Horizons

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NASA Celebrates its 50th Year

Vanguard 1
Launched March 17, 1958
The fourth artificial satellite and the oldest human-made artifact still in space

AIAA HOUSTON

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Fall 2008

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Cover: Vanguard 1 liftoff, March 17, 1958 (NASA photo).

The Old and the New

From the Editor

STEVEN EVERETT, HORIZONS EDITOR

I hope everyone has had some success in recovering from the effects of Hurricane Ike. The widespread devastation and drain on local resources undoubtedly affected every person in the area in some way. Among the effects which were particular to the aerospace community, the Ballunar Liftoff was cancelled, and extensive damage was done to the Lone Star Flight Museum. Publication of this issue of Horizons, which was to be online in September, was itself delayed by nearly a month. However, we will be back to a quarterly release of Horizons now that its contributors are beginning to resume their normal lives.

Just as many other magazine features and celebrations have done this year, in this issue of Horizons we chose to highlight some of the events of the 50 years since NASA's inception in our feature article. Norm Chaffee also shared the unique perspective on NASA's history he has gained over his four-decade career at JSC.

During this, the 50th year of NASA's existence, it seems appropriate to reflect on the old and the new. Award-winning editor Jon Berndt and acting editor for the last three issues, Douglas Yazell, have moved on to other things, but they remain as assistant editors. I am a relatively new member of the Houston AIAA chapter who has worked in Shuttle Entry flight control for the past few years, and I am looking forward to serving our local chapter as Horizons editor for at least the next few issues. I am also fortunate to have the assistance of Sean Keefe and Robert Beremand. Despite the new editorial staff, however, you won't see any significant changes to the format, the professional appearance of which has undoubtedly contributed to the Communications Award our chapter newsletter has received the past three years.

Our profession is seeing the old and new most obviously in the Constellation architecture being developed to support the new Vision for Space Exploration. Capsules reminiscent of the 1960's Apollo era vehicles promise to take mankind back to the place they took us almost 40 years ago. But this time, they will be brimming with the newest technology, and will take crews of four or more to the lunar pole for weeks rather than days. Meanwhile, rumblings about a possible extension of the Space Shuttle program beyond the established deadline of 2010 continue.

One of the most poignant juxtapositions of the old and new I've seen recently was on a visit I made to Kennedy Space Center this past Spring. I had the once-in-a-lifetime opportunity to take some close-up tours of the Vehicle Assembly Building, launch pads, Mobile Launch Platforms, Orbiter Processing Facility, Space Station Processing Facility, and Launch Control Center. Most impressive to me was the logistical miracle of each launch considering the incredible amount of hardware that must coalesce perfectly before every mission. As a part of this series of tours, our group visited pad 34, the site of the Apollo 1 fire. From there, we could see pad 37 where a Delta 4-H, adorned with a United Launch Alliance logo, was being prepared for launch. It was somewhat dismaying to see this historic site marked by little more than a kiosk, plaque and engraved benches, and to read the words "Abandon in Place" stenciled on the concrete pillars and flame diverters. This site stood among a string of abandoned launch pads along the Cape Canaveral coastline, generated as each new system outgrew its current facilities during the 1960's and 70's. Only time will tell if pads 39A and B will also stand empty someday, or if the modifications in process will finally result in a new gateway back to the moon, and eventually Mars and beyond.

Below: ULA Delta 4-H launch vehicle on pad 37, as seen from pad 34, site of the Apollo 1 fire. (photo by the editor)

Lecture Summary

X-Prize at JSC

MICHAEL FROSTAD

Be sure to check out the review of this talk in Justin Kugler's blog at the Houston Chronicle website also. Go to http://blogs.chron.com/sciguy/ then look for COSMO.SPHERE on the right. You can find his discussion in the August archives.

After a long day of work and meetings a good cross section of the JSC population made their way to Building 30's Auditorium here at NASA JSC. The reason? X Prize Foundation Chairman and Founder, Dr. Peter Diamandis was in town and the Advanced Planning Office asked him to give a talk about his inspiring ventures.

Dr. Diamandis is involved with many exciting space ventures and he probably has even more exciting plans for the future. Some of his best known ventures are the X Prize Foundation, Space Adventures, Zero-G Corp., and now the RRL (Rocket Racing League).

If you are unfamiliar with his ventures, The X-Prize foundation and its $10 million Ansari X PRIZE for private spaceflight led to Space Ship One's flight, a first for pure commercial interests. Space Adventures has allowed multiple people to stay in space, the most famous being Dennis Tito, the first commercial space traveler, and Anousheh Ansari, the first female space traveler and the person who funded the $10 million X prize. The Zero-G corporation is a commercial parabolic flight service where people experience 15 parabolas of microgravity on a Boeing 727-200. They fly out of KSC, Las Vegas, and now JSC (Ellington Field)! Finally, the Rocket Racing League, the newest venture using NASA developed technology, is just getting started and will combine the excitement of NASCAR and flying to give the public a whole new experience while driving technology development.

So what advice did Dr. Diamandis have for those seeking it?

- Never give up. Determination and persistence, even in the face of failure, can get big results. An idea is crazy one day, and a breakthrough the next.
- Looking at recent history who were those that were making things happen? The internet and .com explosion? People in their 20's. The manned program of the 60's? People in their 20's. Make sure you are giving them the chances and responsibilities where they can excel and use their creative energy. All generations can learn from each other.
- Did you know Lindbergh flew across the Atlantic for a $25,000 prize? New prizes and different contracting set ups may drive future feats. (Dr. Diamandis is now focused on building the X Prize Foundation into a world-class prize institute whose mission is to bring about radical breakthroughs for the benefit of humanity. The X Prize is now developing in fields such as Genomics, Automotives, Education, Medicine, Energy, and Social arenas.)
- For NASA, things like the COTS program are essential to building commercial capability from which NASA can then expand.

In summary, Dr. Diamandis gave an insightful and inspiring speech. He showed activities that he has undertaken to push commercial space and technology development, as well as giving those who attended some things to think about, always key to a good presentation.

