished Service Medal, Distinguished Flying Cross with Oak Leaf Cluster, Bronze Star with Valor Device, Purple Heart, Meritorious Service Medal, three Air Medals, POW Medal, and many others.



During Operation Gothic Serpent, Durant was the pilot of Super Six Four, the second MH-60L Black Hawk helicopter to crash during the Battle of Mogadishu on October 3, 1993. The helicopter was hit by a rocket-propelled grenade in the tail, which led to its crash about a mile southwest of the operation's target. Durant and his crew of three, Bill Cleveland, Ray Frank, and Tommy Field, survived the crash, though they were badly injured. Durant suffered a broken leg and a badly injured back. Two Delta Force snipers, MSG Gary Gordon and SFC Randy Shughart, had been providing suppressive fire from the air at hostile Somalis who were converging on the area. Both volunteered for insertion and fought off the advancing Somalis, killing an undetermined number, until they ran out of ammunition and were overwhelmed and killed, along with Cleveland, Frank, and Field. Both Gordon and Shughart received the Medal of Honor posthumously for this action.

The Somalis captured Durant and held him in captivity. Durant was the only one of his crew to survive. During part of Durant's time in captivity, he was cared for by Somali General Mohamed Farrah Aidid's propaganda minister Abdullahi "Firimbi" Hassan. After eleven days in captivity, Durant was released, along with a captured Nigerian soldier, to the custody of the International Committee of the Red Cross. After being freed, Durant recovered and resumed flying with the 160th SOAR. Durant retired from the Army in 2001 with more than 3,700 flight hours, over 1,400 of which were flown under night vision goggles. He now offers seminars to military personnel about helicopter maneuvering and Combat Search and Rescue (CSAR) operations.

Durant talked about the Somalia raid and the experiences he had in captivity. In 2003, Durant published a book, “In the Company of Heroes” (the basis for the film “Black Hawk Down”), in which he chronicles his military career and his captivity. It was wonderful to hear him speak about his experience.

Jamail Larkins

From the ripe age of 12 when Jamail stepped inside an airplane and co-piloted his first flight with the Experimental Aircraft Association (EAA) Young Eagles Program, he was hooked for life. Falling in love at first flight, Jamail decided he would do whatever it took to continue flying, including petitioning the Federal Aviation Administration (FAA) to let him fly solo at the age of 13. He couldn’t, so he headed to Canada (age 14 to fly) where he became one of the youngest American pilots to solo a powered aircraft in Canada.

A few years later at the age of 16, Jamail became the National Spokesman of the EAA Vision of Eagles Program, a youth education initiative of the EAA Aviation Foundation. In this role, Jamail was able to use his passion to promote the career possibilities available to aviation enthusiasts, young and old alike. With this newfound status and exposure, Jamail was afforded many unique opportunities, including becoming the first and youngest student pilot to solo the Cirrus SR20, a revolutionary certified single-engine aircraft with a built-in parachute. Since Jamail's solo, the Cirrus line of aircraft has become the World's Best Selling Single Engine Aircraft.

Spreading his wings, Jamail branched out into aerobatic flying at the age of 18. Loving the creativity and freedom it allowed him, he became one of the youngest air show aerobatic performers in the U.S.

Jamail realized quickly in order to fund his passion for flight; he needed a plan to make more money than the average teenager. To do so, at the age of 15, he founded his first company - Larkins Enterprises, Inc., an aviation sales & advertising company. Since its first inception, Jamail has transformed Larkins Enterprises into two successful business units: an aircraft sales and leasing company and an aviation consulting firm. Over the years, Jamail's business accomplishments have earned him accolades from the leaders in business media, including a ranking as one of the top entrepreneurs by CNBC, BusinessWeek, Black Enterprise, and as the #1 Entrepreneur under the age of 30 by Inc. Magazine.

In 2002, Jamail became the National Spokesman for Careers in Aviation, a non-profit organization that promotes and provides aviation opportunities to young people. Because of his passion for flying, ability to connect with youth and his role with Careers in Aviation, Embry-Riddle Aeronautical University (ERAU), the top aviation school in the country, recruited Jamail to bring attention to the exciting yet declining industry of aviation. Together they founded the DreamLaunch Tour, a national tour designed to educated students about career opportunities in the aviation industry and to motivate students to reach for their dreams.

Jamail's profile was building, and the Federal Aviation Administration (FAA) took notice. By Fall 2004, the FAA signed Jamail as the first official Ambassador for Aviation and Space Education. Through his work with the FAA, ERAU and numerous other organizations, Jamail has had the opportunity to give speeches beside notables like Chuck Yeager, Gene Cernan, and Cliff Robertson. He has flown with the Navy's prestigious Blue Angels, is featured in the renowned Franklin Institute, and has received a Certificate of Special Recognition from the United States Congress.

Today, Jamail serves on the board of several large-aviation non-profit organizations. In addition to his industry commitments, he continues to lead his primary company, Ascension Aviation, which is rapidly becoming one of the premier companies specializing in aircraft sales, leasing, financing, and management. Jamail currently resides in Atlanta, GA, but can typically be found flying around the country, spreading his passion and expertise in the field of aviation & aerospace.

Story Musgrave

Franklin Story Musgrave (born August 19, 1935) is an American physician and a retired NASA astronaut. He was born in Boston, Massachusetts, but considers Lexington, Kentucky to be his hometown. He has six children, one deceased. His hobbies are chess, flying, gardening, literary criticism, poetry, microcomputers, parachuting, photography, reading, running, scuba diving and soaring.

He talked about his education: Story Musgrave attended Dexter School, Brookline, Massachusetts and St. Mark's School, Southborough, Massachusetts, from 1947 to 1953, but left school shortly before graduation and before receiving his high school diploma. He received a BS degree in mathematics and statistics from Syracuse University in 1958, an MBA degree in operations analysis and computer programming from the University of California, Los Angeles in 1959, a BA degree in chemistry from Marietta College in 1960, an M.D. degree from Columbia University College of Physicians and Surgeons in 1964, an MS in physiology and biophysics from the University of Kentucky in 1966 and a MA in literature from the University of Houston–Clear Lake in 1987.

He talked about his military career: Musgrave entered the United States Marine Corps in 1953, served as an aviation electrician and instrument technician, and as an aircraft crew chief while completing duty assignments in Korea, Japan and Hawaii, and aboard the carrier USS Wasp in the Far East. He has flown 17,700 hours in 160 different types of civilian and military aircraft, including 7,500 hours in jet aircraft. He has earned FAA ratings for instructor, instrument instructor, glider instructor, and airline transport pilot, and U.S. Air Force Wings. An accomplished parachutist, he has made more than 800 free falls — including over 100 experimental free-fall descents involved with the study of human aerodynamics.

He discussed his civilian career: the Eastman Kodak Company in Rochester, New York, employed Musgrave as a mathematician and operations analyst during 1958. He served a surgical internship at the University of Kentucky Medical Center in Lexington from 1964 to 1965, and continued there as a U. S. Air Force post-doctoral fellow (1965–1966), working in aerospace medicine and physiology, and as a National Heart Institute post-doctoral fellow (1966–1967), teaching and doing research in cardiovascular and exercise physiology. From 1967 to 1989, he continued clinical medicine on a part-time basis at Denver General Hospital (presently known as Denver Health Medical Center) and as a part-time instructor of physiology and biophysics at the University of Kentucky Medical Center. He has written or been listed as a co-author of twenty five scientific papers in the areas of aerospace medicine and physiology, temperature regulation, exercise physiology, and clinical surgery.

And, of course, his time with NASA: NASA selected Musgrave as a scientist-astronaut in August 1967. He completed astronaut academic training and then worked on the design and development of the Skylab Program. He was the backup science-pilot for the first Skylab mission, and was a CAPCOM for the second and third Skylab missions. Musgrave participated in the design and development of all Space Shuttle extravehicular activity equipment including spacesuits, life support systems, air locks, and manned maneuvering units. From 1979 to 1982, and 1983 to 1984, he was assigned as a test and verification pilot in the Shuttle Avionics Integration Laboratory at JSC. He served as a spacecraft communicator (CAPCOM) for STS-31, STS-35, STS-36, STS-38 and STS-41, and lead CAPCOM for a number of subsequent flights.

He was a mission specialist on STS-6 in 1983, STS-51-F/Spacelab-2 in 1985, STS-33 in 1989 and STS-44 in 1991, was the payload commander on STS-61 in 1993, and a mission specialist on STS-80 in 1996.

- He first flew on STS-6, which launched from the Kennedy Space Center, on April 4, 1983, and landed at Edwards Air Force Base in California, on April 9, 1983. During this maiden voyage of Space Shuttle Challenger, the crew performed the first Shuttle deployment of an IUS/TDRS satellite, and Musgrave and Don Peterson conducted the first Space Shuttle extravehicular activity (EVA) to test the new space suits and construction and repair devices and procedures. Mission duration was 5 days, 23 minutes, 42 seconds.

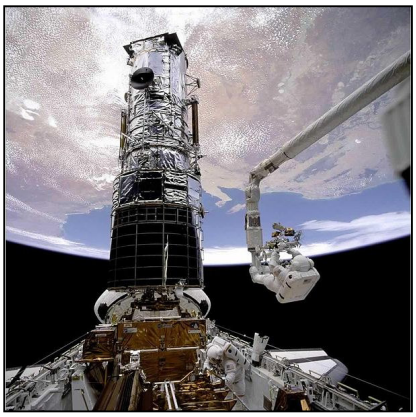
- On STS-51F/Spacelab-2, the crew aboard Challenger launched from the Kennedy Space Center, Florida, on July 29, 1985, and landed at Edwards Air Force Base, California, on August 6, 1985. This flight was the first pallet-only Spacelab mission, and the first mission to operate the Spacelab Instrument Pointing System (IPS). It carried 13 major experiments in astronomy, astrophysics, and life sciences. During this mission, Musgrave served as the systems engineer during launch and entry, and as a pilot during the orbital operations. Mission duration was 7 days, 22 hours, 45 minutes, 26 seconds.

- On STS-33, he served aboard the Space Shuttle Discovery, which launched at night from the Kennedy Space Center, Florida, on November 22, 1989. This classified mission operated payloads for the United States Department of Defense. Following 79 orbits, the mission concluded on November 27, 1989, with a landing at sunset on Runway 04 at Edwards Air Force Base, California. Mission duration was 5 days, 7 minutes, 32 seconds.

- STS-44 also launched at night on November 24, 1991. The primary mission objective was accomplished with the successful deployment of a Defense Support Program (DSP) satellite with an Inertial Upper Stage (IUS) rocket booster. In addition the crew also conducted two Military Man in Space Experiments, three radiation-monitoring experiments, and numerous medical tests to support longer duration Shuttle flights. The mission was concluded in 110 orbits of the Earth with Atlantis returning to a landing on the lakebed at Edwards Air Force Base, California, on December 1, 1991. Mission duration was 6 days, 22 hours, 50 minutes, 42 seconds.

- STS-61 was the first Hubble Space Telescope (HST) servicing and repair mission. Following a night launch from Kennedy Space Center on December 2, 1993, the Endeavour rendezvoused with and captured the HST. During this 11-day flight, the HST was restored to its full capabilities through the work of two pairs of astronauts during a record 5 spacewalks. Musgrave performed 3 of these spacewalks. After having travelled 4,433,772 miles in 163 orbits of the Earth, Endeavour returned to a night landing in Florida on December 13, 1993. Mission duration was 10 days, 19 hours, 59 minutes.

- On STS-80, (November 19 to December 7, 1996), the crew aboard Space Shuttle Columbia deployed and retrieved the Wake Shield Facility (WSF) and the Orbiting Retrievable Far and Extreme Ultraviolet Spectrometer (ORFEUS) satellites. The free-flying WSF created a super vacuum in its wake in which to grow thin film wafers for use in semiconductors and the electronics industry. The ORFEUS instruments, mounted on the reusable Shuttle Pallet Satellite, studied the origin and makeup of stars. During de-orbit and landing, Musgrave stood in the cockpit and pointed a handheld video camera out the windows. In doing so, he recorded the plasma streams over the orbiter's hull for the first time, and he is still the only astronaut to see them first-hand. In completing this mission he logged a record 278 earth orbits, traveled over 7 million miles in 17 days, 15 hours, 53 minutes.



A veteran of six space flights, Musgrave has spent a total of 1281 hours 59 minutes, 22 seconds in space. Musgrave is the only astronaut to have flown missions on all five Space Shuttles. Prior to John Glenn's return to space in 1998, Musgrave held the record for the oldest person in orbit, at age 62. He retired from NASA in 1997.

Great, great stuff.

ASTROTREKING ACROSS THE UNIVERSE ///

Of course, we finished the night AstroTreking across the Universe – training with the Multi-Axis Trainer, 1/6th Gravity Chair, 5DF Chair and Ground Manned Maneuvering Unit. Let me explain those:

The Multi-Axis Trainer (MAT) simulates the disorientation one would feel in a tumble spin during reentry into the Earth's atmosphere. The MAT is patterned after the MASTIF (Multiple-Axis Spin/Space Test Inertia Facility), a series of cages within cages, used for astronaut training during the Mercury program. The astronauts used this to condition themselves for disorientation that might occur in emergency conditions during flight. The MASTIF had a joystick, which allowed the astronaut to control the device. The MAT has no joystick so you're just along for the ride!

The 1/6th Gravity Chair is modeled after one the Apollo astronauts used for moon walk training, as it is designed to simulate the Moon's gravitational pull, about 1/6th that of the Earths. For example, a person who weighs 150 pounds on Earth would weigh 25 pounds on the Moon. Hence the chair gives trainees a realistic feeling of walking in the reduced gravity of the moon. The apparatus is suspended on a long bungee like cord; upon sitting in the chair your weight is balanced against the tension in the cord. Once properly balanced you're set off on your task. If you step too hard, you'll end up in the ceiling, so for the most part the counselors keep a hold of you. Once strapped in you're asked to do a variety of things. First it's a side-to-side walk, then a bunny hop, and on to whatever other steps you think might propel you across the floor (like a slow motion jog). After about three or four walks around you're done!

As most physicists know, there are really six degrees of motion, but unfortunately here on Earth, only five can be simulated at any one time – and to do that you need this chair. The five directions are: Forward and Back, along the Y-axis; Left and Right, along the X-axis; Pitch, Roll, and Yaw. The sixth degree is the Z-axis, which more or less is up and down. The 5DF chair rides on a cushion of air rendering the forces we take for granted - inert. As you sit in this suspended chair, the simulator will allow movement in any of the five different directions depending upon your initial push off, simulating the frictionless environment of space. Such free movement allows an astronaut to practice tasks here on the ground that would need to be completed in microgravity once the mission begins. It's also a fun demonstration of Sir Isaac Newton's Third Law of Motion: *For every action there is an equal and opposite reaction: or the forces of two bodies on each other are always equal and are directed in opposite directions.*

* * *

After spinning, jumping, flipping and flopping we called it a night. We've all returned to our respective rooms at either the Habitat or the Marriott – a new thing this go-round. Apparently you can, should you desire, bunk over at one of their rooms for a slightly higher cost to accommodations, but who wants to do that? I mean, I truly understand that the bunks here at the Habitat aren't the most comfortable (in fact, they're downright horrible) but that's part of the experience. And I'd never miss a chance to stay in the Habitat – never!

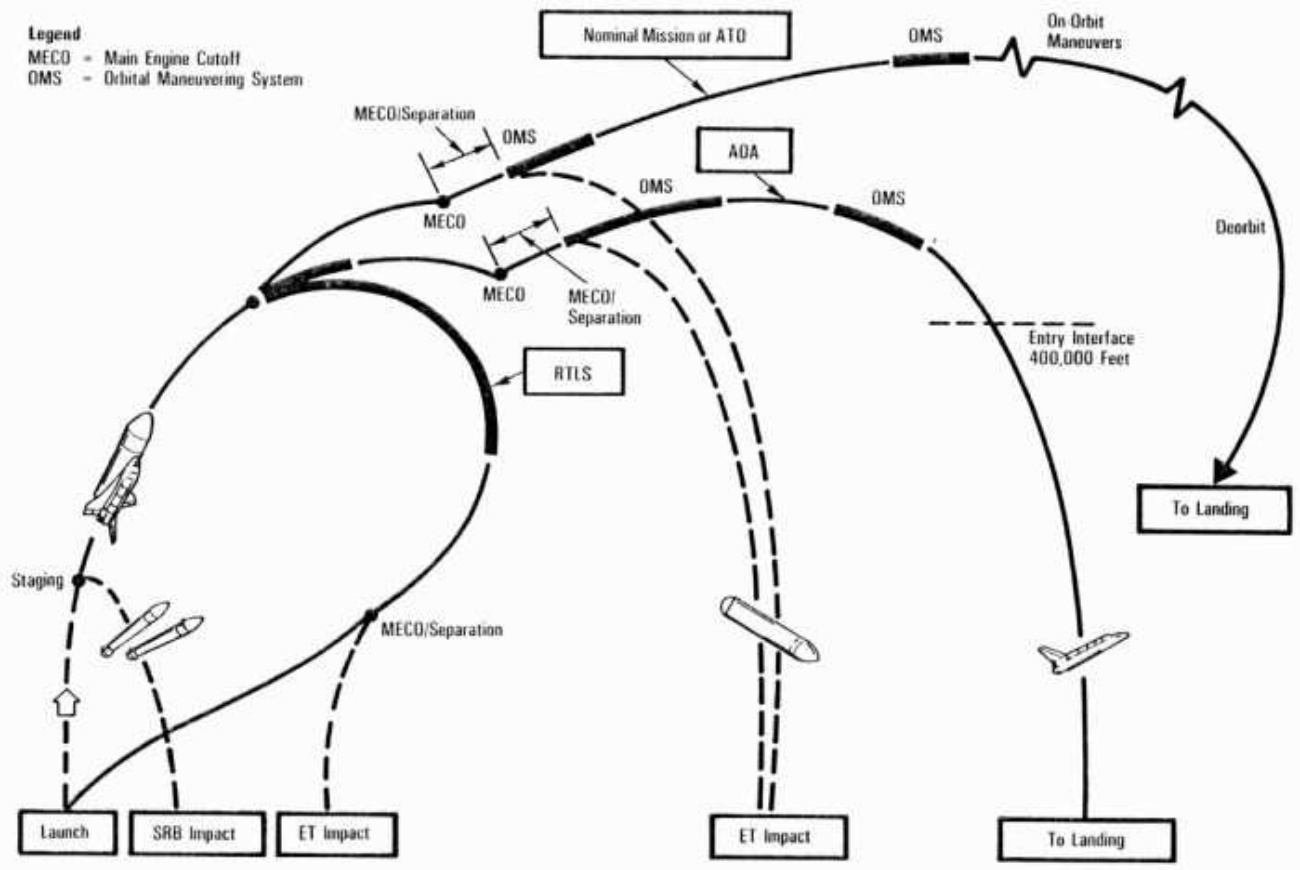
Tomorrow promises to be quite the busy day. According to the schedule we're headed over to the Aviation Challenge area (as I'd mentioned earlier) to take part in a helicopter crash-n-rescue exercise. Apparently you sit in a mock-up of a helicopter cage that we must simulate escaping out of after it has crashed into the lake – sounds like heady stuff. Then we're scheduled to take a spin in their centrifuge before returning to the space-side of things, hearing once again from Story Musgrave, attend a briefing on Ares, NASA's next-generation space transportation system, take our group photo, practice and then run our mission.

So goodnight!

Day Two – AVIATION CHALLENGE
FRIDAY | JUNE 15, 2007

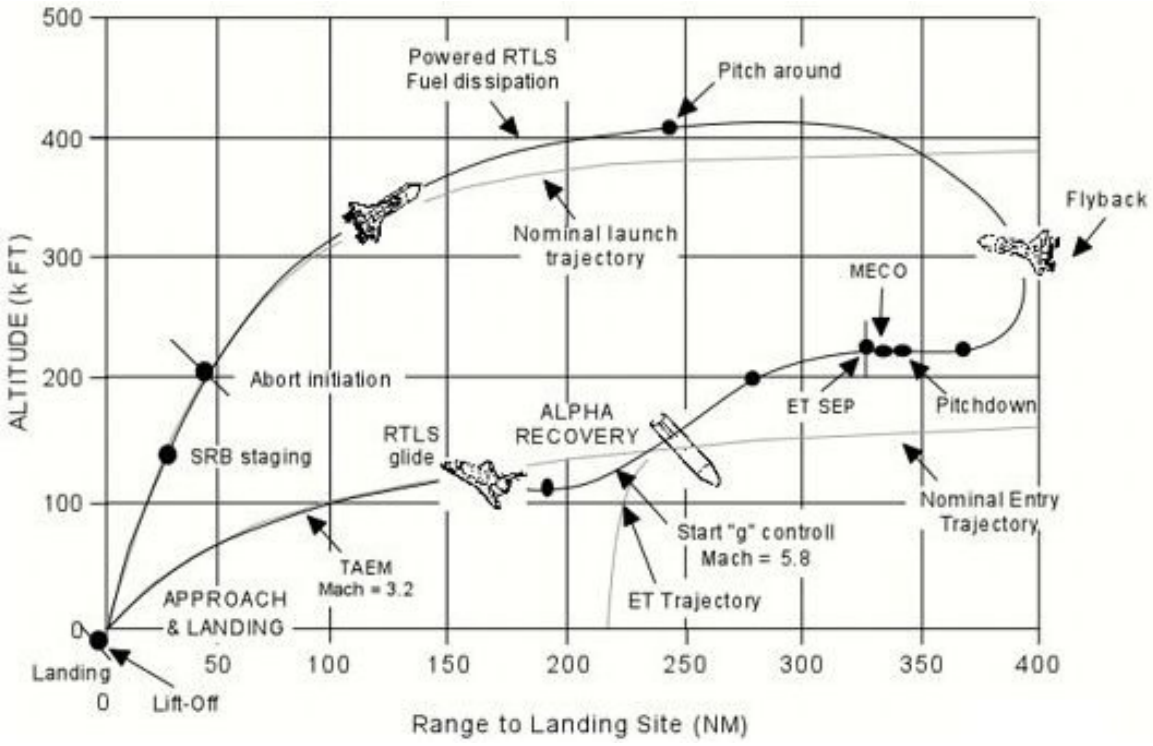
Houston, Atlantis... ATO necessitated, OVER!