Below: Dr. Peter Diamandis (holding sword) with Arthur M. Dula (left), Kristen Diamandis, and astronaut Buzz Aldrin upon receipt of the half million dollar Heinlein Prize for Space Commercialism on July 7, 2006. (photo by AIAA Houston section member Jim McLane III)

The Colder Side of Global Warming

SEAN KEEFE, ASSISTANT EDITOR, HORIZONS

Lecture Summary

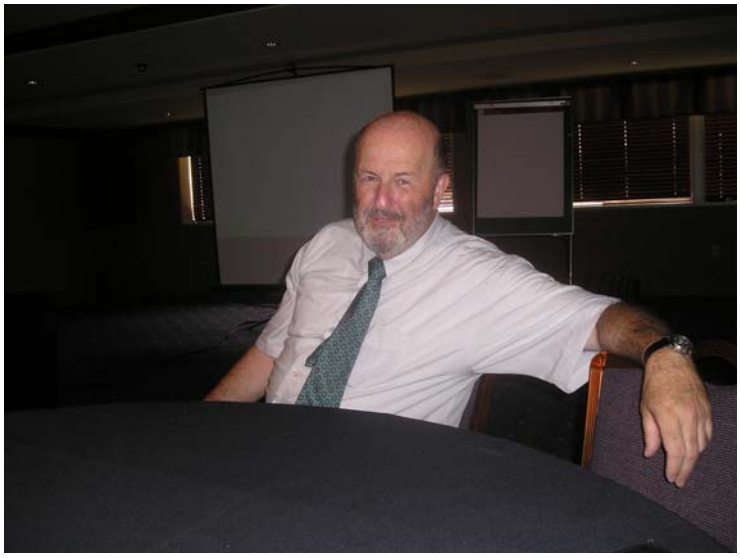
On July 22, 2008, the JSC Chapter of the NASA Alumni League and the AIAA Houston Section co-hosted a talk on Global Climate Change at the Gilruth Center. Keynote speaker Tom Wysmuller presented *The Colder Side of Global Warming* to a packed room of about 70 people from the JSC aerospace community.

Wysmuller studied meteorology, sociology, and political science at NYU and worked as a meteorologist in the Netherlands. During the Apollo era, he worked as a NASA intern at Ames and Goddard. He also wrote the code used in TI calculators that solves the polynomial regression algorithm. Currently, Wysmuller is President of the NYU Alumni Association and speaks regularly to various educational, community, and science organizations around the country on global warming.

Wysmuller proceeded quickly through his presentation, showing many phenomena, including polar-centered maps of Earth, seasonal temperature gradient images of Earth, Pangea recreations (which he rotated 90 degrees to illustrate how he viewed the actual position of land masses away from the Earth's poles), videos of Jupiter's perpetual storms, and diagrams of Earth's latitudinal wind belts. He also showed photos related to basic meteorological concepts, including heat transfer, evaporation, condensation, and the influence of wind on Earth's temperature.

Wysmuller explained that the Earth's rotation can speed up or slow down depending on a number of factors, and said that our planet spins faster with ice at the poles.

Wysmuller discussed the albedo effect of glaciers and glacial movement and showed an extruded topo map of Long Island's great outwash plain—an erosion plain created from glacial melt and debris deposits. He discussed deep ice cores that have been taken in Arctic regions and the gases contained within those core samples that indicate climate change variations and atmospheric CO_2 at various times in the past millennia. Wysmuller focused on graphs of data indicating global climate change trends during the past glacial epochs. He discussed the effect of atmospheric dust on temperature, the city heat islands phenomenon, the open water and thinning sea ice found in the North Pole, submarine ice soundings, and the decreasing extent of Arctic sea ice. He highlighted the short-term (400-year) cooling period of the Middle Ages, a period when Chinese astronomers also recorded no sunspot activ-



Above: The speaker relaxing before the presentation
Below: An attentive audience

Above: The speaker shows a polar view of Earth
Below: After the talk, more questions

ity, indicating that the lower solar input contributed to this temporary temperature drop.

The latter part of Wysmuller's talk centered on his theory that, when the Arctic ice caps melt, heavy "lake effect" or "ocean effect" snows will result when Arctic winds pick up water vapor from open Arctic waters and deposit them on the leeward shores—the colder side of global warming. He showed slides illustrating the annual recession and progression of glaciers, the Grinnell Ice Cap Retreat, summer vs. winter in Hudson Bay, and Norwegian pack ice flows. He discussed the Soviet-era Vostok (Antarctica) ice core drill data covering four 100,000-year glacial periods. The Vostok ice core data indicates that Earth has experienced warming periods of roughly 15-20,000 years in between those long 100,000-year glacial periods. Wysmuller explained that we are at the end one of those warming periods. There are also some mini-cooling periods or "little ice ages" interrupting those warming periods, for example, the 400-year cooling period during medieval times.

Wysmuller's noted that long-term temperature trends from the Vostok ice core samples indicate that an increase of CO_2 is a "lagging indicator" of temperature rise. He pointed out that Earth's temperature has steadily increased by an average of one degree per 1000 years in the last 18,000 years, but Earth's temperature has increased by two degrees in just the last 200 years. This "sudden" increase, Wysmuller said, is due to an anthropogenic effect—an increase of greenhouse gases from human industry. He theorized that, although Earth's climate is warming up now, the next ice age will get here faster than it normally would due to this sudden warming. He cautioned that the northern latitudes will experience severe snowstorms or "lake effect snow" due to Arctic sea ice melting from global warming and decreasing albedo. He stated that no sea level rise will be caused by polar ice melting because polar ice is already being displaced like an ice cube in a water glass. (He did not dispute the sea level rise from melting, land-based glaciers.

The nature and consequences of global climate change are the subject of great debate in academia and the media. Like many discussions of global warming change, Wysmuller's presentation seemed to raise more questions than it answered. Ultimately, the presentation gave the JSC aerospace community an opportunity to explore and discuss the many forces at work behind global climate change.

Congressman Lampson Town Hall Meeting July 21, 2008

Town Hall Meeting Report

ALAN SIMON

In conjunction with NASA's 50th Anniversary, Congressman Nick Lampson (22nd Congressional District of Texas) hosted a panel discussion to highlight NASA's accomplishments over the past 50 years, and to answer questions from local citizens as the space exploration industry looks forward to NASA's next 50 years. Members of the panel included President of the University of Houston at Clear Lake (UHCL), Dr. William Staples; Harris County Commissioner for Precinct 2, Ms. Sylvia Garcia; NASA Deputy Associate Administrator for Strategic Partnerships, Mr. N. Wayne Hale; and Barrios Technology President, Ms. Sandy Johnson. Additionally, Florida Senator Bill Nelson, Chairman of the Senate Commerce Subcommittee on Technology and Space (and former shuttle payload specialist), addressed meeting participants via recorded video.

Congressman Lampson was very upbeat about the influence of NASA-JSC in the local community, and the impacts that NASA innovations have made over the past 50 years. He expressed his personal appreciation and respect for the NASA and contractor community for the work that continues to be done, and he said that the current NASA Administrator, Mike Griffin, shares this same appreciation immensely. He told the assembly that Mr. Griffin was very clear in saying that, although skill set changes are expected, he anticipates no net job losses here at JSC following the transition and retirement of the Shuttle Program.

Lampson indicated his frustration, though, with the responsiveness of the federal government, and stated that NASA was hugely underfunded. He explained that he was working with other members of Congress very proactively to convince them of the need to authorize additional budget and resources in order to accomplish the NASA charter. Congressman Lampson contrasted the ten-to-one funding ratio between the Apollo era of NASA versus today, which limits the achievements that NASA can realize. He commented on the value of manned space flight in particular, and stated that human space flight holds achievements that cannot be accomplished with robotics missions.

For the STS-123 mission this past March, Lampson was able to fly about two-dozen congressmen to see this night launch, returning them back to

Above and Below: Congressman Lampson in joined in a panel discussion with Dr. William Staples, Ms. Sylvia Garica, Mr. N. Wayne Hale, and Ms. Sandy Johnson (photos from Mr. Lampson's office)

Washington without missing any congressional activities. That goodwill helped secure signatures from 29 congressmen who petitioned the House leadership to consider increasing the FY2009 NASA budget by $2.6 billion. And, in fact, a $20.2 billion budget was passed for next year. The additional budget would be used to close the gap between the Shuttle and Constellation programs, and minimize dependence on Russia for access to space. Additionally, Lampson confirmed the authorization of two contingency shuttle flights, though these must still be funded.

Congressman Lampson also specifically mentioned the Space Alliance Technology Outreach Program (SATOP), and the significant return on investment of tax dollars allocated to SATOP. He anticipates that federal funding for SATOP projects will be on hold until the next presidential administration has settled into office and NASA funding can get out from under another continuing resolution. Lampson said that the success of this program has been the result of community assistance, and the support of the Bay Area Houston Economic Partnership (BAHEP). In fact, Mr. Bob Mitchell, BAHEP president, recently testified before a congressional subcommittee on the positive impacts of SATOP.

Dr. Staples spoke briefly about UHCL's 40-year history relative to NASA and the Johnson Space Center. He also touched on the alliances that exist among the University, JSC, and the contractor community.

Commissioner Sylvia Garcia also was very inspired by NASA's history. She said that, because of her elected position, her participation in her community, and her family, she personalizes JSC and the Bay Area. She commented that she is often incensed by Houston Chronicle articles that paint NASA or JSC in a negative light. She appealed to the audience members to take advantage of every opportunity to reach out to those in the community who may not be aware of the Space Program achievements, and to counter negative criticism with NASA successes.

Wayne Hale delivered his thoughts and insight to the assembly just as anticipated—very articulately and inspiringly. "What does it mean to us today to be at this current place in the history of the world and universe?" was his initial question. Prior to the inception of NASA, no one in the history of the world knew what the far side of the moon looked like; no one knew whether great civilizations may have once lived on Mars; and no one knew what the environment of Venus was really like. But within the past 50 years, because of the work of NASA, anyone born today has the answers about the far side of the moon, Mars, and Venus. Because of NASA accomplishments, there are four spacecraft traveling within interstellar space. And today, the knowledge of the human cardiovascular system has been greatly expanded because of experiments performed on the ISS.

Mr. Hale spoke about the inspiration of technical learning that NASA has provided. He maintained that the creativ-

Below: Audience member and AIAA Houston Section International Space Activities Committee (ISAC) member George Abbey, Jr. greets Congressman Lampson (photo from Mr. Lampson's office)

ity and innovation of the space program directly yielded US leadership in space exploration. Hale opined that the Hubble Space Telescope has become the most productive instrument of all time, and that the James Webb telescope would prove to be even more astonishing. Mr. Hale made a solid case that a successful space program can lead to a sound physical environment on earth, help to shore the US financial system, promote better primary and secondary education, and even improve homeland security (through teaming with other countries in space exploration).

Ms. Johnson spoke of the opportunities that NASA has provided for small and disadvantaged local businesses, many of which have had women and minority owners. She spoke of her personal experiences in this area, detailing her successes in building Barrios Technologies from just a few employees, to now over 500; and developing a company infrastructure that provides high quality, cost-effective services to its NASA customer. Her company has earned the George M. Lowe Award twice in recent years, and Ms. Johnson currently serves on the BAHEP board.

Several questions from the audience focused on NASA's role in studying climate change on earth. Mr. Hale emphasized the need to study changes in the sun in addition to studying the earth. He also explained that to understand climate change, scientists need to explore more than a single model. To fully understand cause and effect of complex weather systems, an investigation is needed of other planets, and the influence of their respective suns.

The panel was also asked about the potential for space-based solar power satellites that could collect energy and send the power via microwave to earth. Several panel participants commented that the cost and level of maturity of that technology precludes its short-term or even long-term feasibility. However, Mr. Hale suggested that mining Helium-3 from lunar regolith could prove promising for nuclear fusion power generation, and without producing any radioactive waste materials. Mr. Hale talked briefly about the research facility that the country of Costa Rica built for Dr. Franklin Chang-Diaz. Costa Rica is now working very diligently towards advancing propulsion technology.

All of the panelists agreed that industry partnerships with NASA are frequently limited because of the process of authorizing budgets on an annual basis. Short-term government funding hurts these partnerships that most often require greater than one year commitments.

Several from the audience were clearly frustrated with NASA's inability to popularize its successes, and achievements, and spin-offs. The panel members cited a variety of sources that provide information on NASA developed new technologies. But, most readers will agree that this is an area that NASA has much room for improvement.