In NASA Shuttle lingo, ATO means Abort-to-Orbit and its one of five abort modes built into the Space Shuttle's flight plan (and one of four that can be called during ascent) to help the flight recover from an anomalous event during lift-off. Besides Abort-to-Orbit (ATO) there's: Redundant Set Launch Sequencer (RSLS) abort, Return to Launch Site (RTLS), Transoceanic Abort Landing (TAL), and Abort-once-Around (AOA), each with their own set of circumstances but all generally caused by a main engine failure.

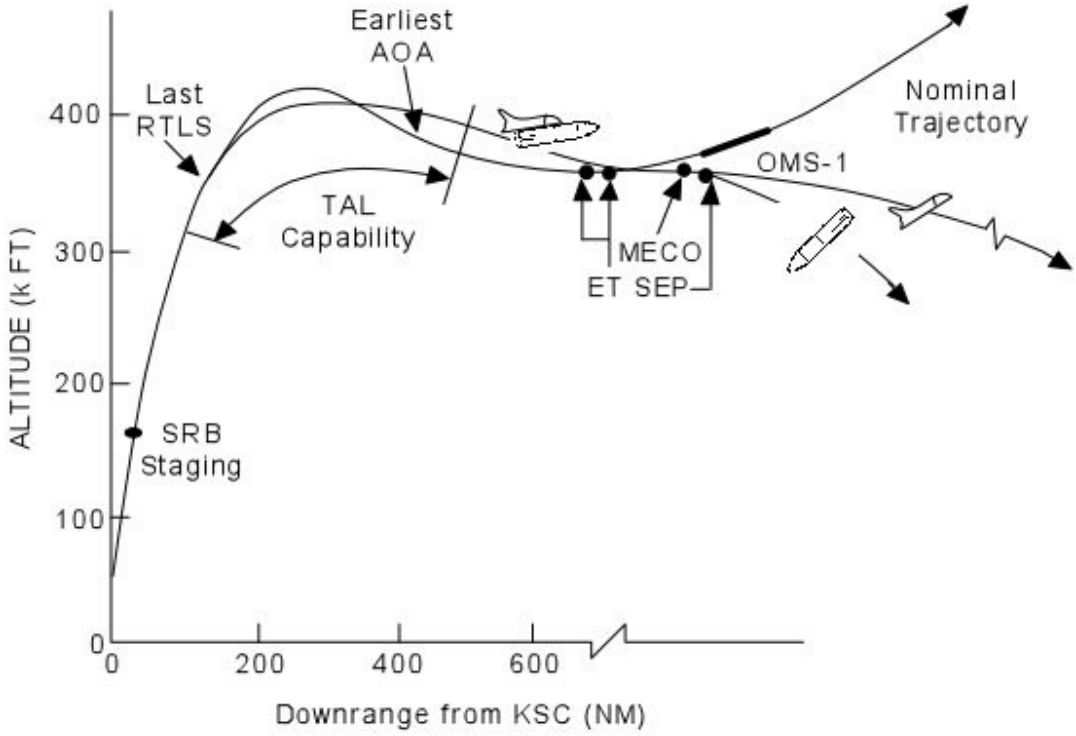


An RSLS can be called during the 6.6-second window during which the Main Engines are ignited prior to liftoff. From that point to ignition of the Solid Rocket Boosters (at T – 0 seconds), the main engines could be shut down due to some unforeseen problem the computers sensed. This was called a "Redundant Set Launch Sequencer Abort", and happened five times, on STS-41-D (1984), STS-51-F (1985), STS-51 (1993), STS-55 (1993), and STS-68 (1994). Since the SRBs cannot be turned off after ignition, once lit the Shuttle is committed to take off. If an event such as an SSME failure requiring an abort happened after SRB ignition, acting on the abort would have to wait until SRB burnout 123 seconds after launch. No abort options exist if that wait is not possible.

The next option is a RTLS abort, or Return to Launch Site. Here the Shuttle would have to continue downrange until the SRBs are jettisoned, then pitch around so the SSMEs are firing retrograde (This maneuver would have occurred in a near vacuum above the appreciable atmosphere and was conceptually no different from the OMS engines firing retrograde to de-orbit), burning continuously until downrange velocity is reduced to allow the Shuttle to return to the launch site. Then the SSMEs are stopped, the external tank is jettisoned, and the orbiter makes a normal gliding landing on the runway at Kennedy Space Center about 25 minutes after lift-off. The CAPCOM calls out the point in the ascent at which an RTLS becomes no longer possible as "negative return", approximately four minutes after lift-off. This abort mode has yet to be used in the history of the Space Shuttle program.



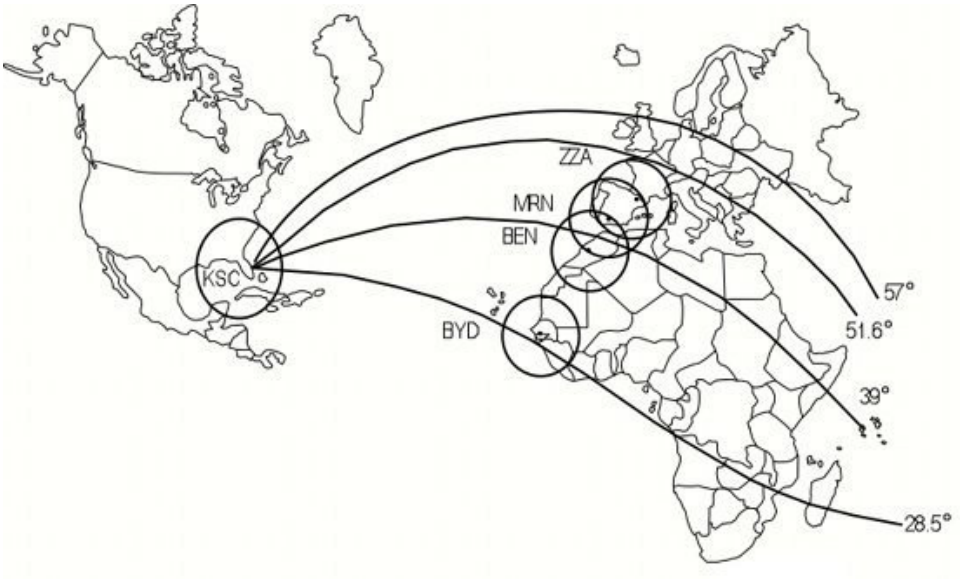
A Transoceanic Abort Landing (TAL) involves landing at a predetermined location in Africa or Western Europe about 25 to 30 minutes after lift-off. It is used when velocity, altitude and distance downrange do not allow return to the launch point via RTLS. It is also used when a less time-critical failure does not require the faster but possibly more stressful RTLS abort. A TAL abort would be declared between roughly T+2:30 minutes (2 minutes, 30 seconds after liftoff) and Main Engine Cutoff (MECO), about T+8:30 minutes into flight. Preparations of TAL sites take 4–5 days and begin a week before a launch with the majority of NASA, DOD and contractor personnel arriving 48 hours before launch. Additionally two C-130 aircraft from the Manned Space Flight support office from the adjacent Patrick Air Force Base are deployed. So far this abort mode has also not been used.



An Abort-Once-Around (AOA) is available when the shuttle cannot reach a stable orbit but has sufficient velocity to circle the earth once and land, about 90 minutes after lift-off. The time window for using the AOA abort is very short – just a few seconds between the TAL and ATO abort opportunities. Therefore, taking this option would be very unlikely and as with the previous two, has so far not been used.

Last, and certainly not least, is Abort-to-Orbit (ATO), which is called when the intended orbit cannot be reached, but a lower stable orbit is possible. This one actually has happened – on mission STS-51-F (lucky mission), which continued on despite the abort to a lower orbit. STS-51-F (also known as Spacelab 2) was the nineteenth flight of the Space Shuttle Program and the eighth flight of Challenger. It launched from Kennedy Space Center, Florida, on July 29, 1985 and landed just under eight days later on August 6th. One of the Shuttle's SSMEs failed resulting in the ATO call.

The abort didn't interfere with the Spacelab 2 mission, however, nor with the heavily publicized marketing experiment whereby astronauts enjoyed carbonated beverages from specially designed cans provided by competitors Coca-Cola and Pepsi. (A display on the Coca-Cola technology can be found in the museum.)



In either case, Mission Control Center in Houston (located at Lyndon B. Johnson Space Center) observed the SSME failure and called "Challenger—Houston, Abort ATO. Abort ATO." The moment at which an ATO becomes possible is referred to as the "press to ATO" moment. In an ATO situation, the spacecraft commander rotates the cockpit abort mode switch to the ATO position and depresses the abort push button. This initiates the flight control software routines that handle the abort. In the event of lost communications, the spacecraft commander could make the abort decision and take action independently. It's actually one of the abort modes we train for here at Space Camp... because you never know what the counselors will throw at you (but more on that later as I digress...)

Although ATO means Abort to Orbit for NASA, here around Space Camp it means something entirely different: Abort to Otters – the bar/lounge at the Huntsville Marriott – and a place from where we've just come. We also met up with fellow Space Camp alumni (though unable to attend the session) Brian "Hot Dog" Matney and Jason "Boomerang" Shrek while there. "Hot Dog" is actually quite a famous alumnus: he and his team – Morton Thiokol – are the ones who created the famous shuttle patch which has graced Space Camp application guides throughout the late 1990s and early 2000s; it's quite an honor in these circles. Even so, he's a down home kind of boy, humble, and was quite beside himself that we'd even want to hang out with him. And why wouldn't we? He's just as much a part of our alumni team as anyone else!

Much fun was had at Otters this evening (rum and coke anyone?), but I must admit I had equally as much fun (if not more) down at Aviation Challenge (AC) this morning. It's hard to believe, I know, but no less true! Created in 1990, Aviation Challenge is to fighter pilot training as Space Camp is to astronaut training. As such Aviation Challenge follows the Top Gun mind-set and comes in three levels: Mach I, II and III depending on your age. Aviation Challenge offers kids the chance to train as a fighter pilot rather than astronauts, but I missed out on this when I was younger. It was my choice.

THE NEED FOR SPEED ///

All pilot astronauts and many mission specialists began their flight careers as military high performance jet pilots. Aviation Challenge is an answer to requests received at Space Camp for educational, hands on programs that involve groundwork needed to pursue military aviation careers. AVIATION CHALLENGE is a program for youths and adults patterned after high performance jet pilot training. Students are members of "flight squadrons" who train at a facility constructed around a lake on the U.S. Space and Rocket Center grounds. Instruction includes flight simulators, land survival and water survival complete with a 40-foot tower and "zip line" equipped for water recovery. Each Aviation Challenge session is topped off with an exciting mission based on the Navy's "Top Gun" pilot training.

Trainees occupy the Edward O. Buckbee Aviation Challenge Complex, a 22,000 square foot building designed to resemble an aircraft hangar. It includes male and female living quarters, simulators, classrooms and a centrifuge that allows trainees to experience the force of 3 G's. The atmosphere of military aviator training is further enhanced with the presence on the grounds of various aircraft including an F 14A Tomcat, YAV 8B Harrier II, F 111A, an F 4 Phantom, a MIG 17, a T 38, the A 7A Corsair II, an SH 2F Sea-sprite Helicopter and an AH 1 Cobra attack helicopter. Aviation Challenge is also a Civil Air Patrol Squadron. Students may become members while attending Aviation Challenge, and continue their aerospace interests in squadrons in their hometowns.

But just what kind of activities go on down at Aviation Challenge?

- FLIGHT SIMULATORS -- Trainees fly missions in simulators patterned after advanced fighter and attack aircraft. The simulators create the sensation of roaring off the end of an aircraft carrier, the experience of high speed maneuvering and low level flight. The skills necessary to perform night carrier landings are also learned. Students learn aerobatics, navigation, and air to air intercept procedures. Simulated flights are land or carrier oriented and includes catapult launches and arrested carrier landings. Students experience the physiological effects of G forces inside a cockpit style 3G centrifuge.

- WATER SURVIVAL -- The will to survive in a downed aircraft situation is developed through knowledge and training which is gained through hands on sessions with the slide wire, helicopter dunker, helicopter hoist rescue, parachute descent and disentanglement plus life raft exercises.

- GROUND SURVIVAL -- Trainees are introduced to survival equipment and the theory of short and long term survival on land. Then it's time to put on "makeup" and master an outdoor evasion course that requires problem solving skills, escape and evade maneuvers, camouflage, signaling, water and food procurement, first aid and teamwork.

- ACADEMICS -- Trainees spend time learning about flight planning procedures, aerodynamics, aeronautics, propulsion, flight systems, navigation, emergency procedures, aviation physiology and aviation history. There's also time to discuss aviation careers and flight charts. After dark, the classroom becomes the wraparound screen of the Spacedome Theater where trainees experience space and aviation oriented IMAX films.

And like Space Camp, the Aviation side is divided into three programs - Mach I, II and III - based on your grade-level and age:

- MACH I (Originally called “Basic”): Available to students in grades 4, 5 and 6 (ages 9 to 11). Primary students learn the basics of flight (taking off and landing, and ground munitions delivery) before moving on to the techniques of high performance flight (dog-fighting). Cadets also participate in survival training on both land and water.

- MACH II (Originally called “Intermediate”): Available to students in grades 7, 8 and 9 (ages 12 to 14). Students have the opportunity to develop their interests in the aerospace education, training and skills required to fly high performance jets. The basic flying skills from the Mach I program are expanded upon, culminating at the end of the week in a "Top Gun" competition to determine the week's best pilot. Cadets also learn land and water survival skills and culminate the week in a NAVY SEAL Search and Rescue (SAR) mission during the day and an escape and evasion activity that night.

- MACH III (Originally called “Advanced”): For student aviation enthusiasts in grades 9, 10, 11 and 12 (ages 15 to 18). This advanced program is a mixture of flight simulator training, water and land survival procedures and classroom study. The potential pilot will learn what it takes to be accepted for military and civilian aviator training, requirements for selection to a military academy and options for attending ROTC and/or Officer Training School. Flying in Mach III becomes even more difficult, using full sized simulators, communications, the pairing of a pilot and RIO (Radar Intercept Officer) to work together, and daily missions that are scored. Mach III campers once again learn land and water survival, using equipment such as the "helo-dunker" and a zip line to simulate a parachute landing. Culminating the week is an extensive Navy SEAL Ops mission and very challenging escape and evasion activity.

We’d get a taste of some of all three today, with even more on tap for tomorrow...

THE BIRTH OF “E-STOP” ///

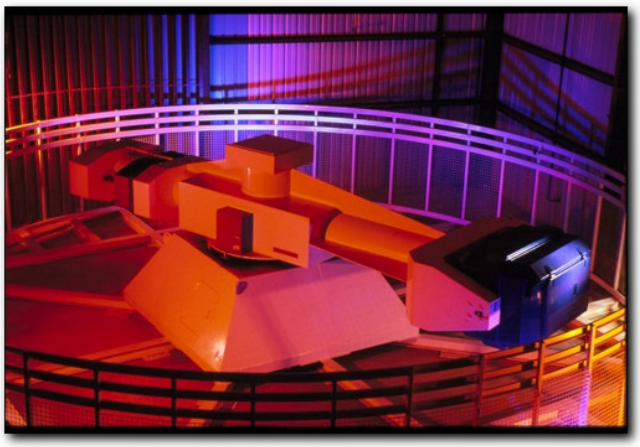
As a separate program from Space Camp, Aviation Challenge operates on its own set of rules. For example, many cadets have a nickname. Some of them, like mine (“Richasi”), are self-given and have nothing to do with the Camp experience. In the military your peers assign you a nickname, or in this case a call sign, based on their observances of you. Sometimes this could be something noble, sometimes it could be something hot-headed, and other times it could be something dumb you did... and you become stuck with that memory, branded with it for the rest of your life. Keep that in mind for later...

After completing our morning meal the entire compliment boarded one of the famous (or infamous, because they're old and smelly) Space Camp busses and made our way over to the Aviation Challenge area – a small barracks-like compound surrounding a medium-sized lake not far from the Space & Rocket Center. Although not within quick walking distance, cadets in the program do march to and from the AC Compound when it's time for meals – they generally eat at the Space Camp cafeteria like everyone else – much to their chagrin I'm sure, but we alumni were treated with better care: a hot bus ride over. In either case, our task over at AC today was supposed to kick start with the dunker exercise, a training piece whereby you're lowered into the water in an apparatus that simulates the inside of a helicopter. The drill simulates a crashed chopper and the skills we as cadets would need in order to a) survive such an ordeal and b) escape from the wreckage. Unfortunately the dunker was broken so we had to move on to Plan B.

Plan B ended up being an ad-hoc "Flight Physiology Briefing", which is a fancy way of saying we're going to learn about how much punishment your body takes as a fighter pilot – and why you need to be so physically fit to do something like that. Therefore we learned all about redouts (which occur when the body experiences a negative g-force sufficient to cause a blood flow from the lower parts of the body to the head), brownouts (where blood flows away from the head to the lower parts of the body, therefore starving the brain of oxygen) and potentially how dangerous both could be during a flight. Redouts, for example, could cause retinal damage and hemorrhagic stroke. Suffering a brown or blackout during a maneuver could, well, lead to death too – only you'd be unconscious. Therefore the military has a number of advances in flight suit designs specifically tuned to help combat these and other issues.

We simulated the experience first-hand in AC's centrifuge. This simulator artificially increases accelerative force under controlled conditions allowing trainees to experience 3.2Gs and feel the effects of gravitational force on the body as a pilot or astronaut would during flight. It's similar to the G-Force ride out in the Rocket Park only it holds less people, is more pod-like, and is quite a bit more intense – this is not a ride, it's a simulation and guess who got to be the first rider? Why I did, of course, and what an experience that turned out to be.

Although the centrifuge rides two at a time you're not just sitting there with nothing to do. Climbing into this contraption, which appears to be no larger than a Gemini capsule, is only the beginning.
Once you're settled and strapped in next to your neighbor, the doors close and for a moment you're cut off from the outside world, almost what I imagine being stuck in a coffin and buried alive might feel like... or having been closed into one of those Gemini capsules and shot off into the blackness of space. The only things to touch around you are two red buttons on either side of you; who knew what they did. Then before you know it the contraption begins to spin and the machine's operator makes voice contact with you, to talk you through what's happening and to be your lifeline.



In fact, throughout the entire experience the operator is handing you tasks to do. At first it's pressing those buttons on either side of your chair at the right intervals. Failing to do so would alert him and the machine that you were no longer conscious enough to adhere to a command, and thus the simulator would come to an immediate halt as an emergency stop, or E-Stop. But at only 1.0 G, this was easy. Once the centrifuge reached 2.0 G's we were asked to sing "Itsy Bitsy Spider" while pressing the buttons at the right time – this got a little harder, but we managed. By the time the contraption reached 3.0 Gs we were asked to not only sing but perform the moves to YMCA by the Village People, which proved to be difficult for all (although I did end up doing it.)

At this point you might realize that I labeled this section of my briefing "The Birth of E-Stop" and began this diatribe by mentioning nicknames, or in this case, call signs and how they are assigned. Here amongst the Centrifuge one of our own received their very own new call sign: Ben "Benji" Shwartz. Can you guess what new call sign he received and why he received it? Yep, he forgot to press the red. And for doing so he'll now be branded "E-Stop" for the remainder of Alumni camp.

Aren't we cruel? Oh, but he loves it!

After the entire compliment had their opportunity to spin about in the Centrifuge, we moved on to another ad-hoc activity, one that was certain to get us wet!

Since we were already in our skivvies for the original planned water activity, we jumped onto another – raft races in the lake. Splitting into two teams of six, and then further subdividing into groups of three, our tasks here were simple: race against your fellow teammates and win! There would be three cadets per raft – two paddling and one steering – and all we had to do was beat our fellow team to the finish line. It wasn't going to be easy, however, because it wasn't just one lap around – it was six and they were some pretty long laps! I was part of the first group of three, along with Anna Lawitzke and Laura ("Monkeynaut") Boyle, and off we went. At one point during the exercise I thought I was going to lose it – I could hardly use my arms anymore they felt like wet noodles (no pun intended, as they were wet) – and I was seriously beginning to wonder if we'd finish the first lap at all. But somehow we did.

Getting off and on the raft at this point was an exercise in and of itself. Rather than pulling the raft ashore to disembark, those on it had to jump off while still in five-foot waters and those wading out in the water had to somehow leverage themselves and climb in. This wasn't a huge deal for me as I just flopped out, hitting the shoreline and crashed into the sand – I was deaaaaaaaaaad - but it would be later.