Another comment to the panel was that NASA has always provided a sense of hope to the country, and to the world. But decreasing emphasis on NASA and its annual budgets is reason for concern. Congressman Lampson agreed, but said that those colleagues he was able to take to the STS-123 launch now continue to talk up the awe of NASA. Lampson went on to present an interesting perspective that, if the US would choose to play catch-up with the Chinese in space exploration, for instance, that decision could cost taxpayers much more money in the long run. He sees a substantial cost avoidance by maintaining US leadership in space. Lampson also assured the assembly that he was working very closely with members of both presidential campaigns on the importance of NASA.

Finally, the panel members and several members of the audience commented that NASA Public Relations has tools that can be provided to reach out to schools, communities, organizations, etc. A public sponsored site, ThanksToNasa.blogspot.com, allows for commentary and public opinion for anyone wanting to participate.

International Space Activities

Two photos at La Cite de l'Espace, both showing the Mir space station

Top: Philippe Mairet, Michel Bonavitacola, Douglas Yazell, and Laurent Mangane and Mir

Bottom: Beatrice Cartier-Yazell replacing Douglas, and a better view of space station Mir

Sister Section Visit to Toulouse, France

DOUGLAS YAZELL, PAST CHAIR

Thanks to a royal welcome from our sister section members in France, my wife Beatrice and I had an unforgettable visit in Toulouse June 24-28 for four days and five nights. Our hosts were members and leaders in l'Association Aeronautique et Astronautique de France, Toulouse - Midi-Pyrenees.

Thanks to our hosts, we found a hotel in the downtown area, or centre ville, called the Ours Blanc, the White Bear, at Place Victor Hugo. A nice enclosed farmers market, so to speak, was across the street, with a long outdoor covered patio.

We began our visit on Wednesday, June 25, with my visit to the AAAF TMP office, which is in an aerospace university, SUPAERO. Obviously, this gave me the idea of renting an office in the Houston Clear Lake area for AIAA Houston Section. I worked with the AAAF TMP secretary Joelle Stella (a paid employee) and AAAF member Philippe Mairet as I was welcomed to this meeting by the AAAF TMP President, Alain Chevalier. Later Mr. Chevalier and I met with AAAF member Mr. Jean-Jacques Runavot to plan a conference in Toulouse in 2010 or 2011, to be followed two years later by a conference in Houston.

Lunch was provided courtesy of Thales and our host Mr. Pierre Conforti, President of the AAAF TMP Space Observation and Exploration technical committee. While I met with them as a guest for this lunch-hour meeting, a superlative lunch was served in a private dining room. Mr. Luc Fonda of Thales gave a brief presentation about GMES, Global Monitoring for Environment and Security, one of Europe's flagship programs. Attendees included Mr. Philippe Mairet, Mr. Laurent Mangane, Mr. Michel Bonavitacola, and others.

Beatrice and I then made an afternoon visit to theme park La Cite de l'Espace, accompanied by Mr. Mairet, Mr. Mangane, and Mr. Bonavitacola. The full-sized Mir space station replica was purchased from Russia, and visitors can walk through and around it. There was much more to see, and the visit was very enjoyable and inspiring for both of us. A similar attraction called La Cite de

l'Aviation is planned nearby for the near future.

Wednesday was aeronautics day for the two of us. Our guide was Airbus Vice President Mr. Francis Guimera, and the first visit was a glance at cabin interiors for some Airbus airplanes. Such visits are normally reserved only for Airbus clients. Stephan Boutonnet was our guide for this part of our visit. Mr. Guimera then welcomed us to an excellent lunch in a private room at the Airbus cafeteria. He then gave us a tour of the buildings where the final assembly takes place for the Airbus A380 airplanes. We especially enjoyed stepping onto the upper deck of one of these airplanes. Mr. Guimera had an historic job supervising the A380 evacuation certification on March 26, 2006, in Hamburg, Germany. Using Wikipedia for these details, "With 8 of the 16 exits blocked, 853 passengers and 20 crew left the aircraft in 78 seconds, less then the 90 seconds required by certification standards." Alain Chevalier and Alice Torgue joined us for this visit, and Mrs. Torgue showed us a bit of Toulouse after the Airbus tour.

On Friday evening our hosts invited us to a memorable meal at Le Bouchon Lyonnais, a restaurant patterned after a famous one in Lyon.

Our visit also included exchanges of gifts and dinners on three evenings at the homes of three AAAF members. We stand by to return the favor in Houston. Attempts to round up a delegation from France to visit Houston, DC, and Orlando did not work out for 2008, but we will keep the door open and work to encourage such visits in the near future.

Above: artwork from Airbus showing an A380 for Qantas airline of Australia

Left: lunch at Airbus in Toulouse thanks to Mr. Francis Guimera, second from left, Vice Chairman of Airbus. At left, Alice Torgue. From right: Philippe Mairet, Alain Chevalier, and Douglas Yazell

Above: left to right: Klaas Dijkstra, Etienne Rouot, and Marie Froment

Toulouse: The church of the Jacobins, begun in 1229

OES in Toulouse

Working Group Meeting in Toulouse, France

DOUGLAS YAZELL, PAST CHAIR

The Association of Aeronautics and Astronautics of France (AAAF) working group Space Observation and Exploration (OES for Observation and Exploration of Space) met for the first time on June 25, 2008, at Thales, 105 avenue du Général Eisenhower, Toulouse, France. This new working group succeeds the one called Human and Robotic Space Exploration (ESHR), created in October of 2007.

Guests at this meeting included Mr. Douglas Yazell (AIAA Houston Section chair 2007-2008, Honeywell Aerospace), Luc Fonda (Project Lead for GMES at Thales), and Thomas Babits (formerly CLS). Also present were Mr. Pierre Conforti, Philippe Mairet, Jean-Jacques Runavot, Laurent Mangane, Michel Bonavitacola, Olivier Marty, Jean-Luc Chanel, et Thierry Çamalbide.

Douglas Yazell thanked AAAF Toulouse – Midi-Pyrenees (TMP) for his welcome. We note that AIAA Houston Section is a sister section with AAAF TMP since 2007 for an initial period of three years.