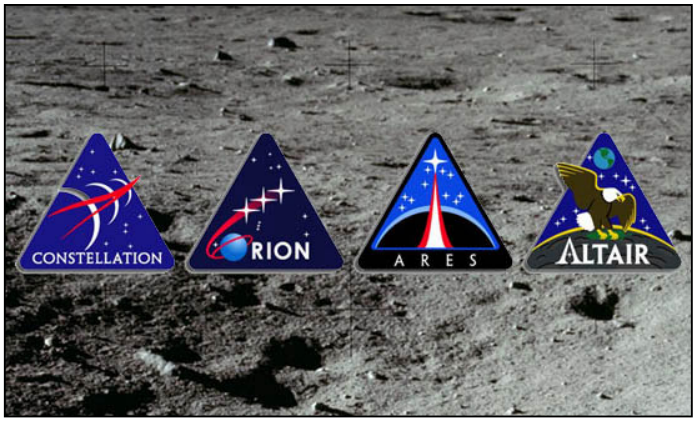
Meanwhile, our replacements took up the charge and continued the route around the lake. All too soon it was time to take up the mantle again. While I paddled like a madman during the first lap, I hardly had anything left to paddle again for the third and I knew it. So I took over the navigator's job, steering us well into a lead! By the time the second group took over again we were well ahead of the curve and were destined to win (but I had no idea how I'd be able to perform for the fifth lap). Thankfully the race was called short during the fourth lap – we were pressing up against the clock number one, but I think mostly because we out-of-shape alumni were ready to keel over number two. Either way it was a boon for us – we won the race!

It took quite a long time for me to recover from exerting so much energy; I really looked forward to having something to eat. We mercifully broke for lunch not long after – returning to the museum proper for the remainder of the day and night, albeit with little rest for the weary.

As soon as we could get cleaned up and fed, we donned our special Space Camp 25th Anniversary T-shirts then headed out to the Shuttle Park where we'd get our group photos taken. Because we were two groups – Columbia and Challenger – our group photos were taken separately. We attempted to get them to take one massive picture of all of us together, but that didn't fly; however, one of our compliment (I forget who at this time of night) did suggest he'd chip in and supply the necessary funds to give each of us copies of the other's group photos – and that seemed reasonable to all those at the Rocket Center. So it looks like we'll have two photos come graduation!

STORY, ARES & DIPPIN' DOTS ///

We re-convened in the classroom building – situated across from the Habitat Complex, outside of the main museum territory – to hear Story Musgrave speak once again. This time his thoughts ran a little more personal as he went in depth about his experiences flying the shuttle, his time with NASA, his family and other more personal episodes.



But with our attentions divided (I think most of us were a little more than weary by then) and Story's penchant for mumbling and speaking in a monotone voice ("He just kept talking in one long incredibly unbroken sentence moving from topic to topic so that no-one had a chance to interrupt; it was really quite hypnotic." – Captain Picard, Star Trek: The Next Generation) we became listless and inattentive. Following Story there was an optional briefing on the Ares Rocket – the crew launch vehicle that is being developed by NASA as part of the Constellation Program, the fore-runner for the Shuttle's replacement.

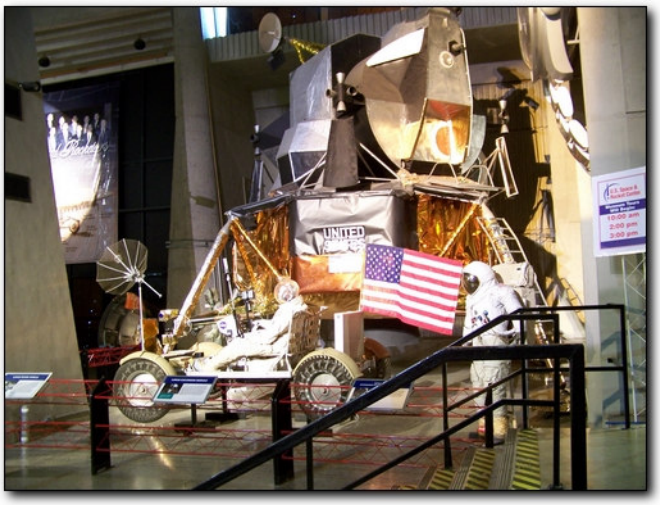
NASA plans to use Ares I to launch Orion, the spacecraft intended for NASA human spaceflight missions after the Space Shuttle is retired in 2010. Ares I will complement the larger, unmanned Ares V, which is the cargo launch vehicle for Constellation.

NASA selected the Ares designs for their anticipated overall safety, reliability and cost-effectiveness; however, the Constellation Program has been having a tough time of it but that's all I know – Lisa and I decided not to attend this briefing and opted to explore the museum freely on our own.

Mostly because we didn't really want to sit through another lecture (as interesting as our time with Story was, the seats were not all that comfortable) and it allowed us to just take a breather from it all. Ultimately it allowed us to grab a snack and so we found ourselves upon the Dippin' Dots kiosk. Dippin' Dots is an ice cream snack, invented by Southern Illinois University Carbondale graduate Curt Jones in 1987. As the "ice cream of the future", the confection is created by flash freezing ice cream mix in liquid nitrogen. It makes for a very interesting foodstuff, one I'd never tried before! (It was good).

As we walked around the outskirts of the Training Center Floor with our Dippin' Dots in hand, there by the UAT or Underwater Astronaut Trainer (a smaller version of the Neutral Buoyancy Tanks used by astronauts at NASA's Johnson Space Flight Center in Houston to simulate zero gravity, or micro gravity, conditions encountered by working in space), we ran into another Hab1 alumni – Jason ("Boomerang") Shrek.

Much like Kim and I who had found out through web-forum Hab1 that we'd attended Space Academy together as children (the same week and everything; she's in my group picture) but weren't aware of it, same went for Lisa and Jason; they'd attended the same adult session together back in 1998, although I think they *were* aware of it. We stopped and talked with Jason for a bit – who is a seasonal employee of the Space & Rocket Center now – before continuing our museum adventures.



Although exploring the museum these days doesn't have that same rewarding feel as it did back in the day (there's less hands-on things to do in the museum today than there was 15 years ago), walking around at this hour proved most fun: the museum was closed so it was nice and quiet! The two of us met our teammates at the cafeteria so we could dine together, assembled for an hour-and-a-half training on our mission, and then ran it as soon as we became comfortable with our positions and equipment.

Climbing into Atlantis was a dream come true.

ATLANTIS, HOUSTON – GO FOR LAUNCH! ///

Yesterday, after we'd assembled for the Shuttle Operations lecture in Habitat II, we'd made our elections for positions known. Later that day, just before dinner, we all received those mission assignments. Selecting which position I'd like to occupy for our one-and-only mission was tricky at best. In the end I'd chosen PILOT based on the fact that I had flown missions in the past as COMMANDER (Academy, 1991 for "Discovery"), as a MISSION SPECIALIST (Adult Academy, 2003), as a STATION SPECIALIST (Academy, 1991 for "Atlantis"), not to mention MISSION CONTROL twice (Camp, 1989 for "Columbia" and Adult Academy, 2003 for "Endeavor Bravo"), but never as PILOT. Thankfully the instructors sought it fit to award that position to me, with my buddy-in-arms Lisa as my Commander.

We'd talked about what our jobs were going to be while we toured the museum earlier, both of us a little nervous of the hefty responsibility lumped upon us, even if it was just a simulation. I mean, look how hard Andie rode Kevin in the movie Space Camp when he didn't take it seriously! Because there are a couple of folks here who are very keen to be in the positions we've found ourselves in and don't appear to be too happy about that. Alas, Lisa and I made a pact to have fun with this because that's why we've come to Alumni Camp after all!

Thankfully we had time to burn off some of that nervous energy at the Rock Wall, which no doubt contributed to her "killing" us all no less than four times in botched landing attempts (as the Commander it's her responsibility to land that bird!). Climbing the MARS Rock Wall out in the museum was a singular treat for me – I had never done such a thing in my life. Although it's not high up and the footholds are not too strangely spaced, I'd never even attempted such a thing before, although Lisa had. But unlike Lisa, not only did I reach the top but also hit the bottom on my feet! (Lisa always seems to land on her back – or so she says!) It's a good thing we got in this practice too because tomorrow's Area 51 "High Ropes" experience at Aviation Challenge is supposed to be something similar...

Meanwhile, though, I was really looking forward to stepping inside Atlantis. I never got the opportunity to see inside of Columbia during my 1989 Space Camp experience because only those with cockpit assignments got to go in there, but I did at least get to see (and Command) Discovery during my 1991 Space Academy experience, missing out on Atlantis by just a smidgen. Adult Space Academy trainees don't get to use Atlantis, unfortunately; we were stuck with Endeavour instead. So I was about due, don't you think?

I also understand my obsession with Atlantis might seem a bit unhealthy, but like coming to Space Camp, my affiliation (and thus affection for it) stems from the movie.

Atlantis is the shuttle the crew was launched into space with, and therefore became the backdrop for many personal adventures. The Atlantis flight deck was also the one used to film those scenes from the movie in to begin with so hopefully you can understand how getting a chance to not only see inside the simulator but actually buckling into the Pilot's seat was a singular thrill for me.

And it lived up to the hype.

Atlantis is (or was) one of Camp's most complete Space Shuttle simulators. Today some of its electronics has been pilfered for other Shuttle simulators as Camp has expanded but that's no bother, it's still like getting into the real thing (almost). You enter the simulator from the outside through a real-looking hatch mechanism (the same hatch as you'd find on the Space Shuttle itself), which then places you right on the Shuttle's Mid-Deck. Here you'll find a row of three seats and a number of lockers recessed into the simulator's wall, which house all the equipment and materials the crew will need to survive the duration of their flight, perform the experiments they're tasked with, and so on. Challenger Team members Vincent Vazzo and Chris ("ApolloXI") Kauppi were stationed here.

To reach the Flight Deck one has to climb a ladder and press through another hatch in the Mid-Deck's ceiling, just like the real thing – but watch your head! Diane ("Conan") O'Keefe, Laura ("Monkeynaut") Boyle, Lisa ("Pilotgirl") and Ricky ("Richasi" – that's me) Russo were then here, part of the action. As soon as we stepped foot into the bowls of Atlantis we took our positions: Lisa took the forward left seat as COMMANDER, I took the forward right seat as PILOT, and Diane and Laura took the seats behind us as MISSION SPECIALIST ONE and TWO respectively. Once settled we began working through our pre-flight checklists to prepare ATLANTIS for its upcoming launch; the problems began almost immediately.

Over in Mission Control Ben ("Benji", er I mean "E-Stop") Schwarts, Vicki Pohl, Frank Scalia and others were having a tough time communicating with us in the Shuttle. "They're not really good with this communication thing," remarked Ben as soon as we got everyone on Channel A from B. "We may have to re-think this whole relationship!" After getting everyone on the right com channel and performing our pre-flight checks (APU checks, cabin leak checks, caution and warnings, and O2 pressurization), I announced "Atlantis is ready," which meant we were prepared for lift-off.

Then time accelerated.

Most missions flown at Space Camp get plenty of time to set-up and follow-through on all countdown specs, checklists and features. Because our Alumni Camp missions were pressed for time, we couldn't run a full-fledged mission as originally timed. Time was sped up for us, which opened up a number of oddities during flight: first and foremost, the mission clock and our checklists were never in synch and too many things begin to happen at once. For example: while Mission Specialist 1 and 2 prepare to go outside to perform their EVA, the Commander and I are tasked with launching a satellite – AT THE SAME TIME. This, of course, caused so much confusion on the Flight Deck (and in Mission Control) who knew if the satellite deployed or not? (But I can say that we DID perform the right steps to execute the launch so you can't blame the crew!)

Other oddities also crept up because of time acceleration, such as shooting off an OMS burn whilst the crew was still outside performing the EVA and preparing the shuttle to make a landing! There were some very confusing and out-of-synch calls made to and from the Shuttle that just had Lisa and I (not to mention those down in Mission Control) stymied, but we worked through the frustrations. And, of course, we ran into system malfunctions and anomalies. One such occurred during the melee of getting the EVA crew back into the shuttle and closing the Cargo Bay Doors: one of our GPC's was failing.

There are five identical General-Purpose Computers (GPCs) controlling the systems aboard the orbiter. Each GPC is composed of two separate units, a central processor unit and an input/output processor. When one fails to execute a command or becomes caught in a loop a Master Alarm sounds (a rather loud one at that), which sets us in the Orbiter and those in Mission Control off to find a quick solution. But at first the solution called up was rather bizarre: "On Panel C6, set affected GPC mode to ALT then RUN" but which GPC was the one affected? Mission Control didn't seem to know.

First I tried cycling GPC4 at their insistence but that didn't clear the alarm. Then we tried cycling GPC3 with no joy. Next we cycled both, placing GPC3 to ALT and GPC4 to RUN but that didn't work either. Eventually we set both to ALT and the light cleared. Chris and Vince joined us on the Flight Deck during this time telling us of their woes as Lisa and I waited for Mission Control to get their acts together: seems there were little in the way of experiments flown on our flight due to a distinct lack of supplies! They did scrounge through the various simulators and station modules for the chemicals needed to make their experimental slime (doing something with their time) but otherwise their part of the mission turned into a bust. Meanwhile, our EVA crew came back aboard after completing their task (constructing some apparatus out in the cargo bay; at least they seemed to have some fun), crowding the Flight Deck with six bodies and adding a second layer of confusion to the scene. And then...

"Atlantis, Houston. What is the status on the Cargo Bay Doors?"

Houston had been attempting to get us to close the Cargo Bay Doors for quite some time as the clocks were quickly suggesting this mission was coming to an end. We tried to get them closed, but, they wouldn't budge. Then our EVA crew came in (why would we close them and leave them out there?) and they made an attempt. No joy again. Evidently both the Commander and Mission Specialists were attempting to do the same thing, overwhelming the computers (which may have led to our unexpected GPC problem) resulting in none of their commands being executed. As soon as we could get everyone from punching in commands, the Commander attempted ITEM 17 EXEC, which should force the doors closed, but it didn't work. "They're not closed, but we're not going to worry about it anyway," called up Mission Control then – the simulation had to go on.

Landing the Shuttle fell to Lisa who, as I'd stated earlier, crashed us at least five times during her practice runs. She took to the controls a little better this time but still having a tough time keeping command of things.

A call up from Mission Control during this moment really cracked us up – “Atlantis, wind status nominal” – which resulted in a response from me: “Thank you Capcom, roger that”. But with the cargo bay doors open throughout the landing process there was little in the way of NOMINAL about it all! And when the AC BUS system threw up a warning light there was little to do but hang on. A sentiment echoed by Ben in Mission Control: “Flight, that’s currently the least of our problems!”

If there was any cause to complain about the mission experience it would be this: at an hour or so the mission was just too short. Most of the time it was a switch-flipping fest, rushing time from one check-list to the next, which seemed to sour the mood for some. Me, I was having a ball in the Pilot’s chair rattling off Tish’s lines from SpaceCamp: The Movie – “Whoa, is that India we’re coming up on?” or Kevin’s “Whoaaah, no survivors!” – to really care too much.

Following our mission and its subsequent follow-up briefing we were dismissed for the day, and thankfully so. We were all ready for an ATO!

* * *

With our day now complete it’s about time to turn in. It’s well after 1:00am and I’m pooped. I haven’t felt this tired since the day after I returned from Japan in 2004 and there’s still plenty of more action here to go. Besides the Area-51 “High Ropes” course routine at Aviation Challenge we’re also going to be spending most of the afternoon there doing fighter-pilot ops (which should prove interesting) and then meet and dine with Hoot Gibson, Shuttle astronaut extraordinaire.

There was talk following our mission tonight of trying to get Camp to assign a second mission to us – a joint mission between the Columbia and Challenger teams - because it was just so darn fun. Most Camps have two missions lasting two hours or more; however, they only assigned one, one-hour mission to us Alumni. That’s not pleased anyone really but with the schedule so full (and mixed with Aviation Challenge stuff, also not pleasing everyone); some more influential Alumni are attempting to get a second mission added. Will they succeed? We’ll have to wait and find out tomorrow.

If they do it will probably be another late-late night.

I knew I should have left Otters earlier... but who can pass up pizza with the gang? But I digress...

So goodnight Campers!

Day Three – INFILTRATING AREA 51
SATURDAY | JUNE 16, 2007

Chalumbia, ATO! *Aye, sir!*

Phew... it's a little late here by Space Camp standards, but we're finally in our bunks ready to turn the page on this long, though rewarding, day.

As you can imagine we "Aborted to Otters" again; it was a hoot, quite literally. Besides having a couple of brown ale's (and watching Lisa get drunk off of her Bud Lights), Hoot Gibson joined the party all hell broke loose. It's now 2:00am and we just got in, can you believe it? But what do you expect us to do with it being our last night at Camp and all? There was plenty to celebrate!

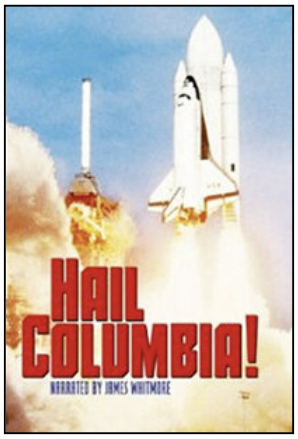
Last night I mentioned there was talk of trying to get Camp to assign another mission in addition to the two each alumni team ran yesterday. This new mission, envisioned as a joint operation between the Columbia and Challenger teams (therefore a longer, more robust mission), was asked for because... well... flying the first one was so darn fun! Most youth and adult Camps alike have two missions lasting two hours or more; however, they only assigned one, two-hour mission to us Alumni. That didn't please anyone really but with a schedule so full what could be done? Some influential Alumni had attempted to convince the counselors to come up with and run a second operation but all we heard back was "we'll try."

It took most of the day for us to hear back but as we huddled around the picnic tables at AC today the word was given: Chalumbia would fly! And what a fun time too! To celebrate our victorious day our second mission's Commander had one last order to give: *Chalumbia, ATO*! And Otters is where we've all just come – myself, Vincent, and Chris (who decided to move in to our room for the night). But what about Ben, my other roommate, you might ask? He's the reason we're still up, see – he disappeared into the night with "Princess" Leah and we're not entirely sure if he's coming back, so we're waiting up for a few minutes to see if he returns.

While we're waiting I'll give you a run-down on today's activities.

And what a day it has been. Besides the Area-51 "High Ropes" course routine over at Aviation Challenge we did today (that I spoke about last night), we also spent most of the afternoon doing fighter-pilot ops (which wasn't all that exciting for me, but I'll get into that in a little bit), met and dined with Hoot Gibson, Shuttle astronaut extraordinaire (cool dude!). But first we'd have to wake up, have breakfast, and work through the rest of our schedule, which started down in the SpaceDome Theater for "Hail Columbia!" one of the first IMAX films about the Space Shuttle.

HAIL, COLUMBIA! ///



Board the mighty shuttle Columbia for its maiden voyage. Experience one of humankind's crowning achievements: the inaugural voyage of the world's first space shuttle. Hail Columbia! goes behind the scenes with astronauts John Young and Robert Crippen as they prepare for their historic launch. Feel the thunderous liftoff and our heroes' awe as Columbia achieves orbit for the first time. Join the celebration as the shuttle triumphantly touches down, mission accomplished.

The first launch of the Space Shuttle occurred on 12 April 1981, exactly 20 years after the first manned space flight, when the orbiter Columbia, with two crew members, astronauts John W. Young, commander, and Robert L. Crippen, pilot, lifted off from Pad A, Launch Complex 39, at the Kennedy Space Center. This was the first of 24 launches from Pad A. The launch took place at precisely 7 a.m. EST. A launch attempt two days earlier was scrubbed because of a timing problem in one of Columbia's general-purpose computers.

Not only was this the first launch of the Space Shuttle, but it marked the first time that solid-fuel rockets were used for a NASA manned launch (although all of the Mercury and Apollo astronauts had relied on a solid-fuel motor in their escape towers.) STS-1 was also the first U.S. manned space vehicle launched without an unmanned powered test flight. The STS-1 orbiter, Columbia, also holds the record for the amount of time spent in the Orbiter Processing Facility (OPF) before launch – 610 days, the time needed for the replacement of many of its heat shield tiles.

The primary mission objectives of the maiden flight were to perform a general check out of the Space Shuttle system, accomplish a safe ascent into orbit and to return to Earth for a safe landing. The only payload carried on the mission was a Development Flight Instrumentation (DFI) package, which contained sensors and measuring devices to record the orbiter's performance and the stresses that occurred during launch, ascent, orbital flight, descent and landing. All of these objectives were met successfully, and the orbiter's space-worthiness was verified.

During flight day 2, the astronauts received a phone call from Vice President George H. W. Bush. President Ronald Reagan originally intended to visit the Mission Control Center during the mission, but at the time was still recovering from an assassination attempt which had taken place two weeks before the launch. Columbia reached an orbital altitude of 166 nautical miles (307 km). The 37-orbit, 1,074,567-mile (1,729,348 km)-long flight lasted 2 days, 6 hours, 20 minutes and 53 seconds. Landing occurred on Runway 23 at Edwards Air Force Base, California, at 10:21 am PST, 14 April 1981. Columbia was returned to Kennedy Space Center from California on 28 April atop the Shuttle Carrier Aircraft.

And it was all captured in glorious IMAX.

STS-1 was the first test flight of what was at the time the most complex spacecraft ever built. There were numerous problems – 'anomalies' in NASA parlance – on the flight, as many systems could not be adequately tested on the ground or independently. Some of the most significant are listed below:

- A tile next to the right-hand External Tank (ET) door on the underside of the shuttle was incorrectly installed, leading to excessive re-entry heating and the melting of part of the ET door latch.

- The astronauts' on-orbit visual inspection showed significant damage to the thermal protection tiles on the OMS/RCS pods at the orbiter's aft end.

- John Young reported that two tiles on the nose looked like someone had taken 'big bites out of them'. Post-flight inspection of Columbia's heat shield revealed that an overpressure wave from the Solid Rocket Booster (SRB)'s ignition had resulted in the loss of 16 tiles and damage to 148 others.

- The same overpressure wave pushed the body flap below the main engines at the rear of the shuttle well past the point where damage to the hydraulic system would be expected, which would have made a safe re-entry impossible. The crew was unaware of this until after the flight. John Young reportedly said that if they had been aware of the potential damage at the time, they would have flown the shuttle up to a safe altitude and ejected, causing Columbia to have been lost on the first flight.

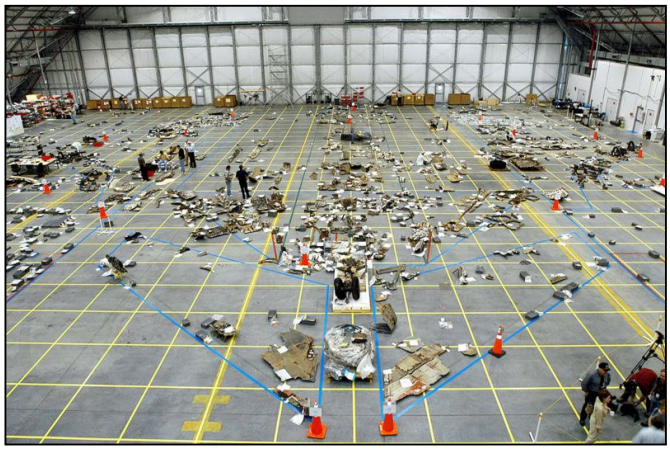
- Bob Crippen reported that, throughout the first stage of the launch up to SRB separation, he saw 'white stuff' coming off the External Tank and splattering the windows, which was probably the white paint covering the ET's thermal foam.

- Columbia's aerodynamics at high Mach numbers were found to differ significantly in some respects from those estimated in pre-flight testing. A mis-prediction of the location of the center of pressure (due to using an ideal gas model instead of a real gas model) caused the computer to extend the body flap by sixteen degrees rather than the expected eight or nine, and side-slip during the first bank reversal maneuver was twice as high as predicted.

Despite these problems, STS-1 was a successful test, and in most respects Columbia came through with flying colors. After some modifications to the shuttle and to the launch and re-entry procedures, Columbia would fly the next four Shuttle missions. Although Columbia would have a prestigious career through the years, it would unfortunately meat the same fate as its sister ship – Challenger – although many years later: it too would be lost to a disaster. The incident occurred about 0900 EST on February 1, 2003, shortly before it was scheduled to conclude its 28th mission, STS-107, by touching down at the Shuttle Landing Facility at Kennedy Space Center.

The Space Shuttle disintegrated over Texas and Louisiana during re-entry into the Earth's atmosphere, resulting in the death of all seven crewmembers.

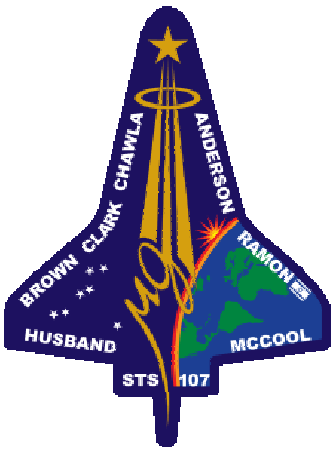
The loss of Columbia was a result of damage sustained during launch when a piece of foam insulation the size of a small briefcase broke off from the external tank under the aerodynamic forces of launch. The debris struck the leading edge of the left wing, damaging the Shuttle's thermal protection system (TPS), which shields it from the intense heat generated from atmospheric compression during re-entry. While Columbia was still in orbit, some engineers suspected damage, but NASA managers limited the investigation, on the grounds that little could be done even if problems were found.



NASA's original shuttle design specifications stated that the external tank was not to shed foam or other debris; as such, strikes upon the shuttle itself were safety issues that needed to be resolved before a launch was cleared. Launches were often given the go-ahead as engineers came to see the foam shedding and debris strikes as inevitable and un-resolvable, with the rationale that they were either not a threat to safety, or an acceptable risk. The majority of shuttle launches recorded such foam strikes and thermal tile scarring. On STS-112, two launches before, a chunk of foam broke away from the ET bipod ramp and hit the SRB-ET Attach Ring near the bottom of the left solid rocket booster (SRB) causing a dent four inches wide and three inches deep in it. After that mission, the situation was analyzed and NASA decided to press ahead under the justification that "The ET is safe to fly with no new concerns (and no added risk)" of further foam strikes, justification that was revisited while Columbia was still in orbit and Chair of the Mission Management Team (MMT) Linda Ham re-assessed, stating that the “Rationale was lousy then and still is”. Ham as well as Shuttle Program Manager Ron Dittemore had both been present at the October 31, 2002 meeting where this decision to continue with launches was made.

During re-entry of STS-107, the damaged area allowed hot gases to penetrate and destroy the internal wing structure, rapidly causing the in-flight breakup of the vehicle. An extensive ground search in parts of Texas, Louisiana, and Arkansas recovered crew remains and many vehicle fragments.

Mission STS-107 was the 113th Space Shuttle launch. It was delayed 18 times over the two years from its planned launch date of January 11, 2001, to its actual launch date of January 16, 2003. (It was preceded by STS-113.) A launch delay due to cracks in the shuttle's propellant distribution system occurred one month before a July 19, 2002 launch date. The Columbia Accident Investigation Board (CAIB) determined that this delay had nothing to do with the catastrophic failure six months later.



The Columbia Accident Investigation Board's recommendations addressed both technical and organizational issues. Space Shuttle flight operations were delayed for over two years, similar to the delay following the Challenger accident. Construction of the International Space Station was put on hold, and for 29 months the station relied entirely on the Russian Federal Space Agency for resupply until Shuttle flights resumed with STS-114 and 41 months for crew rotation until STS-121. Major changes to shuttle operations, after missions resumed, included a thorough on-orbit inspection to determine how well the shuttle's thermal protection system had endured the ascent, and keeping a designated rescue mission at the ready in case irreparable damage was found. Also it had been decided that all missions would be flown only to the ISS so that the crew could use that spacecraft as a "safe haven" if need be. Later NASA decided it would be an acceptable risk to make one exception to that policy for one final mission to repair Hubble in its high-altitude low-inclination orbit.

The nearly 84,000 pieces of collected debris of the vessel are stored in a 16th floor office suite in the Vehicle Assembly Building at the Kennedy Space Center. The collection was opened to the media once and has since been open only to researchers. As tragic as the incident was, and as much as we all relent the upcoming cancellation of the Shuttle program (for Constellation), it was good to see Columbia flying again, even if it was in the movies.

BELAY ON? ON BELAY! ///

Belaying refers to a variety of techniques used in climbing to exert friction on a climbing rope so that a falling climber does not fall very far. A climbing partner typically applies the friction at the other end of the rope whenever the climber is not moving, removing the friction from the rope whenever the climber needs more rope in order to be able to continue climbing.

Over at Aviation Challenge's Area 51 Ropes course today, we did a lot of belaying... and climbing! This part of Alumni Camp would test our abilities to work together as a team in ways we never would have imagined. Our mission: climb straight up a 42-foot tall wood wall (with strategically placed foot holds about – much like a rock climbing wall) tied to two or three of your teammates, while other teammates belayed. The goal: reach the top together and then slide down a zip line to freedom. The catch: with the rope between you so short there could be no stragglers; everyone had to ascend at or about the same pace! Before we could get started, though, we were instructed on the use of the safety equipment, the ropes and harnesses, and, of course, on the techniques in allowing climbers to repel safely (all of which I knew nothing about).

First, you have to learn how to communicate: "On belay" is the first climbing command used by a climbing team at the base of a route as well as at both the beginning and end of a pitch higher up the cliff. "On Belay" means the Belayer is READY. The belayer, who is probably standing next to you at the base of your route's first pitch, lets you know that he is on belay and that it is safe for you to climb by saying, "On belay." This means that the belayer has uncoiled the rope at the cliff base; tied himself to an anchor like a tree or cams; and has the rope, which is tied to you with a figure-eight follow-through knot, threaded through his belay device.

Then you have to learn how to use the ropes: in a typical climbing situation, one end of the rope is fixed to the harness of the climber, using either a figure of eight loop, or a bowline or double bowline knot. The rope then passes through climbing protection, which is fixed into the rock. This may be bolts which are permanently fixed into the rock, or it may be traditional protection, which is placed by the climber and then later removed without altering the rock. The rope runs through the protection to a second person called the belayer. The belayer wears a harness to which a belay device is attached. The rope threads through the belay device and by altering the position of the end of the rope, the belayer can vary the amount of friction, which is applied to the rope. In one position the rope will run freely through the belay device and in another it can easily be held without moving because the amount of friction on the rope is so great. This is known as 'locking off' the rope.

If the climber climbs three feet higher than the last piece of protection in the rock, and then falls, their rope will allow them to fall the three feet to the protection, and another three feet below that. If they fall any further, rope will be pulled upwards through the protection from the belayer below. Because the belayer generally keeps the rope locked off, the climber's fall should be arrested and they are left suspended, but safe, somewhere below the protection.

A dynamic rope, which has some stretch in it, is used so that the climber is not brought to a sudden jarring stop, which could cause severe injury. As the climber continues his ascent, he clips his rope into higher and higher metal loops fixed into the rock, so that in the event of a fall he will not fall further than the "unclipped" length of rope will allow. While the task of belaying is typically assigned to a companion who stays at the bottom, self-belaying is also possible as an advanced technical climbing technique.

The belayer should keep the rope locked off in the belay device whenever the climber is not moving. As the climber moves on the climb, the belayer must make sure that the climber has the right amount of rope by paying out or pulling in excess rope. If the climber falls, then they will free-fall the distance of the slack or unprotected rope before friction applied by the belayer will start to slow their descent. Too much slack on the rope will increase the distance, which may be fallen, but too little slack on the rope may prevent the climber from being able to continue to move up the rock. It is extremely important for the belayer to concentrate on the climber's situation, as their role is crucial for the climber's safety.

When belaying on overhanging bolted routes, particularly indoors belayers often stand well back from the rock so that they can watch the climber more easily. However, when belaying a lead climber who is using traditional protection, this can be very dangerous. The belayer should stand near to the bottom of the route in order to decrease the angle of the rope through the first piece of protection. This in turn will decrease the force pulling it up and out of the rock if the leader should fall. Standing too far away from the rock can result in protection unzipping, with the lowest piece being pulled away from the rock, followed by the next, until all of the protection may potentially be pulled out. Standing too far away from the bottom of the climb will also mean that if the leader falls, the belayer will experience a sudden pull inwards towards the rock and may be pulled off their feet or into the rock.

All of this sounds easy, of course, and for the most part it was, but it takes a lot of concentration too. One snag and the entire system collapses - meaning, in the parlance of fighter jocks, it gets FUBAR, and FUBAR is not where you want to be. In order to reduce the chances of FUBAR occurring, three cadets were required for the belay – Lisa, Nathan and I (taking up the rear) formed one belay team. Thankfully I did my job as belayer admirably, performing not once but multiple times as I watched my teammates ascend the wall (well, those who wanted to do so). For those who didn't there was a ladder on the other side of the wall to climb, but, who wanted to take the sissy way out? Besides, Lisa and I, who had hung back to the very end, weren't even sure we *could* get up there – climbing the MARS Wall in the museum was one thing, climbing this 42-foot monstrosity was an entirely different animal. But climb it we did.

Getting ready for it was interesting, too. As we suited up in the harness, we were expected to call out the closure of each of our locks as the counselor checked them. “Lock 1; LOCK 1, Lock 2; LOCK 2!” and so on and so forth. Chris Kauppi, Nathan Wilson, and Bill Naivar were my belayers and as others had called down to me, I called down to them – “Belay on? ON BELAY!” and soon Lisa and I were on our way up. Yes, it took conceited effort between the two of us to keep hold of our divots and pull ourselves up, to keep working together as a team and stopping with one or the other needed a moment to rest, or to wait while one or the other got proper footing. Though it took some time for us to get up the wall – we did it! It was something I never thought I could possibly do, but I did it.

Problem was then - standing 40-plus feet in the air - the only way down was the unit’s zip line, which stretched outward longer than a football field (380 feet to be exact) until it touched close to the ground far off in the distance. And, naturally, there were little in the way of safety bars atop the contraption to hold on to while you maneuvered yourself from the wall to the line. And with arms and legs little more than jelly... talk about a hairy situation!

Lisa, who considered herself pretty fearless, wanted to zip down first, so I watched with caution as she suited up, dangled her feet over the ledge, and froze.

One of the things the counselors don’t tell you before you get up there is this: you have to let yourself fall forward and catch on the line – it’s not a gentle glide down! So there Lisa sat, on the edge of the structure, feet dangling and arms crossed across her chest, ready to hold on with all her might.

All she had to do was pitch forward and allow momentum to take her the rest of the way – after that you're on your way. But it's not so easy! It took her a moment to reflect on what she was about to attempt, and then muster up the courage to allow her body to free-fall – even for just a moment – before settling into the zip-line's path. But she did it... which only meant it was my turn to battle those demons.

As I sat there suited up and with my own feet dangling over the ledge, I wondered... could I chicken out and find some way to climb down the ladder ("Giant's Ladder")? Could I even repel down the side of the wall as one other had done who got up there but couldn't take the plunge to come down? Nah, what fun would that be? So I tipped myself forward and threw caution to the wind. I knew the pulleys and various machinations of the security system would catch me and keep me from plunging fifty-feet to my death, but that didn't mean the thought didn't cross my mind as I leapt from the safety of my perch.

It's such a surreal feeling of helplessness coupled with a bizarre touch of elation as your body begins to feel and react to the powerful bonds of gravity the moment you leave the confines of the perch. But the moment you hear the click of the pulley and its safety wire (which means it has caught you) and the scrape of the ball bearings as they turn about allowing you to fall down the line is nothing short of special. Of course that whooping and hollering you hear is fun too – it's yours! And once I got over the initial apprehension of free-falling without knowing whether or not I would be caught, I couldn't help but ham it up a little... who doesn't like assuming the role of Superman while gliding through the air?

After zipping back and forth at the bottom of the wire system for a few moments, Jeramy maneuvered a metal stepladder underneath me (similar to those used to board smallish aircraft from the tarmac), which allowed me to get my footing, as it were. Once on the ground, the safety line came off and I was free to go – elated but very much drained!

Once we all had a turn at the wall and the zip-line, we participated in re-organizing the space, making sure we collected all the equipment we'd used (and made sure it was all still in good working order). Once done, we assembled on nearby picnic benches to discuss the activity, the days that had already progressed and those left to come. Most of us were pretty darn tired by that point – myself included – to really take part in the discussion, but we were all pretty happy with Alumni Camp thus far, I know I am, and we're all looking for further adventures in the afternoon: especially the second mission, which the counselors told us about whilst huddled around.




That news brought out a few good, but tired, cheers for sure! We broke for showers and lunch then (a quick turn-around), returning to AC for four hours of fighter pilot training after. This activity, unfortunately, turned into a long and boring waiting game for me as I didn't have the fore-knowledge to use these particular simulators and the instruction for doing so left me wanting – it was not nearly enough for either myself or my friend-in-arms Lisa (what, a thirty minute briefing on what the buttons do on the throttle assembly but on nothing else?). Most of the Training Briefing went over our heads (I recall there being two scenarios: fighters leaving from an aircraft carrier and launching from a landing strip); once we got into the cockpit simulators – which are just as interesting as the Shuttle ones; you sit in what appears to be an actual cockpit (with switches to pull, press and flip), there's an actual plexi-glass canopy to lower, and flight is simulated via projections on a screen: very much like an up-scaled version of Microsoft Flight Simulator - there was little for us to do.

So for the first half of the simulation – we were tapped to fly two Ops – Lisa and I joked around through the headsets, re-enacting such flying favorites as Iron Eagle, True Lies and Top Gun (“Talk to me Goose!”) getting shot out of the sky, while the rest of the cadets actually flew their missions. What else could we do? Once the second Op came up I climbed out of the cockpit and sat it out; Lisa drafted a different spotter to fly with and the hilarity continued between them. Although others were definitely having fun with this part of the Aviation Challenge experience (Ben took his plane into orbit, no really!) I was grateful for it to end. It’s been the lowest part of Alumni Camp for me thus far.

DINE WITH AN ASTRONAUT! ///

We returned to the Space & Rocket Center with about an hour to prepare for our next activity, one the majority of us were really looking forward to today: a very special meeting with Robert L. “Hoot” Gibson, another fantastic Shuttle astronaut and friend to Space Camp. This meet-and-greet would be drastically different from those we’d met with earlier in the week; our meeting with “Hoot” would take place over a fantastically catered dinner for just us Alumni!

Let me tell you a little about “Hoot”:

Robert Lee "Hoot" Gibson (born October 30, 1946) is a retired Captain and Naval Aviator in the United States Navy and a retired NASA astronaut. Born in Cooperstown, New York, but considered the Lakewood area of east Long Beach, California, to be his hometown. Married to fellow astronaut Dr. M. Rhea Seddon of Murfreesboro, Tennessee, and had four children. He enjoyed home built aircraft, Formula One Air Racing, Unlimited Class Air Racing, running and surfing during his free time. His mother, Mrs. Paul A. Gibson, resides in Seal Beach, California. Gibson's late father, an FAA Inspector, built his own private plane in the garage of their home in Long Beach with help from his family. Family includes brothers, Jon, Don and Richard and a sister Kathy. Gibson graduated from Huntington High School, Huntington, New York as a part of the class of 1964, and went on to earn an associate degree in engineering science from Suffolk County Community College in 1966. He received a Bachelor of Science degree in aeronautical engineering from California Polytechnic State University in 1969.

Gibson entered active duty with the Navy in 1969. He received basic and primary flight training at Naval Air Station Pensacola and Naval Air Station Saufley Field, Florida, and Naval Air Station Meridian, Mississippi. He completed advanced flight training at Naval Air Station Kingsville, Texas and was assigned to Fighter Squadron 121 (VF-121) at Naval Air Station Miramar, California for replacement training in the F-4 Phantom II. While assigned to Fighter Squadron 111 (VF-111) and Fighter Squadron 1 (VF-1) from April 1972 to September 1975, he saw duty aboard the USS Coral Sea (CVA-43) and the USS Enterprise (CVN-65), flying combat missions in Southeast Asia in the F-4 with VF-111 and making the initial operational carrier deployment of the F-14 Tomcat with VF-1. He is a graduate of the Navy Fighter Weapons School, also known as "TOPGUN."

Gibson returned to the United States and an assignment as an F-14A instructor pilot with Fighter Squadron 124 (VF-124) at Naval Air Station Miramar, California. He graduated from the U.S. Naval Test Pilot School at Naval Air Station Patuxent River, Maryland in June 1977 and later became involved in the test and evaluation of improvements to the F-14A aircraft while assigned to the Naval Air Test Center's Strike Aircraft Test Directorate. Selected as a NASA astronaut, he continued to be promoted, eventually achieving the rank of Captain in the U.S. Navy and the rank at which he retired from active naval service.

His flight experience included over 6,000 hours in over 50 types of civil and military aircraft. He held an airline transport pilot license, which expired in 2006, but is still current in these a multi-engine, and instrument rating. He has held a private pilot rating since age 17. Gibson has also completed over 300 carrier landings.

Selected by NASA in January 1978, Gibson became an astronaut in August 1979. Gibson flew five missions: STS-41-B in 1984, STS-61-C in 1986, STS-27 in 1988, STS-47 in 1992, and STS-71 in 1995. Gibson served as Chief of the Astronaut Office (December 1992 to September 1994) and as Deputy Director, Flight Crew Operations (March–November 1996). On his first space flight Gibson was the pilot on the crew of STS 41-B, which launched from the Kennedy Space Center, Florida, on February 3, 1984. The flight accomplished the proper Shuttle deployment of two Hughes 376 communications satellites, which failed to reach desired geosynchronous orbits due to upper stage rocket failures. Rendezvous sensors and computer programs were flight tested for the first time.

The STS 41-B mission marked the first checkout of the Manned Maneuvering Unit (MMU), and Manipulator Foot Restraint (MFR), with Bruce McCandless II and Bob Stewart performing two spectacular EVAs (space walks). The German Shuttle Pallet Satellite (SPAS), Remote Manipulator System (RMS), six "Getaway Specials," and materials processing experiments were included on the mission. The eight-day orbital flight of Challenger culminated in the first landing on the runway at the Kennedy Space Center on February 11, 1984, and Gibson logged 191 hours in space. [*The famous photo showing McCandless (above-right) using the MMU was taken by Gibson. He later remarked imagining about the caption being "NASA Photo by Hooter" STS-41-B in 1984.*]

Gibson was the commander of the STS-61-C mission. The seven-man crew on board the Orbiter Columbia launched from the Kennedy Space Center, Florida, on January 12, 1986. During the six-day flight the crew deployed the SATCOM KU satellite and conducted experiments in astrophysics and materials processing. The mission concluded with a successful night landing at Edwards Air Force Base, California, on January 18, 1986, and logged him an additional 146 hours in space.

Gibson subsequently participated in the investigation of the Space Shuttle Challenger accident, and also participated in the redesign and recertification of the solid rocket boosters.

As the commander of STS-27, Gibson and his five-man crew launched from the Kennedy Space Center, Florida, on December 2, 1988, aboard the Orbiter Atlantis. The mission carried a Department of Defense payload, and a number of secondary payloads. After 68 orbits of the Earth the mission concluded with a dry lakebed landing on Runway 17 at Edwards Air Force Base, California, on December 6, 1988. Mission duration was 105 hours.