Mr. Pierre Conforti is the President for 2008-2009 of this OES working group. He began by recalling the scope of working group from our recently revised brochure:

- Observation of Earth and Space
- Astronomy (interface)
- Space exploration (human and robotics)

His primary focus is professional employees and institutions, but he will not neglect the public audience.

Pierre Conforti spoke first of all about the interest which our working group has in four big projects in which Thales participates currently: GMES, FIPES, EXOMARS and AURORA. He thinks that space observation is our strong point, but that the Region Midi-Pyrénées (MP) is very, very interested in human spaceflight and space exploration. It would be unthinkable that the Region MP would not invest in these subjects which are already the next technological breakthough of 2010-2030 and the assurance of of the creation of scientific, cultural and economic riches.

Pierre Conforti pointed out that Toulouse is still in the running as a candidate to be the 2013 European Cultural Capital. The selected "Toulouse 2013" theme was "Europe En Route" (L'Europe en Chemin), which might also be translated as "On the Way to Europe", "On the Road to Europe", "En Route to Europe", etc. He suggested that this working group adopt the theme, "From Toulouse to the Moon", and his motion was carried by a unanimous vote. One can imagine a "space base" for the general public in the outlying regions of Toulouse, a "simulator of life beyond Earth". The 2,000 children who will be 18 years old in 2013 could be ambassadors for the project. On a similar scale, similar projects currently exist in Turin (Italy) and in Belgium, but unfortunately not, for now, in the Region MP.

Olivier Marty noted that there were, also, in the past, similar capabilities which were brought into existence by aviation pioneers, such as air mail.

Pierre Conforti suggested sending documentation of a multi-use isolation integrated simulator (created with lunar outposts in mind) to Douglas Yazell in order to exchange ideas and perhaps exchange skills between AIAA Houston Section, NASA, and the Region MP.

Toulouse would be well placed to receive the simulator. Land, scientists, researchers, and workers in industry are available in the MP region. The problem is in the lack of leadership carrying the project to a European level, despite the good examples from places in Italy, Germany, Spain, and Belgium. In addition to being a tourist attraction unique in the world, this project would create 2,500 jobs in Toulouse. Also, this simulator could serve as a training center for future passengers of suborbital spacecraft.

Michel Bonavitacola added that this simulator also

must have a capability to simulate radiation.

Pierre Conforti hopes that this OES working group will organize, with the help of the Regional Council of the MP region, the Consul General of the Haute-Garonne region and of the city of Toulouse, a competition (open to European countries) related to lunar exploration. Possible ambassadors to be contacted are Mr. Jean-Pierre Haigneré and Michel Tognini, the City of Space (la Cite de l'Espace, a tourist attraction in Toulouse similar to Space Center Houston), the President of the French National Center for Space Studies (CNES) et the Director of The Space Center of Toulouse (CST).

The competition would be open to Europe (educational establishments and French and foreign university students) and to the USA (Awty International School in Houston, Texas, in the USA, which has grades K-12, for example). A correspondent in the USA would need to be named in that example.

Five categories of "competitors" would be possible: kindergarten, students in elementary school, students from junior high schools, students from high schools, and advanced students (commercial and scientific schools for those preparing for universities, also those in other courses of study, university students, various institutes…). A call for candidates would be sent out in the national and regional press. A jury consisting of people of note would select the best candidates who would win excellent prizes.

This OES working group of AAAF would draft the specifications and the conditions for the call for candidates. The competition would take place in two school cycles, over a period of about 18 months. The prizes would be awarded in Toulouse.

Thomas Babits emphasized that it would be necessary to motivate students to study science.

Laurent Mangane spoke to us next, about the first results of the call for candidates for the recruitment of future European astronauts. The "winning trio" is France, Germany, and Italy (since they are by chance the biggest contributors to European space programs). Note about 16% of candidates from France must be women, vs. 17% in Germany. In 4th and 5th positions are Spain and Great Britain.

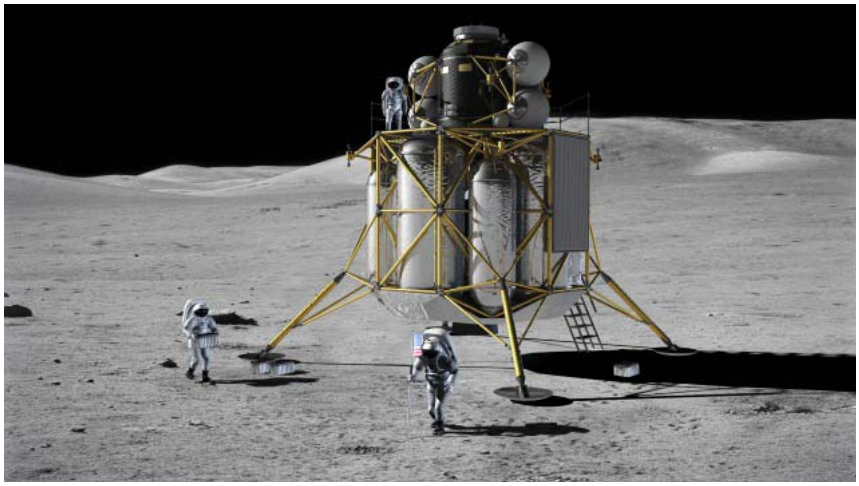
Thierry Çamalbide proposed, for better communication, a relaunching of traditional media. Olivier Marty added that communication is created with worthwhile subjects, not for large groups, but more targeted (small meetings in secondary schools, for example).

Laurent Mangane noted that AAAF will need intermediaries (journalists) to communicate with the public.

It was decided to organize in Toulouse in 2010 (or 2011) a space conference co-organized by AAAF TMP and AIAA Houston Section, the idea being to promote Toulouse and to develop a bridge for working with space-related programs between Toulouse and Houston.

Douglas Yazell thanked the AAAF TMP for his warm welcome and expressed his wish for a long life for the sister section relationship with AIAA Houston Section.

After the meeting: "Toulouse 2013" not being kept, the collection of the OES working group projects above is maintained, but independent of the "2013 calendar". A change to the timing is possible with the project of a space conference co-organized by AAAF TMP and AIAA Houston Section in 2010 or 2011 in Toulouse.