On Gibson's fourth space flight, the fiftieth Space Shuttle mission, he served as commander of STS-47, Spacelab-J, which launched on September 12, 1992 aboard the Orbiter Endeavour. The mission was a cooperative venture between the United States and Japan, and included the first Japanese astronaut and the first African-American woman, Mae Jemison, in the crew. During the eight-day flight, the crew focused on life science and materials processing experiments in over forty investigations in the Spacelab laboratory, as well as scientific and engineering tests performed aboard the Orbiter Endeavour. The mission ended with a successful landing on the runway at the Kennedy Space Center in Florida after 126 orbits of the Earth on September 20, 1992.

On his last flight, (June 27 to July 7, 1995), Gibson commanded a crew of seven-members (up) and eight-members (down) on Space Shuttle mission STS-71. This was the first Space Shuttle mission to dock with the Russian Space Station Mir, and involved an exchange of crews. The Atlantis Space Shuttle was modified to carry a docking system compatible with the Russian Mir Space Station. It also carried a Spacelab module in the payload bay in which the crew performed various life sciences experiments and data collections. Mission duration was 235 hours, 23 minutes.

In five space flights, Gibson completed a total of 36.5 days in space. Gibson left NASA in November 1996 and became a pilot for Southwest Airlines. In 2006, as reported by NASA Watch, Gibson was forced to retire as mandated by the Federal Aviation Administration for commercial airline pilots. Gibson has publicly spoken out against federal regulations, which require airline pilots to retire at age 60. In December 2006, he joined the Benson Space Company as Chief Operating Officer and Chief Test Pilot. Gibson has flown 111 different aircraft types, and is scheduled to compete at the 2007 Reno Air Races.

He's one hell of a guy.

It was a privilege and an honor to meet him and listen to his stories.

It was equally hilarious to trick Jason out of his cheesecake dessert, which I accomplished by pulling the oldest routine in the book: “Look! What’s going on over there?” As soon as he turned his head I grabbed his cheesecake and he never knew it had gone missing. He didn’t get it, even after a number of protests to what I could have been referring to were brushed aside. Although I kept a straight face, it took all Lisa and I had to contain ourselves until eventually we just had to tell him!

* * *

With full bellies and aching cheeks (from listening to the wild and mostly hilarious stories that “Hoot” regaled us with), both Alumni teams assembled just outside the Training Center Floor to begin the second – unplanned – mission... Ahh, but that’s going to have to wait until tomorrow. “E-Stop” hasn’t returned, it’s 3:00am and we’re all beyond a little tired now so it looks as if we’re off to bed.

Tomorrow we’ll have some free time in the museum, have another classic IMAX film to see (“The Dream is Alive”) and, of course, graduation!

Belay off!

Day Four – EARNING OUR WINGS
SUNDAY | JUNE 17, 2007

Chalumbia, Houston –- Begin de-orbit burn.

I've had an amazing four days here at Alumni Space Camp, but it has now come to its natural conclusion. The experience actually concluded some time ago, but I've only just now had the opportunity to commit the words of the final day to text. Besides, Lisa accompanied me to the airport – her flight left out of the gate next to mine – so we've been re-living our memories of the experience since we left the Space & Rocket Center this afternoon... but I'm getting ahead of myself here.

Currently I'm airborne aboard a Delta flight direct to Orlando, settled into this rather short haul, but no less sad about leaving Huntsville and Space Camp behind. I've had an amazing time down there at Camp – more fun than I can remember having at Space Camp before. Sure, there were some times where it was less fun – such as during the dog fighting simulations over at Aviation Challenge on Saturday – but the rest of the offerings more than made up for that. I especially enjoyed the AC stuff more than the space stuff if you can believe that? The High-Ropes Area 51 ordeal was challenging and enjoyable, and though I almost died of exhaustion in the lake (an exaggeration to be sure), running the raft races with my fellow teammates was good fun too.

But that's what it's all about, no?

Before getting into today's activities, and whether or not we ever saw "E-Stop" again, let me finish up last night's events with the Chalumbia mission.

CHALUMBIA FLIES! ///

Last night, and the night before, I mentioned there was talk of trying to get Camp to assign another mission in addition to the two each alumni team ran on Thursday. This new mission, envisioned as a joint operation between the Columbia and Challenger teams (therefore a longer, more robust mission), was asked for because... well... flying the first one was so darn fun! Assigning only one two-hour mission to us didn't sit well with anyone so some influential Alumni were able to convince the counselors to come up with and run a second operation for us, news of which we were given during our High Ropes exercise over at Aviation Challenge's Area 51 course.

To just be heard and awarded a second overall mission was a real treat there's no doubt about that, but the moment I heard Discovery was to be the orbiter assigned to us I couldn't be happier. Some might recall I flew Discovery during my Space Academy youth experience in 1991 - I haven't stepped foot in it since (during Adult Space Academy in 2003 we used Endeavour), doing so for this experience proved to be a lot of fun, and filled with a lot of memories. As soon as I settled in I found the hatch Chip banged against the hull as he entered, where the RMS controls Jeff was supposed launch the satellite with (and failed to do), and, of course, the Commander's chair... where I flew Discovery to the best of my ability. But I wasn't allowed to sit in it.

For this mission Rich Kolker was our Commander, Ben "E-Stop" Schwartz our Pilot, and Mary Lawitzke, as my fellow Mission Specialist and space walker, rounded the crew of Discovery. Yes, even though I would not sit in the Commander's chair this turn – since I was awarded the position of PILOT in our official Camp mission, I would not serve in any real capacity aboard the Shuttle in this one – getting the opportunity to just sit aboard her again was reward enough.

Having been a Mission Specialist in the past I knew that rather than sit at Mission Control and direct traffic, or even sit aboard the Shuttle pressing button after button, I was going to be part of the action – I was there to do something. What? Mary and I were chosen to perform a rather unique EVA on one of the modules of the sprawling space station complex that inhabited the Training Center Floor. Although I would not know how unique that situation would be at the start (and my part of the mission did get off to a rocky start: Rich was a little too serious at the beginning, keeping me from entering the sequence to open the Cargo Bay Doors on the shuttle's keypad), it turned out to be one of the most fun EVA activities I've ever had to perform at Space Camp!

To say I was excited to see how this was going to be done would be an understatement. At the appropriate moment during the mission's elapsed time, Ana and I were instructed to leave the shuttle for the "airlock", to don the orange-colored space suits we'd wear outside in the vacuum of space. That is if we could find our way to them.

Discovery, like the rest of the orbiter simulators, was connected to the station mock-up through a series of tunnels that seemed like they were built and rebuilt over the years so that what existed was a confusing maze-like menagerie one could never hope to escape. Exiting Discovery's airlock, for example, lead to three places: 1) the cargo bay where a SpaceHab module was installed, 2) the space station module generally used for Discovery's simulations, and 3) down a tunnel to the Training Center Floor where the EVA's were performed. As soon as Mary and I were in the airlock we were faced with a bad proposition: the door to the space station was closed and locked, so we couldn't enter and leave through it. And because it wasn't being used, the door to the SpaceHab module was locked, so there was no escape there. That left us one option: crawl on our hands and knees down this rather long (and dark) tunnel to the end where we'd pop out onto the Training Center Floor.

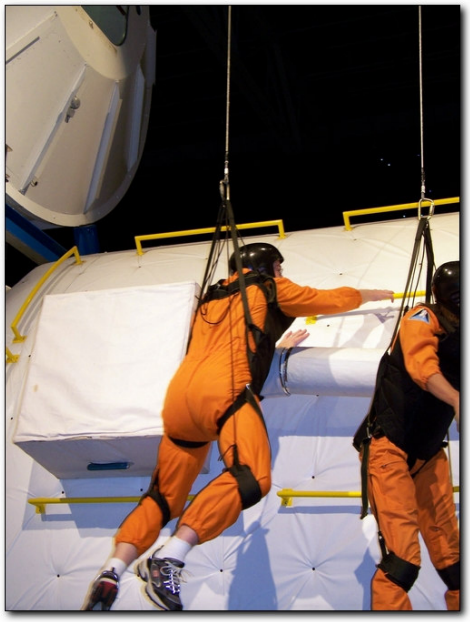
So we crawled.

Wouldn't you know the hatch on the other end was latched too? There was no escaping to perform our EVA! By the time we crawled back down the tunnel to the airlock junction (backwards I might add) the station's door was open, which allowed for us to get out of the darkened tunnel system. Although we weren't supposed to walk through the station and go out its opposite airlock (there's "nothing but space" on the other side), we did so anyway.

We eventually met up with Jeramy – who wondered where we were – and were then instructed where to find our suits and how to put them on. After taking a few moments to find one that would fit me (either I found ones for the kids or really tall adults), we "floated" outside the Shuttle to begin our EVA. Our task was simple enough: install a version of the Canadarm – or Shuttle Remote Manipulator System – to the Space Station for its future use.

The Canadarm is a mechanical arm used on the Space Shuttle to maneuver payload from the cargo bay to its deployment position to be released. It can also be used to grapple satellites in space to be taken back to earth (like LDEF), or brought into the payload bay for repairs (like Solar Max and the Hubble Space Telescope). By the numbers: the Canadarm is 15.2 meters (50 ft 3 in) long and 38 centimeters (15 inches) in diameter and has six degrees of freedom. It weighs 410 kg (905 pounds), and the total system weighs 450 kg (994 lb). The Canadarm has six joints that correspond roughly to the joints of the human arm, with shoulder yaw and pitch joints; an elbow pitch joint; and wrist pitch, yaw, and roll joints. It's been a boon for the Space Shuttle – how else would we have built the Space Station? And it will be more than helpful in the continued operation of the station as construction nears completion.

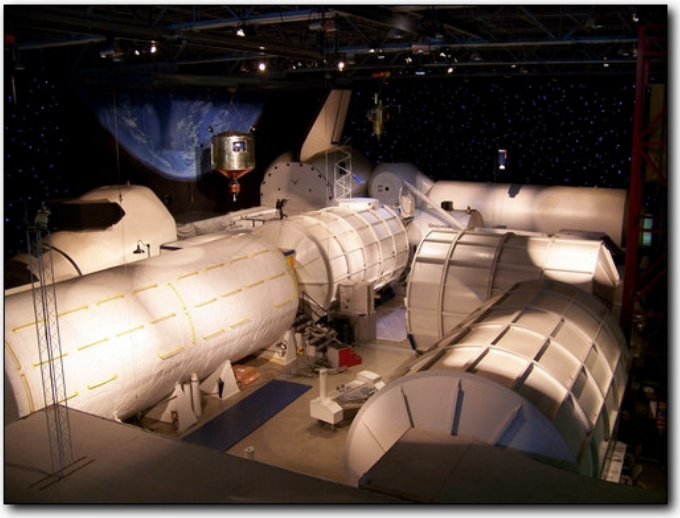
Therefore, our job was to take the six pieces of the arm – three large and three smallish – one by one to the connector unit already in place on station's science module and shimmy them into place. Sounds easy, right? So did the EVA I performed at Space Academy (both youth and adult) where the task is to repair the Hubble Space Telescope while sitting in a 5DF Chair. It was maddening enough trying to keep your chair from floating away while you dangled in it! This exercise though would prove just as harrowing: the arm connector piece was on top of the station module. With Space Camp striving to have their simulations be as real as possible, in order for Mary and I to complete our task we donned harnesses that attached to an overhead telepherique system, which hoisted us above the Training Center Floor and dangled us over the module.



Using the harness and telepherique, our belayers either dropped us to the floor (which simulated the cargo bay, even though we weren't anywhere near Discovery) where we could grab a piece to the Arm, then lifted us into the sky so it could be connected. Each piece was numbered so we knew which to grab first and, more importantly, how to place it. Within a few minutes of floating about, and moving tubes of various sizes into place, our task was complete.

Though harrowing at first the result was just too cool! I loved it but I can't say Mary enjoyed it that much.

Following the EVA we were supposed to report back to Discovery for our simulated ride back to Earth, but with the change-over of personnel – giving everyone a chance to run a position on the shuttle and/or mission control – there was hardly a need to head back in. So I ended up staying out on the Training Center floor with Jeramy, helping put the EVA equipment away and thanking her for the opportunity to do that activity.



Eventually she moved into the main Space Station module complex to check on the activities the other members of Chalumbia were partaking in, so I followed, but that only got me into more trouble. Inside the module we ended up in was a ladder to those modules above us. At Jermay's insistence she urged me to climb the ladder and explore the rest of the station complex on my own, separate from the mission's goings-on, on her authority. So I did; how could I pass that up? At first there was nothing much to see – the complex continued to sprawl out in all directions, tunneling here and there as needed. One moment I was over near Atlantis (its hatch locked), the next I was above the floor in the docking/viewing module, and then over by the far wall where Enterprise used to be (now Columbia), and lastly finding myself in the module where I had performed experiments as a Station Specialist in the 1991 Academy youth program.

But I'd soon step into some trouble.

On the way up to the complex's highest peak – another docking/viewing module - I ran into what appeared to be sleeping quarters. Pushing further in I discovered there was a second module – an entire habitat setup – beyond the first... and it was occupied! It took a moment to comprehend that there were actually people sleeping in the module before I turned around and retraced my steps down as quietly as I could. By the time I'd reached one of the science modules I was met by a counselor (who really didn't pay me much mind), on her way up to check on her people. In the meantime I let myself out of the station complex and returned to the area I'd last seen Jeramy.

"So how was it?" she asked first thing.
"Great, but you almost got me in serious trouble."
"Why?"
"There were girls sleeping up there!"
"Ohmigosh!"

Nothing ever came of the mishap and once the station's activities concluded the two of us retired to Discovery's Mission Control room. Located just beyond the Training Center Floor in a complex of rooms next to the cafeteria, being there was another first for me. I'd never been in one of the Camp's off-training floor mission control rooms. For Camp in 1989, Columbia had its mission control right on the floor, uncovered for all to see and hear (although it later moved to a covered spot just outside the floor years later). For Space Academy in 1991, I was privileged enough not to be assigned to Mission Control for either mission, but those who did called the shots from this very room. And even the missions flown for the Adult Space Academy program in 2003 were done using Endeavour, whose mission control also was on the main training center floor (though covered in glass). So watching the rest of the mission unfold from here was a treat indeed.

Around 11:00pm the mission and its after-flight briefing came to a close. We profusely thanked the counselors for not only allowing us to fly the second mission but in sticking around way passed their scheduled hours to help run the simulation boards. Without them Chalumbia would not have flown, and we would not be nearly as happy. And of course to celebrate our victorious day our second mission's Commander had one last order to give: *Chalumbia, ATO*!

THE DREAM IS ALIVE ///

The majority of our morning was spent gathering our belongings in preparation for leaving Camp later on in the afternoon. Part of our assignment here was, after we'd gotten ourselves presentable, to also take our linens and discard them down in the laundry section of the atrium, a well-marked place on one end of the Habitat where sheets piled up by the ton it seemed. Once that task was completed, we were then asked to bring our luggage down to the atrium and set it against the far wall before we set out on the day's activities. You might ask why, but, it's all very simple: new cadets would be arriving later in the morning and they needed the rooms to be cleaned and your stuff out. All standard procedure here at Camp actually! You get used to it.

Those who got an earlier start had already made their way over to the cafeteria for their last Camp-inspired breakfast, but after last-night's ATO I couldn't imagine anyone wanting to get an early start – but there were quite a few. Besides having a couple of brown ale's (and watching Lisa get drunk off of her Bud Lights), Hoot Gibson joined the party and then all hell broke loose. We were there until 2am can you believe it?

Yeah, we were late for breakfast. Though I wasn't really looking forward to this "final" meal, I had something anyway. Lisa, however, did not, but we all had a good time conversing with our fellow teammates, now the blended Chalumbia, never the less. Part of the buzz making the rounds as I got over to the cafeteria was about what happened to "E-Stop"; he left Otters with "Princess" the night before and hadn't returned to the room. Neither he nor she was anywhere to be found... until breakfast when they walked in together. What could they have been up to? Oh "evasive maneuvers" to be sure.

With this being our final day our schedule was relatively light. Following breakfast (and the "how did we do?" forms) we had some free time to explore the museum, the simulators in the Rocket Park, and take in "The Dream is Alive" in the Space Dome before Graduation. Me, Lisa and fellow teammate Nathan did most of that.

The temperature outside made visiting the Rocket Park a less interesting endeavor; therefore, Nathan, Lisa and I stayed inside the Museum and attempted the MARS Rock Wall again, only this time with disastrous results: neither Lisa nor I could make it to the top. Our muscles simply wouldn't haul us up! We were beside ourselves in our failure but luckily the movie was much more exciting (even if Lisa did yell at me for purchasing concessions at the stand; how was I supposed to know she brought her own?).

It's one of my favorite IMAX space films ever - The Dream is Alive – and I was pleased to hear that the Space & Rocket Center got a special print just for us Alumni (they've not shown the film in years). Released in 1985 and narrated by Walter Cronkite (of CBS News fame), it's all about NASA's Space Shuttle program. The movie includes scenes from numerous shuttle missions, beginning with footage of a de-orbiting Discovery (STS-51-A; the mission where astronaut Dale Gardner holds up a "For Sale" sign, referring to the Palapa B-2 and Westar 6 satellites that it captured) on its approach to Cape Canaveral, complete with sonic boom.

Mission STS-41-C, the 11th for the shuttle program and the fifth for Challenger is featured most heavily, beginning with the deployment of the Long Duration Exposure Facility (LDEF) satellite. The capture and repair of the Solar Max satellite also receives a great deal of coverage, including a detailed overview of training for the mission in the Underwater Astronaut Training tank, a large pool at NASA. This particular mission is of interest, as the first attempt at capturing the satellite failed, and a second attempt almost 12 hours later had to be made. That portion of the mission was a success, with the satellite being brought to the payload bay on the next attempt, and was repaired quickly by astronauts James van Hoften and George Nelson. Other STS 41-C mission activities included a student experiment located in a middeck locker to determine how honeybees make honeycomb cells in a microgravity environment.

Other shuttle missions are interspersed during the feature with the STS-41-C footage. Highlights include:

- The first launch of Discovery (STS-41-D), with footage of liftoff, the deployment of two of the three satellites on this mission, and special attention given to the novelty of the experimental OAST-1 solar array, which we hope will be used in the upcoming Space Station Freedom concept.

- Footage is also shown of Discovery's landing and transport from its landing site at Edwards Air Force Base to Kennedy Space Center on the back of the Shuttle Carrier Aircraft.

- The sixth flight of Challenger (STS-41-G), notable as the largest crew aboard the shuttle, the first time two women flew together on the shuttle, and the first spacewalk by an American woman, Kathy Sullivan.

- Additionally, a small amount of time is also dedicated to other aspects of the shuttle program, including: other crew that work on the shuttle; the work of inspecting and replacing the shuttle's heat tiles; training the astronauts must complete to prepare for missions; what the astronauts eat on spaceflights; and how astronauts would bail out if an emergency occurred on the launch pad (the stomach wrenching part!)

GRADUATION: WHAT A HOOT ///

Immediately following the IMAX film both teams assembled over in the team room at Habitat II for graduation, but we weren't alone. We shared our graduation with the Parent-Child, Adult and other Weekend Camps, although they graduated us alumni first. We were all honored by Hoot Gibson's presence, who not only gave a speech but handed us all our wings, certificates and group photos – how about that!

Individual awards were also given out. Team Columbia won "Best Mission" for their heroic landing and all-around serious flying. Leah won "The Right-Stuff" Award, an award given to a trainee that's said to have the right stuff, which had what it took to be a team leader as well as being a person to stare down their personal fears in order to accomplish something greater. This week that was "Princess" Leah, for her harrowing experience overcoming her personal fear of heights to not only climb up the wall down at the High Ropes/Area 51 course, but also in conquering those fears to allow herself to zip down the line. She was a changed person after that – for the better! – There is no doubt about that.

Following graduation most of the Challenger team (and some Columbia) joined us over at the Marriott for a spot of lunch, our first "real" food of the weekend! It was great hanging out as a group for the last time, reliving the adventure, discussing what we liked and disliked, and expressing our hopes that we'll come together again soon. But before long our time together was done. People had a need to get off to the airport and return to their daily lives. For Lisa and I, not then; we still had plenty of time to waste before our flights were ready to take off – so we continued our exploration of the museum and the gift shops to keep us busy.

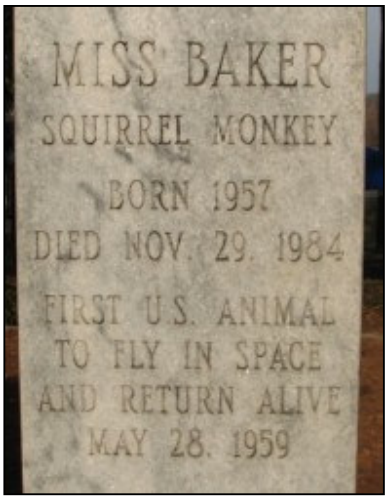
One thing we did partake in was a Geo-Cache hunt with “E-Stop”. Called “B for Miss Baker”, it was part of a series of caches featuring the North Alabama area, one letter at a time. All we had to do was find Miss Baker’s Memorial on the grounds of the US Space & Rocket Center, and answer the questions below, which would then give us the coordinates of the cache:

Who was Miss Baker? She and Big George are resting at the USSRC. What’s their story? If you know feel free to post some pictures, if not, I hope you’ll be curious enough to find out. Use the cords posted to find the marker. Read the information carefully, answer the questions then plug in the numbers to find and sign the log.

34 AB.CDE 86 FG.HIJ

A – numbers on line 3
B - number of words on the top line
C – last number in the birth year
D – ranking number on line five
E – number of words on line six

F – number of letters in the first word, line eight
G – last number in date of death (day of month)
H – number of words in line nine
I – letters first word second line
J – first number in date of death (day of month)



By that reckoning - A=4, B=2, C=7, D=2, E=4, F=3, G=9, H=0, I=8, J=2 – which then gave us the coordinates: 34 42.724 W 86 39.082, or more succinctly: N 34° 42.724 W 086° 39.082. It actually took us a brief moment to find it because the questionnaire was a little off. There was no 9th line. But regardless of the mix-up (or perhaps the memorial had been replaced between the time it was written and the time we’d come to answer it) we found the cache anyway: it was hidden under one of the aluminum benches in the old bus tour waiting area. All that was inside the old 35-mm film tube was a piece of paper (a log book) and a note from the creator of the cache. He (or she) congratulated us in finding it, asked us to sign the log (which Ben did) and then to return it where we found it. Too cool!

* * *

As they say: all good things must come to an end and eventually Lisa and I had to be off to the airport. Thankfully we were able to catch a ride with one of the Space Camp busses, scheduled for ferrying a late cadet over to the airport anyway, so that worked out for us. Unfortunately both of our flights were delayed, so we spent copious amounts of time sitting around the airport doing nothing anyway.

But at least we had a good laugh: the lady sitting across from us in our little seating area dropped her food on the floor, then picked it right up and began eating it. Yeuuuuuck!

I don't know if this will be my last adventure at Space Camp or not. Many of the combined Chalumbia team has expressed interest in reuniting for a Camp adventure in the future – myself included – but who knows if it will ever come to pass. If it doesn't, I can safely walk away completely content with the four Space Camp experiences I've had over the years. It's been a wild ride but let's see what the future brings!

{fin}

Roger, Signing Off...

U.S. Space Camp
30th Anniversary
June 15 – 16, 2012

SPACE CAMP MEMORIES

2012 // Space Camp 30th Anniversary

Part One – HALL OF FAME

FRIDAY | JUNE 15, 2012

Greetings Campers.

Today marks the 30th Anniversary of Space Camp; can you believe it?
Who would have thought that back in 1950, when Dr. Werner von Braun arrived in Huntsville, a city which boasted a population of only 15,000 (and known as the "Watercress Capital of the World"), would become forever forged into the history books as the place where America's space program began? It's true! Although the astronauts launched from Cape Canaveral, Florida and missions were controlled from Houston, Texas, the rockets that were developed to put the first US satellite into orbit and sent men to the moon, where the power for today's space shuttle was developed, where the modules for the International Space Station were designed and built were in Huntsville.

But how do we go from developing America's rocketry to housing a summer camp for space enthusiasts?

During the final months that von Braun and his team of scientists were refining the giant rocket that sent Apollo astronauts to the moon, he was also preparing to launch another important project: a permanent exhibit to showcase the hardware of the space program. Von Braun thought that since there was Disney World and Amusement Parks, a park-like attraction focusing on space and science would be of interest to the general public, especially as a way for the public to see things that only those inside the gates of the ARMY's Redstone Arsenal got to see and work on. But von Braun didn't stop there. As Director of the NASA Marshall Space Flight Center, he began to cultivate an idea to expose young people to science and math using the space program as the focal point of a course of study.

"We ought to have some kind of program that is a continuing educational experience, like a camp," von Braun said to Buckbee, who wrote about the conversation in his book, *The Real Space Cowboys*. "We have band camps, cheerleading camps, football camps and scout camps. Why don't we have a science camp?" He began to work on the Space Camp idea in the mid 1970s with fellow NASA employee later turned US Space & Rocket Center Director Ed O. Buckbee, who saw the idea through to fruition following von Braun's death in 1977.

On this day, in 1982, Space Camp held its first ever open-to-the-public session and very much like early space travel, it was a step into the unknown. But 747 students signed up to find out about this excitement in von Braun's summer-camp environment. There was no Space Camp facility then, so the campers slept in dorms at the University of Alabama in Huntsville. By the next year, when Space Camp became a permanent part of the rocket center, about 1,400 kids enrolled in the 14 weeks of camp. Then 3,000. 5,000. In 1986, with the release of the movie "SpaceCamp", filmed on location here at the U.S. Space and Rocket Center in Huntsville, attendance shot to over 12,000. The word was out and for the past 30 years Space Camp has risen to challenge today's youth and adults alike to dream for the stars (and beyond!). In 1991, Space Camp graduated its 100,000th trainee. By 2007, 500,000 had gone through the program. And earlier this morning the program celebrated its 600,000th trainee – 11-year-old Jenna Allan of Houston, Texas.

That announcement is but one part of this weekend's 30th Anniversary Celebration. Last night the USSRC had a "Retro Movie Night", which included a cocktail mix-and-mingle at the Davidson Center and a bag of "swag" for the attendees that included a Space Camp branded Astronaut Pen, a magnet, keychain, 30th Anniversary pin, a 30th anniversary button and – for alumni only – a Space Camp / Aviation Challenge coin! The evening began with a fashion show to award those "best dressed in the style of the 80s" (and boy were there quite a few classic blue shorts and shirts from Camp on hand!) and, then, of course, we sat in the Center's new movie theater for a DVD screening of SpaceCamp: the Movie with Patrick Bailey – the story's writer and film's producer – in house. Following the film, Patrick Bailey sat down with Ed O. Buckbee (USSRC & Space Camp founder) and Lee Sentell (Space Camp's marketing guru back in the day). It was great to see the movie again... especially with an audience for the very first time!

Today's adventure would prove just as exciting. From 10:00a until 12:00p we were split up into groups for a Space Camp Adventure (a full-on intensive tour of the "Mission Center Complex" (the old Training Center Floor), then from 1:00p to 3:00pm a similar adventure at Aviation Challenge, then from 6:00p – 10:00p, the Space Camp Hall of Fame Ceremony and Banquet.

It's been a long, but fun, day!

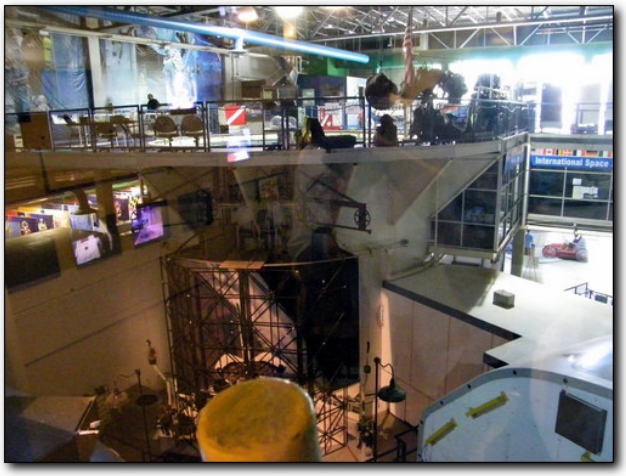
SPACE CAMP ADVENTURE ///

We assembled out in the museum's old ticket lobby (now gift shop) by the dozens; many dressed in classic Camp paraphernalia. Last night I wore my 25th Anniversary "Classic 1982 Logo" T-Shirt, today an old-style Space Camp Red-Ringer shirt with Lockheed Martin logo on the back. To say I was excited to begin the tour would be an understatement. Although I did not know what we'd get to do at the time (the schedule suggested a possible simulator experience, such as a launch/landing countdown sequence in one of the shuttle mock-ups), anything Space Camp related would be welcome. Three Space Camp counselors eventually met the group, and we were subsequently divided up into three more manageable tour groups. Kiki led ours.

Over the next two hours we would visit just about every nook and cranny of the "Mission Center Complex".

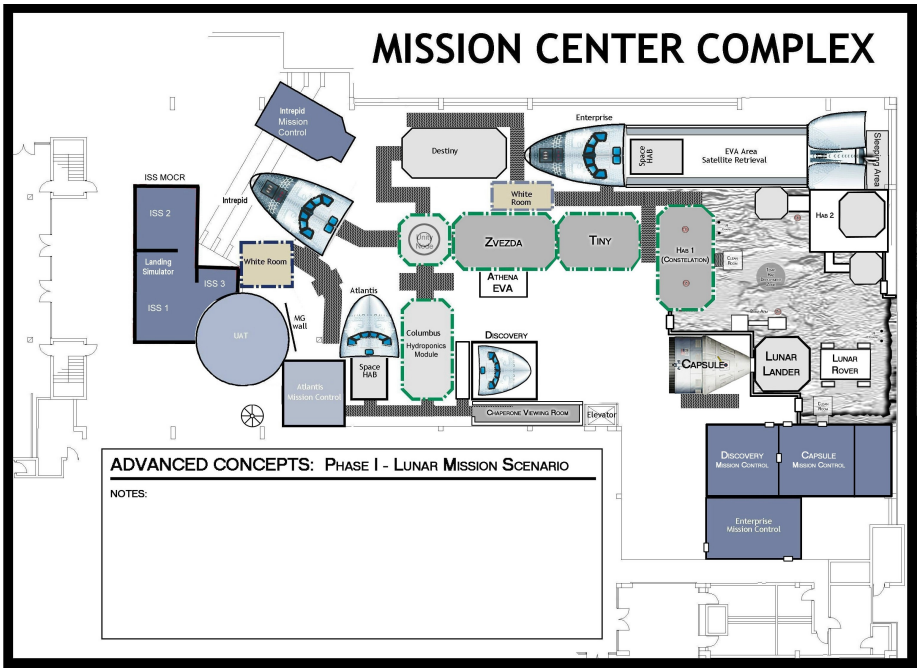
Although much of what used to be the Training Center Floor had changed over to Mission Center Complex the last time I was at camp (Alumni Camp in June 2007), there had been even more changes and additions. To provide a little background: The Training Center and adjoining cafeteria were added to the USSRC in 1988 as an expansion of the Space Camp program, which replaced the old "dome" structure that had existed since 1982. The Training Center was completed at a cost of $4.5 million dollars, to duplicate the functions of equipment and training at the Astronaut training center at NASA-Houston. As such it contains some 70,000 square feet, five times larger than the area previously devoted to Space Camp activities, and everything happened here.

It was open, it was airy, it was dynamic and it was electric. There wasn't any kid in or out of the program who didn't want to be on that floor learning to be an astronaut.



In 2002, things began to change. Many of the small simulators (such as the 1/6th Gravity Chair, the 5DF Chair, the GMMU and the Multi-Axis Trainer) were moved off the Training Center Floor into a building adjacent to the Pathfinder Shuttle Park known as AstroTrek. In their place more and more Shuttle simulators and Space Station modules were crammed in, but the Training Center Floor still remained. By 2007, however, Shuttle Operations gave way to Space Station operations, as module after module showed up and each of the modules (and Shuttles) were inter-connected through a maze of corridors and walkways, shutting off most of the floor to onlookers.

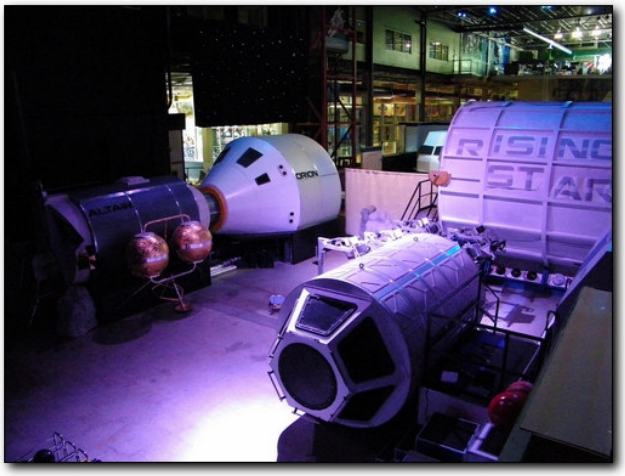
Today, Space Shuttle based training is slowly being phased out, as training for the Constellation initiatives with its Ares, Orion and Altair programs taking their place (although Constellation as a program no longer exists, it's interesting to simulate "what could have been" with updated technology). In fact one of the new simulators we saw today was the Orion/Altair combination and I must say... it is way cool! That being said, however, the Training Center Floor is no longer. It's now known as the Mission Center Complex and its ever evolving.

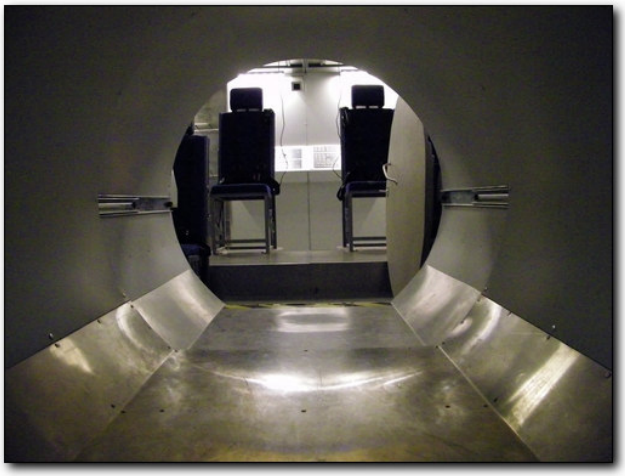


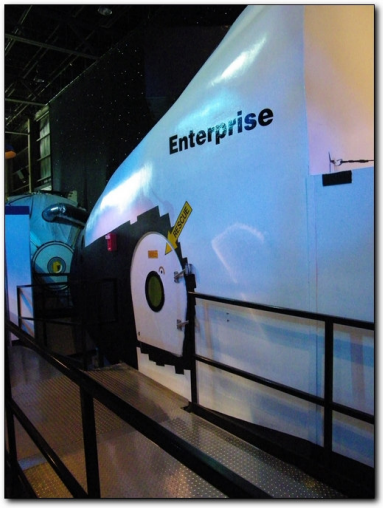
The changes are interesting and we got a chance to see many of these on our tour today.

Beginning in the White Room near the UAT, we first made our way over to Intrepid (a Shuttle simulator) and into its cockpit, then out into the Unity Module (which is a big docking and connector module for the Space Station, as well as functioning in a similar role here at Space Camp) – the view of the Complex from here is fantastic! Then we looked into Destiny, Zvezda, and Tiny (also known as Kibo and Zarya), all Space Station module mock-ups. Next we took a peek into the new Orion capsule and crawled through the airlock into the Altair lunar lander. These were very, very cool mock-ups if I do say so myself.

Orion seats seven in capsule form and its touch-screen controls take Space Camp into the 21st century indeed! Altair, standing two to three, takes campers to the moon!

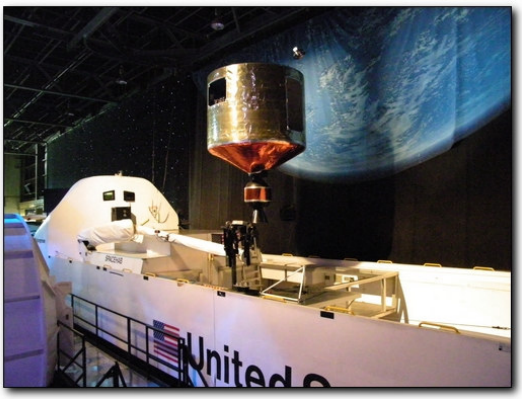


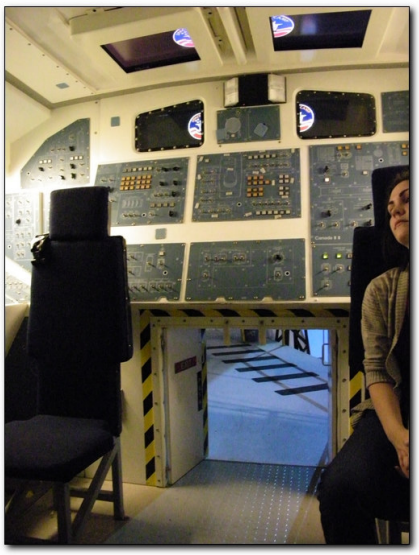




In the back, near Enterprise (the full shuttle mock-up that Advanced Academy uses – the one with the RMS arm that Max from SpaceCamp: The Movie used) are two other modules; these are two moon bases. The first, as the mission criteria explains, was once thriving but an accident caused its environmental structures to be breached so it was abandoned for a second; however, the mission that these campers must perform is getting over to the first base, assessing the damage and repairing it, and getting it fully operational before they leave! There's so much to do on this mission that I wanted to fly it right then! After carousing the new simms we checked out "Base Operations", which is a Mission Operations Control Room (MOCR) for the moon base. Next to it is Capsule Mission Control, which is nice, and Discovery Shuttle Mission Control (which we didn't get to see today).

The final stop on our tour took us past Discovery (did you know this simulator was "The Right Stuff" one from SpaceCamp: The Movie?) and into Columbus, Space Camp's newer hydroponics module (in which they actually grow edible plants as experiments), then over to Atlantis' Mission Control (but not inside Atlantis itself – the actual cockpit used for all internal shots of SpaceCamp: The Movie) before concluding the tour.





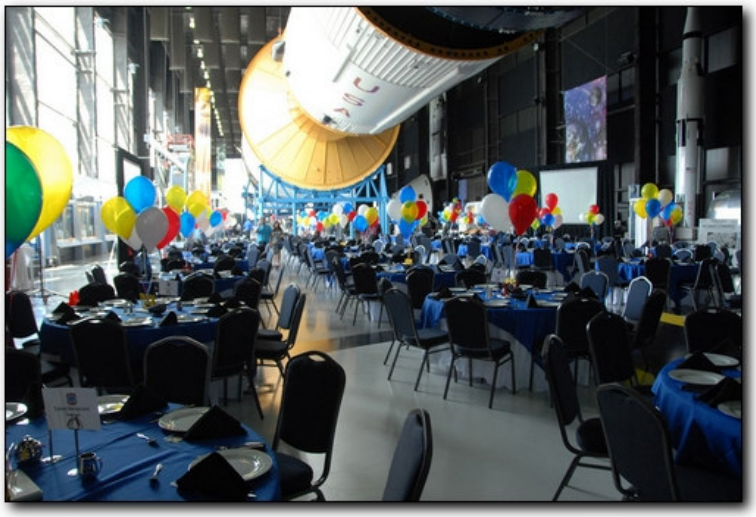
Alas our time was not yet done. We ended our Space Camp Adventure in the AstroTrek building, tumbling in the Multi-Axis Trainer and jumping in the 1/6th Gravity Chair. It was such fun I wanted to do all that again!

Ben, his wife Riki, and I took a break from the group at Noon to get lunch at the MARS Grill before heading off to the Aviation Challenge Adventure. Unfortunately it seemed everyone else was thinking the same thing, and thus by the time we actually got our food there was little time to enjoy it. Woofing it down like a dog, once the three of us were done we made our way back out to the old lobby area where a bus would take us into the jungles of Aviation Challenge. Here there was very little for us to do in the allotted time. We split up into two waves: the first heading over to AC's Centrifuge unit to take a spin there, the second heading over to the flight simulator room to take up approach and landing re-creations in the program's Mach II simulators. Most of our time was spent flying jets in the simulator – Ben was doing a bang-up job landing, even Riki landed hers well but I ended up crashing mine upon landing.

By the time we made it over to the Centrifuge time was running short. Neither one of us took a spin this afternoon.

Between the end of the Aviation Challenge portion of the adventure and the cocktail mix-and-mingle prior to the start of the Hall of Fame Ceremony, there was three hours to kill. I spent the majority of the time ensconced inside my hotel room, relaxing and relaying the day's activities. When Brian and Jason showed up at the Marriott, I joined them in their room for a catch-up and looking at old Space Camp memorabilia session, which turned out to be great fun. By 6:00pm, all cleaned up and dressed for the occasion; we made our way across campus to the Davidson Center for Space Exploration.

HALL OF FAME BANQUET ///



Attending the Space Camp Hall of Fame Induction ceremony and banquet this evening was a rare treat, even though I am not one who usually stands on such ceremony. To be honest I don't fancy getting smartly dressed and roping on a necktie to take part in events in which I know absolutely no one in attendance – it's rather uncomfortable. Other than Ben and his wife, Brian, Jason, and Vince (a Space Camp Hall of Fame member himself), everyone else here was a complete stranger – even those I had begun to get chummy with over the last few hours. That being said the entire four-hour process went relatively smoothly, was never dull, and was quite a pleasant experience all around.

Although I guess before I go further I should explain what the Space Camp Hall of Fame actually is.

The SPACE CAMP Hall of Fame was established in 2007 on the 25th Anniversary of SPACE CAMP to honor the outstanding members of the SPACE CAMP family, including graduates and former employees who have distinguished themselves in their respective careers or friends who have made considerable contributions or personal time, effort or resources to further the goals of the SPACE CAMP programs. Hall of Fame members should display certain characteristics and qualities as a result of their involvement with SPACE CAMP through one of its multiple programs or as a whole. These qualities may differ from member to member, as well as across the Hall of Fame categories. Hall of Fame members should be a positive example of the effect and inspiration Dr. Wernher von Braun intended SPACE CAMP to be.

There are three categories in which you can be inducted: as a Space Camp Alumnus, as a Space Camp Counselor or Staff, or as a Friend to Space Camp.