Lunar Exploration

Lunar Surface Systems Architecture Overview

ROBERT BEREMAND, GN&C TECHNICAL COMMITTEE CHAIR
DOUGLAS YAZELL, PAST CHAIR

These charts shown are are a few of those presented by Chris Culbert. More information and images are available on the web at http://www.aiaa-houston.org/cy0708/event-09may08/program.php

Chris Culbert of NASA Johnson Space Center (JSC) kindly gave us permission to summarize his presentation here in this article. This is from our Annual Technical Symposium of May 9, 2008 (ATS 2008), which took place at the NASA/JSC Gilruth Center with an audience of about 100 people.

The JSC Lunar Surface Systems project office was established in August of 2007 in the Constellation program office. Its mission statement is to develop a sustained human presence on the Moon to promote exploration, science, commerce, and the United States' preeminence in space, and to serve as a stepping stone to future exploration of Mars and other destinations.

A NASA Constellation program organization chart shown and dated January 16, 2008, had Jeffrey M. Hanley's name at the top as Program Manager and Chris Culbert's name in the lower right corner.

Seven desired characteristics were included for the Lunar Architecture Framework: 1) minimally functional outpost capability established as early as possible, 2) "Go as you pay" philosophy, in which an outpost can be built at any rate, 3) pervasive mobility, the ability to move outpost components to other locations on the lunar surface, 4) ability to pause outpost buildup at any time to accommodate sortie missions to other locations, 5) ability for international and commercial participants to contribute elements and systems that augment basic core capability, 6) core technologies and operations applicable to Mars exploration, and 7) outpost configuration and capabilities (layout, mission duration, power) can be implemented to mimic Mars surface scenarios.

A notional internal habitat layout was presented for a crew of four, including two "habs", with one airlock for each hab.

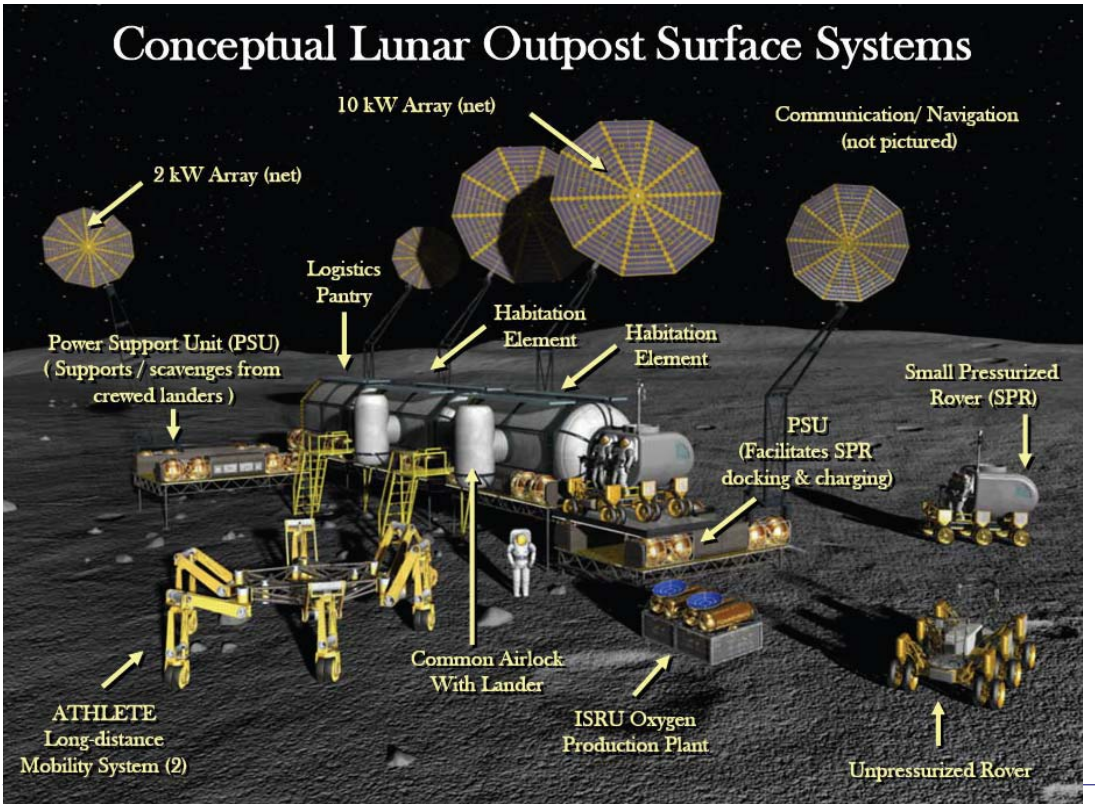
Two "artist concept" paintings showed alternate architectures, including structures which would be inflatable, but with outpost functionality remaining unchanged.

A few graphic images were used to present the Antarctic Inflatable Habitat Demonstrator and the McMurdo Station Science Support Center.

Pervasive mobility on the lunar surface was discussed, in which the habitat elements would be capable of separating from the outpost and traversing long distances across the lunar surface. They would be crewed or uncrewed, move to sortie lander location and be used as a "base camp", and serve as long-distance pressurized rover & habitat function,. Integration with Small Pressurized Rovers (SPRs) is also being investigated.

Four illustrations were used to present a notional power system concept, with five points to elaborate on a stationary outpost, and five points to elaborate on mobility applications.