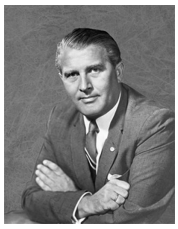
SPACE CAMP Alumnus: The nominee should be a graduate of a SPACE CAMP or Aviation Challenge program (SPACE CAMP programs) at the U.S. Space & Rocket Center in Huntsville, Alabama, SPACE CAMP Florida, SPACE CAMP California, AVIATION CHALLENGE California, and all officially recognized SPACE CAMP programs located internationally. The nominee must be at least 21 years of age and must have graduated from their final program at least five (5) years prior to the date of the annual induction ceremony. Nominees must be, or have been, a credit to themselves and the SPACE CAMP programs as well as distinguished him/her self in their chosen professional field. The nominee may be living or deceased.

SPACE CAMP Counselor/Staff: The nominee must have been a member of the staff of any recognized SPACE CAMP Program for a minimum of one (1) full season (three months), but that has retired or left employment at least three (3) years prior to the date of the annual induction ceremony. The nominee must have worked in or in support of a SPACE CAMP and/or AVIATION CHALLENGE program as a counselor or member of the Aerospace Management team. The nominee must have distinguished him/her self by demonstrating exceptional leadership, character, and achievement in his/her chosen professional field.

SPACE CAMP Friend: The nominee must be a loyal and devoted supporter of SPACE CAMP and its programs for a minimum of 5 years. The nominee must exemplify the qualities of being a genuine friend to SPACE CAMP and its programs, specifically with respect to contribution of personal time, talents, and/or funding towards influencing or inspiring the camp attendees and staff of SPACE CAMP, to assist SPACE CAMP in developing future astronauts, scientists, engineers, and leaders. The inductee may be either living or deceased.

Since 2007, twenty-seven individuals (including tonight's four) have been inducted into the Space Camp Hall of Fame, they are:

2007 Inductees





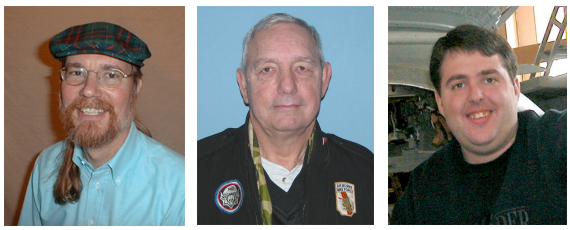



Dr. Wernher von Braun (famed scientist who was the leader of the German Rocket Team that directed the efforts of the scientists and engineers that put mankind on the moon), Edward O. Buckbee (first ever CEO of USSRC, brought von Braun's dream of Space Camp to reality), Georg von Tiesenhausen (member of von Braun's Rocket Team), Dan Oats (the heart, soul, and mind of SPACE CAMP for Interested Visually Impaired Students, or SCI-VIS), Dottie Metcalf-Lindenburger (former Space Academy trainee turned NASA astronaut, launched as a Mission Specialist aboard Discovery, STS-131), Dr. Jim Rice (a previous Space Camp crew trainer, NASA internist, and currently a Science Team Member for Mars Rovers, Spirit and Opportunity, and the man behind the camera onboard Mars Odyssey), Amanda Stubblefield (former trainee and camp crew trainer, today she serves as an instructor for the astronauts and cosmonauts who fly to the International Space Station), and Penny J. Pettigrew (former trainee, at the time of induction she was the Aries I First Stage Systems Engineering and Integration Engineering Lead.)

2008 Inductees

Oscar Holderer (an original member of the von Braun Rocket Team; he also designed many of Space Camp's mainstay simulators: the Multi-Axis Trainer, the 5DF, and the 1/6th Gravity chair), **Marlenn Maicki** (a friend of Space Camp who, as a science teacher, has led her entire class on an annual trek to Space Camp), **Lisa DeVries** (previous Space Academy trainee, was a member of Operations Safety at KSC; among the last to leave the launch pad prior to each Shuttle mission – and one of the first on the runway upon the shuttle's return), **Vincent Vazzo** (he's the brain and energy behind the original, unofficial, SPACE CAMP social network, Hab1.com, and worked for United Space Alliance as part of the Imagery Analysis Team), **Capt. Phillip A. "Ritz" Smith** (previous trainee, currently an F-15E pilot stationed at Seymour Johnson Air Force Base in North Carolina), and **Josh Whitfield** (13 time trainee at Aviation Challenge, earning the coveted Right Stuff Award 5 times and twice won the Top Gun Award; today he's an Army Specialist and an AC crew trainer.)

2009 Inductees



Jim Allan (is behind the custom-made tech behind Space Camp for the Interested Visually Impaired Students, SCI-VIS, serving for 20 years), **SGM Jerry Gleason, Ret** (a highly-decorated combat veteran and survival expert, SGM Gleason is the author of the AVIATION CHALLENGE Land Survival training and has inspired more than a few young men and women to follow their dreams of pursuing a military career), and **Robert Pearlman** (a six-time SPACE CAMP graduate that has successfully turned his passion into his profession, Pearlman has spent the past decade developing collectSPACE.com into the leading online publication, resource site, and community for space history enthusiasts).

2010 Inductees

Francis French (former Academy II trainee and Director of Events with Sally Ride Science and Director of Education for the San Diego Air & Space Museum), **MAJ. J. David Hnyda, US Army** (Eagle Scout and former SPACE CAMP trainee and crew trainer. His military life since SPACE CAMP is surely the envy of every

AVIATION CHALLENGE trainee that has ever attended), **Danny R. Jacques** (a science teacher at Ignacio Junior High School for nearly twenty-five years. He has been a veritable dynamo and perhaps SPACE CAMP's most effective un-official ambassador), and **Andrea M. Hanson, PhD** (former Advanced Space Academy crew trainer and scientist who culminated five years of research in a space shuttle experiment that flew aboard STS-118 in August of 2007.

2011 Inductees



Dr. Michelle Thaller (Assistant Director of Science for Communications at NASA's Goddard Spaceflight Center in Maryland), **Dr. Valerie Meyers** (a board certified toxicologist in the Space Life Science Directorate at NASA's Johnson Space Center in Houston), and **Lieutenant Colonel William Burke Hare III USAF** (Chief of Operations, Flight Test Execution Directorate, Missile Defense Agency, Redstone Arsenal, Alabama).

And 2012's Inductees

Stephanie Abrams

For self-described science geek and adventure-seeker, Stephanie Abrams, Space Camp was an obvious destination. She was hooked on science before camp and well before attending college, but it would be the devastation of Hurricane Andrew in 1992 that would lead her to a meteorology class at the University of Florida and the true passion of her life…weather. Abrams joined the team at The Weather Channel shortly after college as an on-camera Meteorologist and is now among the most recognized faces on television. Naturally gregarious, Stephanie is keenly aware of the unique platform she has to influence young people interested in STEM professions. She has artfully combined her passion, personality, and social media savvy to extend both her appeal and reach in making science cool. Stephanie Abrams is known for her fearless approach to life and learning and happily shares her discoveries with the world.

Lara Elisabeth Warren

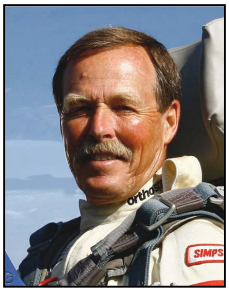
"Liz" Warren always knew she wanted to be an astronaut, a dream she pursues to this day. Her hallmark is that she is not just dreaming the dream, she is working it. Already passionate about space and science, Warren took away other critical life skills from Space Camp – leadership and teamwork – and has applied them throughout an already brilliant career. Dr. Warren holds a Ph.D. in Molecular, Cellular and Integrative Physiology and is an expert at NASA Johnson Space Center, where she studies the effects of space flight on the human body. Today, Dr. Warren is the ISS Program Science Communications Lead working to communicate the research accomplishments of the International Space Station. Aside from contributing to the health, safety and comfort of the ISS crew, Warren spends about 100

volunteer hours every year speaking to students and teachers through NASA's educational outreach efforts. Dr. Warren's enthusiasm for space exploration is matched only by her devotion to inspiring the students now following her into a career in aerospace.

Edward A. Van Cise

"Right Stuff" recipient Ed Van Cise knew before his trip to Space Camp that NASA would be the where of his future. But it was Apollo 16 Moonwalker Charlie Duke's presentation at Camp that led him to the how and what. Van Cise left that week knowing that he wanted to be an Aerospace Engineer, and eventually work at Johnson Space Center in Mission Control. And not long after, that is exactly where he was. Van Cise committed to his path and is currently the 78th Flight Director in NASA's history. Since taking the call sign "Carbon Flight," Ed has worked as Lead Flight Director for several different aspects of the International Space Station. Edward Van Cise methodically pursued his dream, earning awards and commendations for leadership, as well as respect from his peers. He continues that dream, today, fully dedicated to NASA and the future of human space exploration.

Captain Robert "Hoot" Gibson



Retired U.S. Navy Captain and Space Shuttle Commander, Robert "Hoot" Gibson is an aeronautical engineer, test pilot, astronaut, and world record holder, and among the very best friends of Space Camp and Aviation Challenge. A rare mixture of affability, self-effacing humor, and a little hero swagger, combined with the authenticity that is born of an exceptional life, Hoot is the real deal. Gibson is a veteran of five shuttle missions, a recipient of numerous honors, awards, and decorations including the DOD Distinguished Service Medal, the Distinguished Flying Cross, and numerous international medals including the Yuri Gagarin Gold Medal, as well as a member of the Astronaut Hall of Fame. But, it isn't Gibson's resume that lands him in the Space Camp Hall of Fame. Instead it is his genuine, active dedication to its people and programs. Because he happily and effectively endorses Space Camp and Aviation Challenge selflessly offering his time and attention to any and all, Hoot Gibson is chief among our friends.

* * *

Though the event was held in honor of the inductees, for me it wasn't really all about them. For me it was being with friends and enjoying the moment, which for the most part I did. We met Dr. Deborah Barnhart, CEO of the U.S. Space & Rocket Center (and creator of the Space Academy and Aviation Challenge programs back in the day), mixed and mingled with the various hall of fame inductees (although mingled more than mixed), had our pictures taken, and rather enjoyed the meal that Top Chef Season 3 Runner Up Dale Levitski prepared: fried green tomatoes as an appetizer, medium rare steak and garlic mashed potatoes for the entrée, and a chocolate chip cookie with bacon bits and a root beer float for dessert. Afterwards, Jason, Brian and I ATO'ed and continued the party at Otters over at the Marriott!


600,000th Trainee

Part Two – THE DREAM IS ALIVE
SATURDAY | JUNE 16, 2012

Yesterday was Space Camp's Anniversary date, celebrating 30 years of simulating space exploration, but today is mine. A period of reflection from June 11th through 21st during which I celebrate the memories of and time spent at Space Camp, with an all-inclusive date on June 16th, was born in 2004. And over the years I've had the opportunity to celebrate this all-inclusive date (the 16th, the only day where the programs I attended in my youth coincided: Space Camp from June 11-16, 1989 and Space Academy Level I from June 16-21, 1991) here at the U.S. Space & Rocket Center. The first would be in 1995, when I came to the center as nothing more than a tourist, but it would be the second (and last time) that would be more rewarding: it was during the 2007 Alumni Camp program held from June 15th through 17th in celebration of Space Camp's 25th Anniversary. Although I have attended one other session (as of this date) as an adult, and might have been on the grounds here at other times during the year, it is these eleven days I celebrate.

So it has been quite a treat to celebrate this particular day through a special showing of "The Dream is Alive" on the space center's IMAX Dome this morning, and then in the afternoon with Patrick Bailey (producer of Space Camp: The Movie) and his family, as we toured the "Mission Center Complex" together (and performing a launch/landing sequence with ATLANTIS), tumbled in the Multi-Axis Trainer in the AstroTrek building, and saying goodbye to he, all my friends (Brian, Vince and Jason) and to SpaceCamp itself through the 30th Anniversary's concluding event: BBQ Lunch at Aviation Challenge. Before I left the USSRC though I took the opportunity to really visit the Davidson Center for Space Exploration, checking out the various exhibits now installed; browsed through the core museum's "Mammoths and Mastodons" traveling exhibit, and even had the opportunity to see the remnants of the 100 Years Werner von Braun exhibit still on display.

THE DAVIDSON CENTER ///

Perhaps one of the biggest changes to come to the US Space & Rocket Center in recent years is the creation of the Davidson Center for Space Exploration, a two-story, 68,200 square foot facility designed to better showcase NASA and Marshall Space Flight Center (MSFC) contributions to historical, current, and future space exploration. It's also to exhibit the visitor center's famed Saturn V rocket (one of only three remaining – one is at Kennedy Space Center in a similar enclosure, the other at Johnson Space Center in Houston), a Smithsonian artifact.

The restored Saturn V (SA-500D) stretches 363 feet, 10 feet above the floor, and it is the only one on display that was used for its intended purpose: as a prototype Dynamic Test Vehicle. Built under the direction of Dr. Werner von Braun, it was the first full-scale Saturn V completed by the Marshall Space Flight Center serving as the test vehicle for all of the Saturn support facilities there. Though SA-500D never flew, it was instrumental in the development of the Saturn V rocket, which propelled the first men to the Moon as part of the Apollo program.

Before a Saturn V could launch, engineers needed to verify that their design had accounted for everything the rocket would encounter on its journey, from assembly to the launch pad and from Earth to the Moon. To validate the Saturn V design and procedures, NASA created five pre-flight configurations for testing. These configurations were subjected to tests simulating all aspects of flight preparations and flight itself, and all the tests needed to demonstrate satisfactory results before MSFC would certify the Saturn V to fly. SA-500D was one of the five pre-flight configurations of the Saturn V. This configuration showed the Saturn V's "bending and vibration characteristics" and verified "the adequacy of guidance and control systems' design." The rocket's 7,610,000 pounds-force (33.9 MN) of thrust would generate vigorous shaking and it was important to see that the rocket would not shake apart or vibrate itself off-course.

Other pre-flight configurations were:

- Battleship Test model, used for initial engine firing and design improvements.
- Structural Test model, to certify the structure for loads during launch at the anticipated temperatures, and to assess the stiffness of each stage.
- SA-500F, the facilities checkout model, verify launch facilities, train launch crews, and develop test and checkout procedures.
- SA-500T, All Systems Test model, for static firing of engines in the flight configuration.

The vehicle designated SA-500D did not include an Apollo spacecraft, but boilerplate parts were used during testing to verify the entire system.

The Saturn V consisted of three stages and an Instrument Unit (IU). The first stage, S-IC, delivered 7,610,000 pounds-force (33.9 MN) thrust and delivered the other stages to 200,000 feet (61 km). Afterwards, it was jettisoned to fall into the Atlantic Ocean and the second stage continued acceleration. The second stage, S-II, was responsible for lifting the remaining parts nearly to Earth orbit. The third stage, S-IVB provided the final push to orbit and the trans-lunar injection burn to set the Apollo spacecraft on a course to the Moon. The IU was the guidance and control computer. SA-500D was the assembly of these components for dynamic testing.

The Saturn V Dynamic Test Stand with "electrodynamic shakers" provided a table capable not only of holding the Saturn V fully assembled and fueled, but also able to simulate the vibrations that would be generated by rocket engines. The components used for testing were developed from 1964–66, and the tests conducted in 1966-67. Because the Saturn V shared some components with the Saturn IB, some of the components for SA-500D were initially used for dynamic testing with the Saturn IB stack. In naming the individual stages, MSFC used the stage designation with a suffix indicating its purpose. For example, S-IC-D was the first stage, S-IC, for dynamic testing, and S-IC-1 was the first flight model of the first stage. Suffixes used were S, for structural, F for facilities, T for all-systems test, and D for dynamic testing.

Following (thanks to Wikipedia) is a history of each component of the dynamic test article on display at USSRC in order of appearance.

Apollo boilerplate

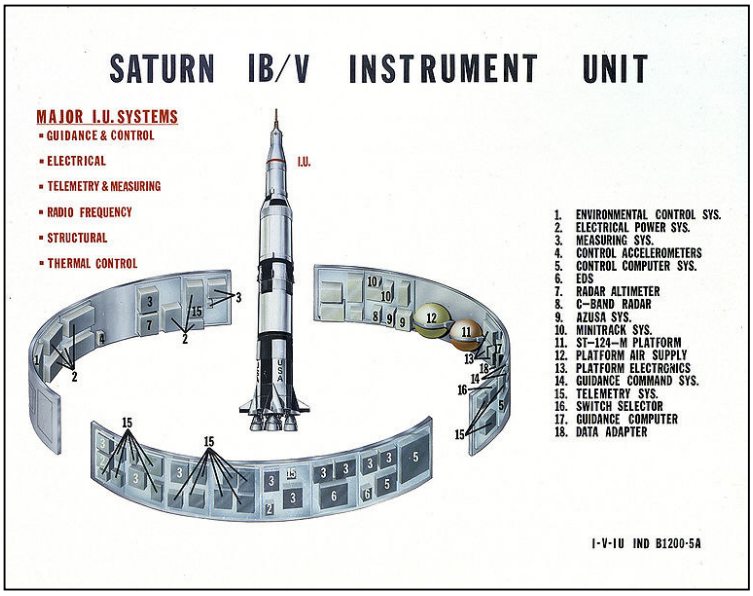
Development of the test article started from the top. A boilerplate Apollo spacecraft, BP-27 together with LTA-2, was used for all configurations of dynamic testing. The boilerplate took the place of actual flight hardware. Boilerplate size, shape, mass and center of gravity were the same, but it was not necessary for the entire Apollo spacecraft to be complete to commence dynamic testing. The boilerplate was outfitted with instrumentation to record data for engineering study and evaluation. BP-27 consisted of hardware specifically built for that configuration and some hardware reassigned from other designations. The Command Module and Launch Escape System were unique to BP-27. The Service Module SM-010 (formerly SM-006) and the Spacecraft Lunar Module Adapters SLA #1 were also assigned to BP-27. BP-27 was accepted at the Marshall Space Flight Center (MSFC) in late September, 1964. Shortly thereafter, MSFC took delivery of the boilerplate Lunar Module, called a Lunar Test Article and designated LTA-2. LTA-2 is the only part of SA-500D to fly in space. It was refurbished, designated LTA-2R, and flew on Apollo 6. BP-27 was used for Saturn IB dynamic testing, shipped to Kennedy Space Center to be a component of SA-500F, and shipped back to MSFC for full-stack testing with SA-500D.

Third stage

The third stage, S-IVB-D arrived at MSFC before any other Saturn V stages because it was destined for dynamic testing in the Saturn IB first. With ceremony and dignitaries for the first Douglas-built S-IVB stage, it set out by barge December 8, 1964, and made its way to New Orleans via the Panama Canal, the Mississippi, Ohio, and Tennessee Rivers to MSFC, where it arrived on January 4, 1965. The same day, MSFC took delivery of the first stage of the Saturn IB for dynamic and facilities checkout testing, S-IB-D/F. The parts were assembled together with the instrument unit designated S-IU-200D/500D and BP-27 for dynamic testing in the Saturn IB configuration from February to September 1965 before it was allocated to the Saturn V configuration.

Instrument Unit

The Saturn V Instrument Unit served as the electronics hub for the first three stages of the rocket, controlling engine firing, guidance, stage separation, and climate for the three stages below. It consisted of two main parts, a rigid ring for structure, and within that, electronics. Instrument units had a slightly different numbering scheme than the other parts. S-IU-200D/500D was for use with the SA-200D dynamic test article - a Saturn IB, and also for use with SA-500D, the Saturn V. IBM won the contract to build electronics for the IU, and so, by 1964, constructed a $14 million four-building complex including a manufacturing facility with clean room in Huntsville. The IU's structural ring had two responsibilities: provide a mounting location for IBM's electronics and hold everything on top of it. It needed to be structurally sound enough to hold the weight of the Lunar Module, Service Module, Command Module and the three astronauts during the acceleration provided by three mighty stages of rocket beneath. The rings were all fabricated at MSFC.



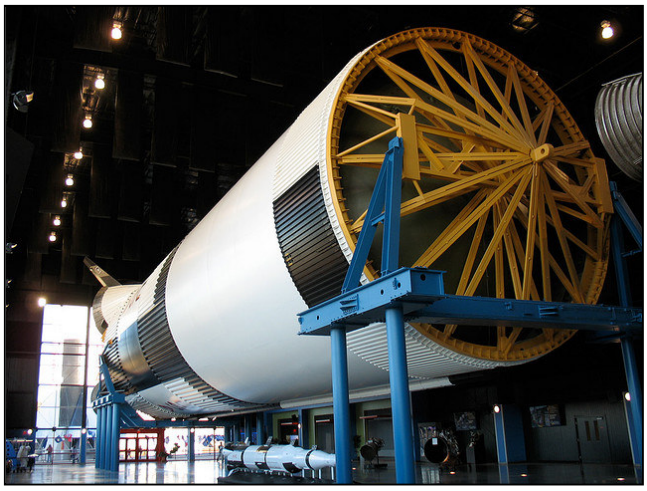
The IU for SA-500D was not the first built. MSFC built S-IU-200V/500V for vibration testing from September to November 1964. Wyle Labs tested it as part of the Saturn I-B program. S-IU-200D/500D was the second IU to be built, with the ring completed in January 1965 and electronic components from IBM installed by February 1. It was the last piece necessary for dynamic testing in the Saturn IB program. It was stacked together with S-IVB-D, S-IB-D, and BP-27 for Saturn IB testing through much of 1965. On October 8, 1965, it began dynamic testing for the Saturn V program as part of SA-500D.

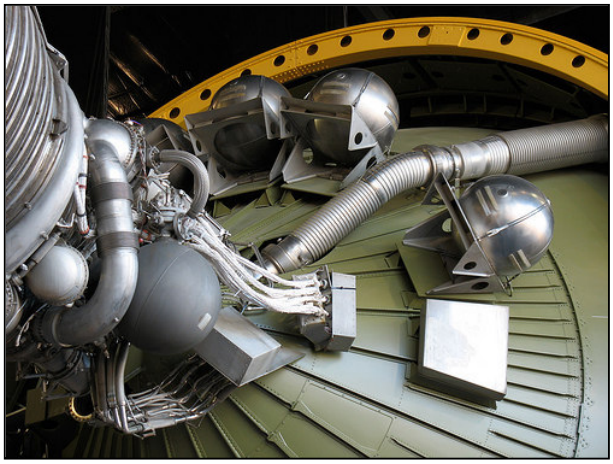
First stage

MSFC built the first three S-IC test first stages for the Saturn V: S-IC-T, the S-IC-S, and the S-IC-F. They also built the first two flight stages, S-IC-1 and S-IC-2. S-IC-D was the first to be built by Boeing at the Michoud Assembly Facility, New Orleans using the tooling that that had been developed in Huntsville. S-IC-D, was under construction on September 9, 1965 when Hurricane Betsy struck the Michoud Assembly Facility. The building housing the stage sustained severe damage, but the stage itself was repaired promptly. S-IC-D set out on the maiden voyage of NASA barge Poseidon to Marshall Space Flight Center on October 6, 1965 and arrived at MSFC October 13. The first stage was lifted into place in the Dynamic Test Stand January 13, 1966 in the picture top right. Said one observer, "Fog and clouds hovered around the top of the 360 foot (110 m) tall test stand most of the day while the 300,000 pounds (140,000 kg) stage was being lifted from its transporter into place inside the stand, said to be the tallest building in Alabama."

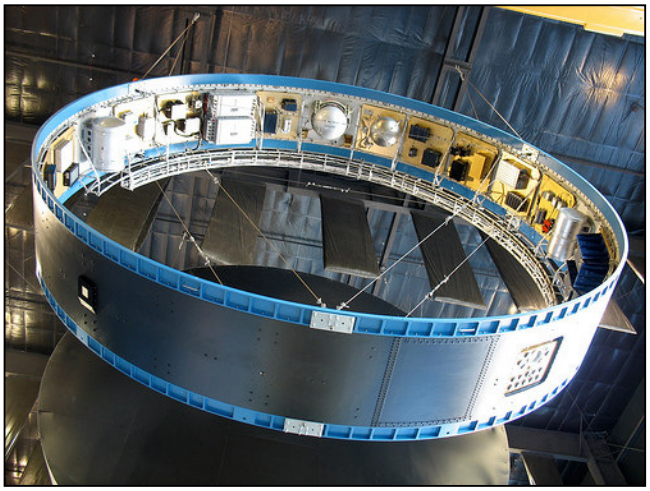
Second stage

The second stage of SA-500D had a complex history. The second stage, S-II-D had been on order, but that part was cancelled February 19, 1965. The plan was to use another test article for dynamic testing as well as its other purpose. Two such test articles were destroyed during testing after having been designated for the dynamic test phase. The actual article used in SA-500D was named in the third re-allocation, when S-II-F, the facilities checkout article, was designated S-II-F/D. S-II-S, which North American Aviation's Space and Information Systems Division (S&ID) at Seal Beach had completed by January 31, was re-designated as S-II-S/D to be used for dynamic testing. S-II-S/D would not survive its final structural test on September 29, 1965, but the test was exercising considerable margin above the structural integrity required for flight.





In January 1966, the all-systems test S-II-T was re-designated S-II-T/D, so that it might be used for dynamic testing as well as engine firing. S-II-T/D completed integrated checkout of ground support facilities at MTF on February 3, 1966. S-II-T/D's engines were fired five times at MTF from April to May, including a full-duration test. On May 28, 1966, S-II-T/D was undergoing a pressure test to find a hydrogen leak, but the hydrogen pressure sensors and switches had been disconnected unbeknownst to the second-shift crew when they tried to pressurize the tank. Five technicians sustained minor injuries. MSFC convened an investigation that night, and the team completed the report in two days.



After the S-II-T/D destruction, a third article was assigned to dynamic test duties. Facilities checkout article S-II-F became the dynamic test article designated S-II-F/D. S-II-F was shipped from S&ID, Seal Beach, California on February 20, 1966, to Kennedy Space Center where it arrived March 4. It filled in the final part of SA-500F to check out facilities for processing the Saturn V, replacing a dumbbell-shaped temporary stage of the same length and weight as an S-II stage. SA-500F was assembled in the Vehicle Assembly Building where it was mated to S-IC-F on March 28 and S-IVB-F the next day.

SA-500F was completed in the VAB, tested for stability against swaying in the wind, and rolled out to the launch pad May 25, 1966, on Mobile Launcher 1.

Hurricane Alma interrupted exercises as SA-500F was rolled back to the VAB on June 8, though the ground crew supposed the rollback was more of an exercise than necessity because winds remained below critical for the entire storm. It was returned to pad 39-A two days later and finally returned to the VAB October 14, 1966 for disassembly. After facilities checkout at KSC was completed, the remaining components of SA-500F were then transferred to MSFC for inclusion in SA-500D: the Apollo boilerplate BP-27 and S-II-F/D. The second stage was modified for dynamic testing, and shipped by Posideon from KSC on October 29 to arrive at MSFC November 10, 1966.

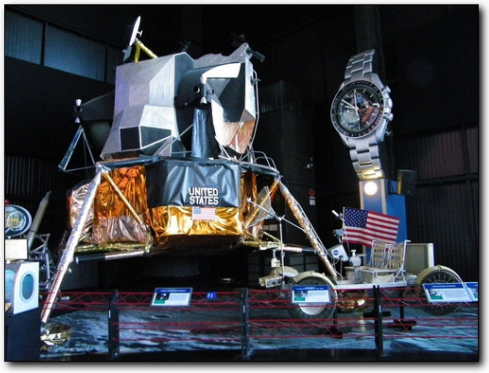
On Display

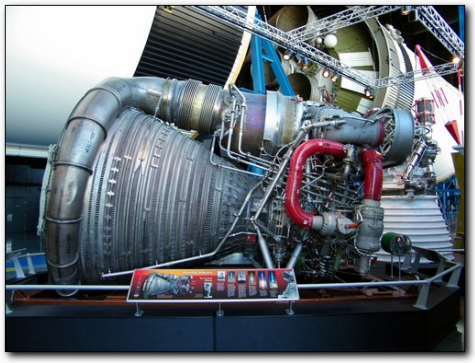
After all tests were complete, the SA-500D was assembled again in Huntsville, this time for public exhibition at the Alabama Space Science Center, on land carved out of the north edge of Marshall Space Flight Center. Transport of the rocket, along with the Saturn I, which would be erected vertically, to the museum, took place June 28, 1969. The rocket would be displayed lying down on the southern edge of a rocket park with its predecessor rockets, near a Saturn 1 standing erect and a moonscape complete with model Lunar Module and a flag. SA-500D was installed in 1969, and the (renamed) Alabama Space and Rocket Center opened in 1970 showcasing articles that could otherwise only be seen by NASA and Army workers at Redstone Arsenal. The first stage sat on a low-boy trailer and the others in cradles. The instrument unit was put on display inside the museum, and connector rings were given roofs and converted to educational rides for the museum. SA-500D was added to the List of Historic Mechanical Engineering Landmarks by the American Society of Mechanical Engineers in 1980 and declared a National Historic Landmark by the National Park Service in 1987.

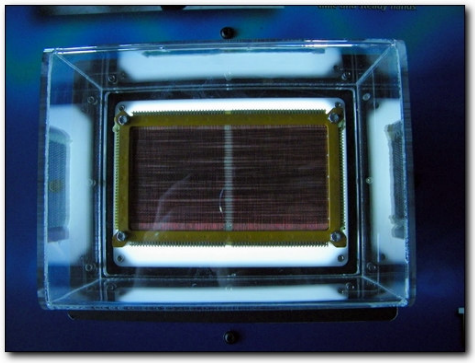
And there it sat out in the Rocket Park for years, deteriorating. After decades of the vehicle resting unprotected outdoors, the U.S. Space & Rocket Center commissioned the restoration of the vehicle in 2005. Various materials comprising the vehicle, including metal alloys and non-metal materials, such as polyurethane foam and fiberglass, exhibited significant deterioration. After conducting the analysis, full restoration of the Saturn V vehicle began in June 2005. Restoration culminated in July 2007 when the Saturn V was moved - taking place from July 10 to approximately the 17th, starting with the first stage – into the Davidson Center for Space Exploration, which opened on January 31, 2008.

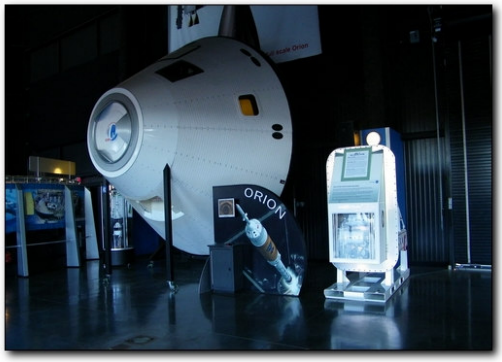
This display consists of S-IC-D, S-II-F/D, and S-IVB-D, S-IU-200D/500D, CSM-010, an SLA, and BP-23A. BP-23 was used for A-002, refurbished, designated BP-23A, and used for Launch Pad Abort Test 2. BP-27, the dynamic test boilerplate article, is on display at the U.S. Space and Rocket Center atop the vertical Saturn I. Other Apollo and Saturn artifacts on display include the Apollo 16 Command Module (with parachute open), the Apollo 12 Mobile Quarantine Facility (which was thought to have been lost in a fire years ago but recently discovered in someone’s backyard), a Lunar Lander with a test article landing stage (MSFC 76545), a White Room and Service Structure (that astronauts walked across to board their capsule), a replica ascent stage, and another Instrument Unit.

The Saturn V exhibit area also features additional exhibit space surrounding the rocket where you'll find various artifacts from a V2 Rocket and Gemini training capsule to the guts of the Saturn V's computers and a full mock-up of Orion, the next generation of US space craft.









100 YEARS, DR. WERNER VON BRAUN ///

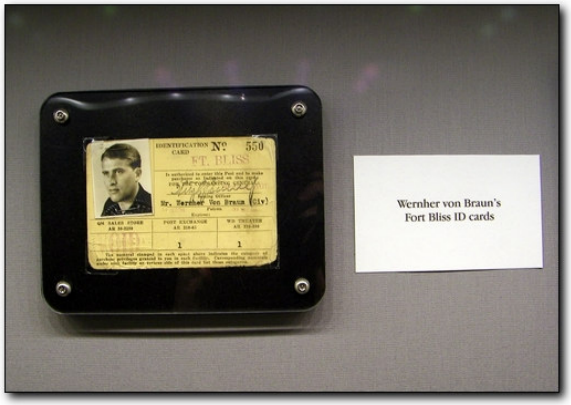
100 YEARS OF
VON BRAUN
His American Journey

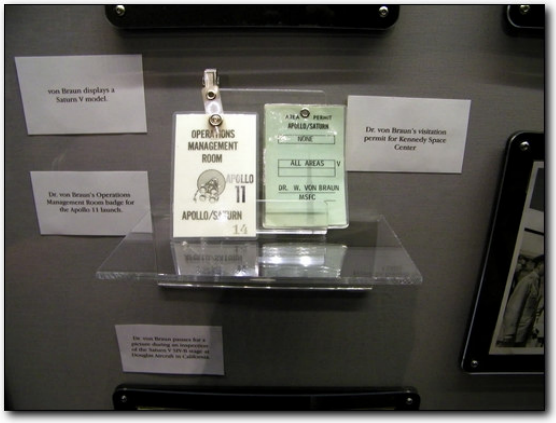
Most people who've gotten into the space race know about von Braun as a rocket scientist and historical figure, but they know little about his personal life. An exhibit created by the U.S. Space & Rocket Center in-house aimed to change all that. "100 Years of Von Braun: His American Journey," is a history lesson on Dr. Werner von Braun's pioneering role in the U.S. space program, but artifacts also show a more personal side of him, as a family man, musician and pilot. What the US Space & Rocket Center has managed to pull together is a picture of him as a whole person, not just a scientist, and it's one of the most well-rounded and informative exhibits about the man ever seen.

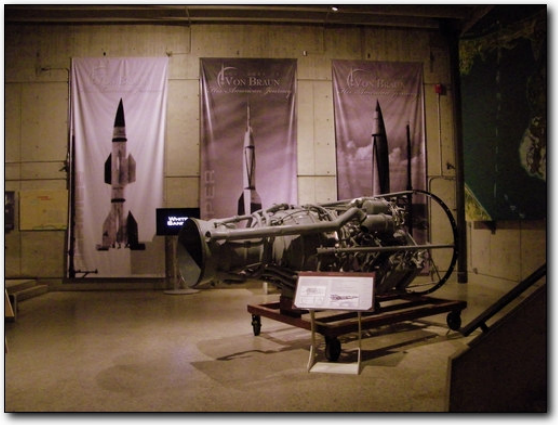
The first stop in the exhibition that traces 30 years of von Braun's life in America - from the surrender to U.S. forces near the end of World War II to his death in 1977 - is a wall covered with tidbits about von Braun himself: milestones in his life, a list of his publications, a map of Huntsville locations named for him and even a "Rocketpedia" entry on von Braun, coupled with a bicycle on display believed to be the same one ridden by von Braun's younger brother, Magnus, as he searched for American troops to arrange the German rocket team's surrender.

There are large impressive features -- a life-size photograph of about 100 members of "Operation Paperclip," the effort to bring more than 100 German scientists, engineers and technicians to the United States; and V-2 and Redstone rocket engines.

Display cases are full of smaller artifacts like von Braun's personal flight log and his ID cards while at Fort Bliss, Texas, where the German team first arrived in the U.S. before moving on to Huntsville in 1950. There's a calendar from 1969, opened to July - each day crossed out with a red pencil and ruler after the day had concluded. And one of his journals, open to a sketch of a manned rocket ship he made when he was 15 years old.







There are artifacts from his career including a shovel from the dedication ceremony on Sept. 8, 1960 at Marshall Space Flight Center, where von Braun was the first director, his entire office with his Hugo award, his daily to-do list, models of Saturn I's and V's, photos and his moon globe, amongst other items of interest.

The more personal effects include a wedding photograph of von Braun and his wife, Maria, taken in 1947, some trophies from his hunting trips and copies of musical compositions created by von Braun, who played the piano and cello. A living room is set up with von Braun's recliner and other furniture that came from a couple of the family's homes in Huntsville. The room also features family photographs and a bassinet used for the von Braun children.

Scattered throughout the exhibition are multimedia displays with von Braun's speeches and interviews.

"My friends, there was dancing here in the streets of Huntsville when our first satellite orbited the Earth. There was dancing again when the first Americans landed on the Moon. I'd like to ask you, don't hang up your dancing slippers." – Werner von Braun.

* * *

By Noon we hopped a bus over to the Aviation Challenge lake where the final 30th Anniversary event took place: a goodbye BBQ lunch under the canopy. And not long after it was time to return to reality...

epilogue

"THE END?"

Space Camp and Space Academy have been very important to me, no matter how much time has passed since I went through the experience. Seeing this all end again was a bittersweet moment. For me, my journey began as far back as the third grade. During that pivotal year, I introduced myself to a little known subject to me: Science. I quickly became so enthralled I tried to learn all I could. Through all the various aspects of Science, I took one genre in particular: Astronomy. Over the course of my youth I did all I could to prepare myself for the day that I would achieve my goal - to become an astronaut. While that lifelong goal has changed, the dream has not.

The Space Camp experience has produced a lot of memories, memories that I cherish above all others. Through this work I hope you gain an understanding and appreciation of childhood dreams and how they come to be realized. I know it is not for all, and many cannot afford it, but if you get your chance to send your son, daughter, or even go yourself - please do not hesitate. The experience will more than make up the cost of tuition! And think of the memories you'll cherish for the rest of your life.

For current information on any of the Space Camp programs - Space Camp, Space Academy, Advanced Space Academy, Aviation Challenge, or the many Adult and Educators programs they now have, all 1-800-63-SPACE (1-800-637-7223), visit them online at <http://www.spacecamp.com/>, or write them at:

U.S. SPACE CAMP
Reservations
P.O. Box 070015
Huntsville, AL 35807-7015

I hope you've enjoyed this trip into my experiences of Space Camp, Space Academy and beyond. This saga is a never-ending one, as I am sure to have further adventures in Huntsville... some day. You never know where the world will take you... perhaps to the stars! Never give up a dream!

Richard Russo

Milestones

1970: Space and Rocket Center Built (March 17, 1970)

1971: Monkeynaut Baker becomes resident until her death in 1984

1972: Bus tours of NASA's Marshall Space Flight Center begin

1975: Space Center opens "Moon Walkers" exhibit

1977: Saturn V rocket nominated to be a historical landmark
Dr. Werner von Braun first shares his dream of Space Camp

1980: Redstone Arsenal donates property for expansion

1982: Space Camp is created (June 15, 1982)
SpaceDome Theater opens

1984: Space Academy, Level I Program Began (June 1984)

1985: My First Trip to Space Center (June 27, 1985)
Adult Space Academy Program Began (September 1985)
SpaceCamp: The Movie filmed on Location (September 1985)

1986: SpaceCamp the Movie Released to Theaters (June 6, 1986)
SpaceCamp Released to Home Video (November 12, 1986)
Space Center Marriott opens

1987: Space Academy, Level II began (July 1987)
Space Academy Teachers program began (July 1987)
New Training Center & UAT opened (August 1987)

1988: Second Trip to Space Center (June 6-7, 1988)
Space Camp For Hearing Impared Piloted (May 1988)
Space Camp Florida Created [Titusville] (April 1988)
Space Habitat Complex Opened (August 1988)
Skylab exhibit opens, featuring Skylab astronauts

1989: Third Trip to Space Center (June 10-17, 1989)
Space Camp attended (June 11-16, 1989)
Pathfinder Shuttle stack completed
Apollo 11 20th Anniversary celebrated (July 1989)

1990: Astronaut Hall of Fame Opened (March 1990)
Space Camp Japan Opened (April 1990)
Aviation Challenge program began (June 1990)
First International Space Camp held (August 1990)

1991: Fourth Trip to Space Center (June 16-22, 1991)
Space Academy, Level I attended (June 16-21, 1991)
10th Anniversary of Space Camp
"Red Star In Orbit" special exhibit
100,000th Trainee graduates in April 1991
Euro Space Camp opened - Redu, Belgium
Parent/Child Space Camp opened
SR-71/A-12 Blackbird becomes permanent exhibit

1992: A Patriot Missile is donated by Redstone Arsenal

1993: "Journey to Jupiter" opens

1994: "Apollo 13" movie actors train at SpaceCamp (June 1994)
Space Camp Canada opens (July 1994)
"Man & the Moon" exhibit opens for Apollo 11 25th Anniversary
New Aviation Challenge "Ed Buckbee" dormitory dedicated

1995: Fifth trip to Space Center (June 16, 1995)
25th Anniversary of Space Center
10th Anniversary of the first USSRC Visit
US Army opens first missile command information center in lobby
USSRC hosts Olympic Torch
"Outpost in Space: ISS" stage show opens

1996: 10th Anniversary of SpaceCamp the Movie
Space Camp California Created - Mountain View.
"Space Shot" opens
USSRC is site for Star Trek 30th Anniversary celebration

1997: Aviation Challenge in California Opened (June 1997)
Mars Virtual Reality Lab opens for Advanced Space Academy

1998: Mars Mission simulator, Kids' Cosmos, meteorite exhibit opens

1999: 10th Anniversary of my first Space Camp experience.
USSRC records 10 millionth visitor
Celebration held for Apollo 11 30th Anniversary

2000: Space Camp Turkey Opened (June 2000)
USSRC celebrates 30th Anniversary

2001: 10th Anniversary of my Space Academy, Level I experience.
Bus Tours of Marshall Space Flight Center halt following 9/11

2002: 20th Anniversary of the Space Camp's Creation!
Special Alumni Event in Huntsville (May 25, 2002)
Phase One of 3-phase major renovation project begins
Space Dome upgraded to show full-length IMAX films
Space Camp Florida Closed
Space Camp California Closed (January 6, 2002)

2003: Sixth trip to Space Center (September 2003)
Adult Space Academy Attended (September 26-28, 2003)

2004: USSRC hosts first Apollo/Saturn Reunion.
Construction begins on Educator/Training Facility (ETF)
1,500 sq ft addition built onto Spacedome lobby

2005: Seventh Trip to Space Center (July 9, 2005)
Dottie Metcalf-Lindenburger, a teacher, becomes first Space Camp graduate named to NASA Astronaut Corps.
Educator/Training Facility opens.
Refurbishing of Saturn V rocket begins

2006: Groundbreaking for new Saturn V Visitors Center

2007: 25th Anniversary of Space Camp's Creation!
Special Alumni Camp - Attended (June 14-17, 2007)
Space Camp welcomes its 500,000th trainee
William Shatner emcees first Space Camp Hall of Fame Induction

2008: Davidson Center for Space Exploration opens

2011: Old Space Camp Florida Habitat demolished (January 5, 2011)

2012: 30th Anniversary of Space Camp's Creation!
"Smile as Big as the Moon" movie airs on ABC/Hallmark
Eighth Trip to Space Center (February 25, 2012)
30th Anniversary Celebration (June 14-16, 2012)

bibliography

A number of sources were used in the creation of this work. Mainly, of course, was my own brainpower and memories. I did have help in other ways as well - the use of a wide variety of sources. So, not to infringe on any copyrighted material I may have used or quoted throughout *Space Camp Memories*, I list my sources below:

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THE END...?

(Only time will tell...)