Alternate power concepts



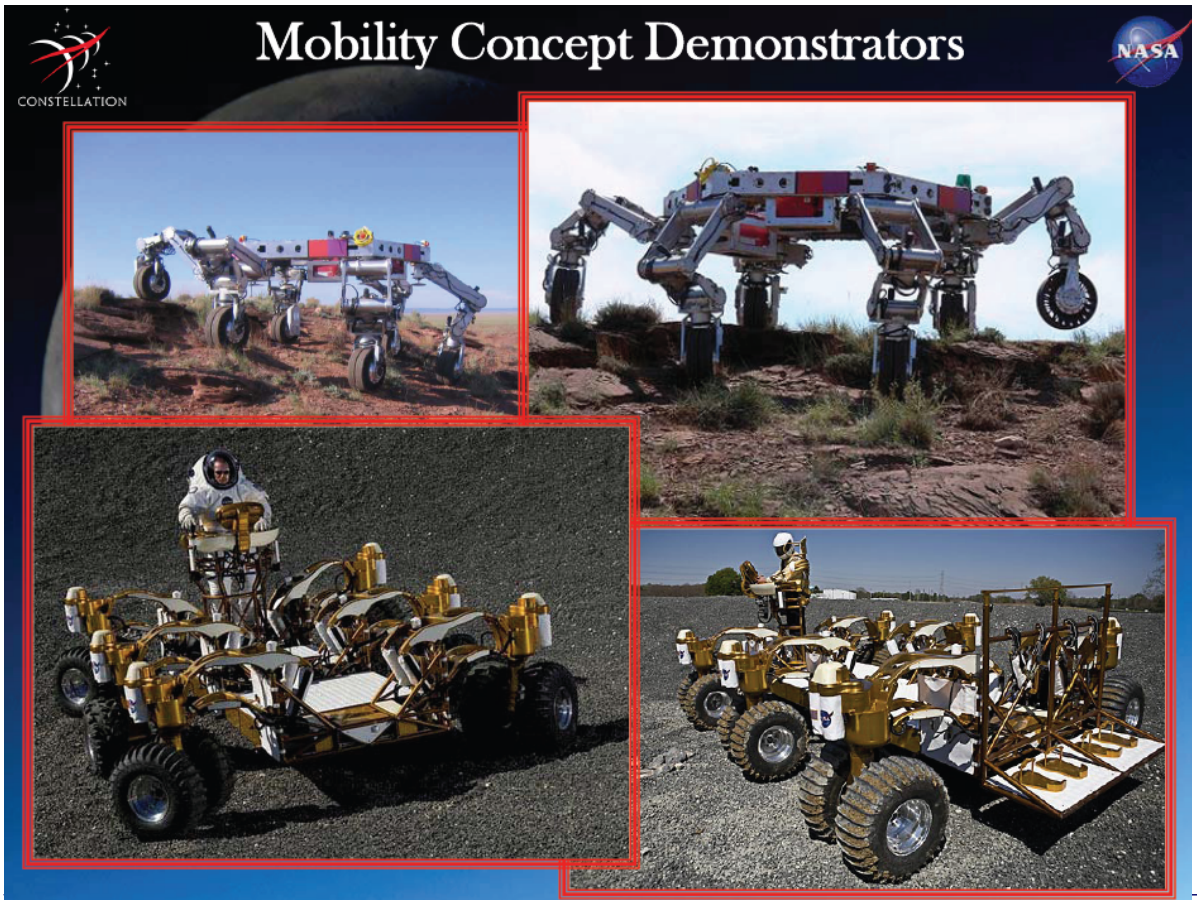
include stationary power (alternate array concepts and Fission Surface Power (FSP) using regolith shielding, and mobility power using radioisotope power systems.

In-Situ Resource Utilization (ISRU) would use "in-situ" resources (found on the Moon and not brought from Earth) to create necessary services for robotic and human exploration. These include regolith, minerals, metals, volatiles, and water/ice. These also include discarded materials: 1) LSAM (Lunar Surface Access Module) descent stage fuel residual scavenging, tanks, etc., after landing (with power), and 2) Crew trash and waste (after life support processing is complete). Benefits of ISRU include 1) increased science and exploration hardware (instead of oxygen and water), 2) increased safety, crew exploration time, and self-sufficiency, and 3) technology spin-in/spin-offs help recycling Earth/space economy.

Science integration was mentioned: "A desire that all future lunar surface systems and exploration plans are science friendly and user-oriented." Planetary science, Earth science, astrophysics, planetary protection, life science, and heliophysics were mentioned.

To summarize: 1) This architecture is robust but aggressive, 2) The final outpost configuration is only achievable with international and commercial partner contributions, and 3) The Lunar Surface System is the next step in exploration that will enable us to continue on to Mars.

"Moon, Mars, Beyond…"



1940 Air Terminal Wings & Wheels, Saturday, July 19, 2008

DOUGLAS YAZELL, PAST CHAIR

Below: Photos of the terminal and Joe Montana, the winner of an airplane raffled at the event. (photos by Andrew Broadfoot)

The bigger the crowd, the more fun we have at the monthly Wings & Wheels program (3rd Saturday of each month, $10 for adults, $5 for kids, free for volunteers, which includes lunch and the event) at the 1940 Air Terminal Museum at Hobby Airport. This was one of the biggest crowds yet, and a record 14 planes were on display. The highlight of the day was the drawing for the raffling off of a Cessna 140 airplane, won by Joe Montana of Pearland. Drew Coats is shown below with the raffle tickets. He phoned the winner while the crowd listened. The winner said something like, "That's great! I am washing my airplane right now! I will be there in an hour." The new raffle plane was also unveiled, a 1956 Cessna 172 A-model, and tickets went on sale soon after.

Captain A. J. High at the museum will work with me and Emily Springer of AIAA to have the ceremony to award the plaque from AIAA honoring the 1940 Air Terminal as an AIAA Historic Aerospace Site, as described in past issues. The ceremony will be held with a Wings & Wheels program in March 2009, April 2009, or maybe in October of 2009 when the city of Houston supports an annual celebration of Hobby Airport. Captain High tells me that the runway by the museum was filled with planes from end to end for the Wings & Wheels program of October 2007, including WW II planes in flying condition.

I met Andrew Broadfoot of www.andrewbroadfootphotography.com, who took the photographs of the winner and his new airplane being flown in that morning. I also met Celeste Graves, author of, "A View from the Doghouse: Of the 319th AAFWFTD", the Army Air Force Women's Flight Training Detachment at Houston Municipal Airport, whose training started in late 1942.

Call ahead at 713-454-1940 if you would like to know what will be on display for the third Saturday of the month. Enjoy a Saturday lunch with Wings & Wheels at the 1940 Air Terminal Museum at Hobby Airport.

Looking Back, Celebrating, Looking Forward

SEAN KEEFE, ASSISTANT EDITOR, HORIZONS

NASA's 50th Anniversary

NASA's 50th Anniversary is being celebrated this year, so it is time to reflect on NASA's achievements. This article briefly summarizes NASA's genesis and the events that commemorate its milestones.

Looking Back:
NASA's Evolution

In 1952, the International Council of Scientific Unions (ICSU), put forth a plan for a coordinated, comprehensive array of international scientific observations of varied geophysical phenomena. This joint initiative, The International Geophysical Year (IGY), was modeled after the International Polar Years of 1882-83 and 1932-33. Eventually, sixty-seven countries, including the United States and the Soviet Union, were involved in this research. The National Academy of Science (NAS) appointed the US National Committee (USNC) in 1953 to oversee American research during the IGY. USNC had a core of sixteen members, five working groups, and thirteen technical panels. Eventually, hundreds of scientists were involved in the planning.

Research during the International Geophysical Year was global in scope, but much of it took place in the polar and equatorial regions of Earth. Advances in research technologies from the prior two decades and the advent of electronic computing facilitated this major undertaking. IGY scientific investigations encompassed twelve Earth Sciences—aurora and airglow, cosmic rays, geomagnetism, glaciology, gravity, ionospheric physics, precision mapping, meteorology, oceanography, seismology and solar activity. Additionally, and significantly for the genesis of NASA, rocketry was also explored. The International Geophysical Year lasted from July 1, 1957 to December 31, 1958. The results of the IGY were, among other benefits, scientific and predictive improvements in the fields of meteorology, seismology, and glacial analysis.

As part of the International Geophysical Year, the US and Soviet Union launched several satellites to explore the upper atmosphere. The US Navy tested the first satellite to 126 miles in April of 1957. On October 4, 1957, the Soviet Union launched Sputnik into geocentric orbit. The satellite was used to study the density of Earth's upper atmospheric layers and radio-signal distribution in the ionosphere. Sputnik's radio signals were picked up by ham radio operators worldwide. The Space Age had begun.

Sputnik's success demonstrated the viability of using artificial satellites and stimulated the US government into action. Nine months later, on July 29, 1958, the National Aeronautics and Space Act was passed. That act converted the World War I-genesis military agency focused on aeronautics, the National Advisory Committee for Aeronautics (NACA), into NASA, a civilian agency focused on aeronautics. All NACA facilities and budgets were transferred intact to NASA, with additional funding and facilities added to NASA's purview. Before the advent of NASA, NACA had been developing reliable, high-performance X-series jets with the US Air Force and US Army Air Force, primarily at Langley. Project Mercury, the first Ameri-

Above: Project Mercury astronauts (NASA photo)
Front row, L-R: Wally Schirra, Deke Slayton, John Glenn, and Scott Carpenter
Back row, L-R: Alan Shepard, Gus Grissom and Gordo Cooper

Above: The Hayden Planetarium and New York City skyline at night (Source: Henny Ray Abrams)

Below: Apollo astronauts Harrison Schmitt, Charlie Duke, Edgar Mitchell, Alan Bean, and Buzz Aldrin at the New York premiere of the film, "In the Shadow of the Moon" (Source: Henny Ray Abrams)

can human spaceflight program, began one week after NASA's formation. The Space Act also established a military/civilian advisory panel headquartered at Vandenberg AFB. Their role was to advise and coordinate the military uses of space. [http://history.nasa.gov/spaceact.html]

NASA's 50th Anniversary Celebrations: Highlights from 2007-2008

The National Aeronautics and Space Administration was created on October 1st of 1958, so NASA's actual 50th Anniversary is not until October 1st of 2008, but NASA started the celebration a little early.

On September 5, 2007, Discovery Communications announced a partnership with NASA to commemorate the space program's 50th anniversary. That partnership includes unique programming, podcasts, and other activities highlighting NASA's 50th Anniversary. The announcement was made at the New York premiere of a documentary about the Apollo era, "In the Shadow of the Moon". The British film highlights personal interviews with Apollo-era astronauts and contains rare footage not seen since the Apollo days. In attendance at the film's New York debut were five Apollo astronauts: Harrison Schmitt, Edgar Mitchell, Charlie Duke, Alan Bean, and Buzz Aldrin.

The film was digitally projected on the dome in the Hayden Planetarium's Space Theater, one of the world's most sophisticated planetariums. It boasts a customized Zeiss Mark IX projector, with fiber optic technology and a digital, full-dome video projection system that can provide a 3-D visualization of the universe based on real-time images generated by an SGI supercomputer. The Hayden Planetarium is part of the exciting new Rose Center for Earth and Space. It has a seven-story glass cube surrounding the 87-foot-diameter Hayden Sphere. The top half of the sphere houses the Space Theater.

In the Shadow of the Moon won the World Cinema Audience Award at the 2007 Sundance Film Festival. In March of 2008, the film earned the first ever Sir Arthur Clarke Award for Best Film Presentation. The film also made its television debut this summer on the Discovery Channel.

In 2007, NASA established a 50th Anniversary website [http://www.nasa.gov/50th/home/index.html] with 50 special images, timelines, videos, the online version of the 50th anniversary magazine, essay competition winners, and links to past and present NASA projects and programs with AV podcasts and other interactive features.

On September 15, 2007, NASA Deputy Administrator Shana Dale unveiled the new NASA 50th Anniversary logo at Wired magazine's 2007 NextFest technology expo in Los Angeles, along with NASA's new Cliffbot rover and other NASA technologies. The design of the NASA 50th logo incorporates the Hubble Space Telescope image of Grand Design spiral galaxy

Above: The newly unveiled NASA 50th Anniversary logo (NASA image)

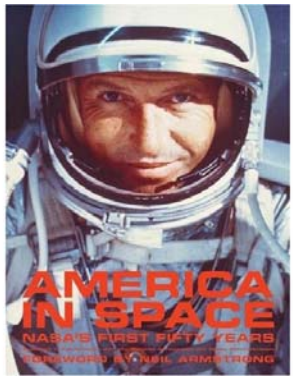
M81 in the constellation Ursa Major, approximately 11 million light years away from Earth.

On October 1, 2007, NASA published a 350-page, large-format book, titled *America in Space: NASA's First Fifty Years*. The book features over 400 stunning images from NASA archives, with foreword and editing by Apollo 11 commander Neil Armstrong.

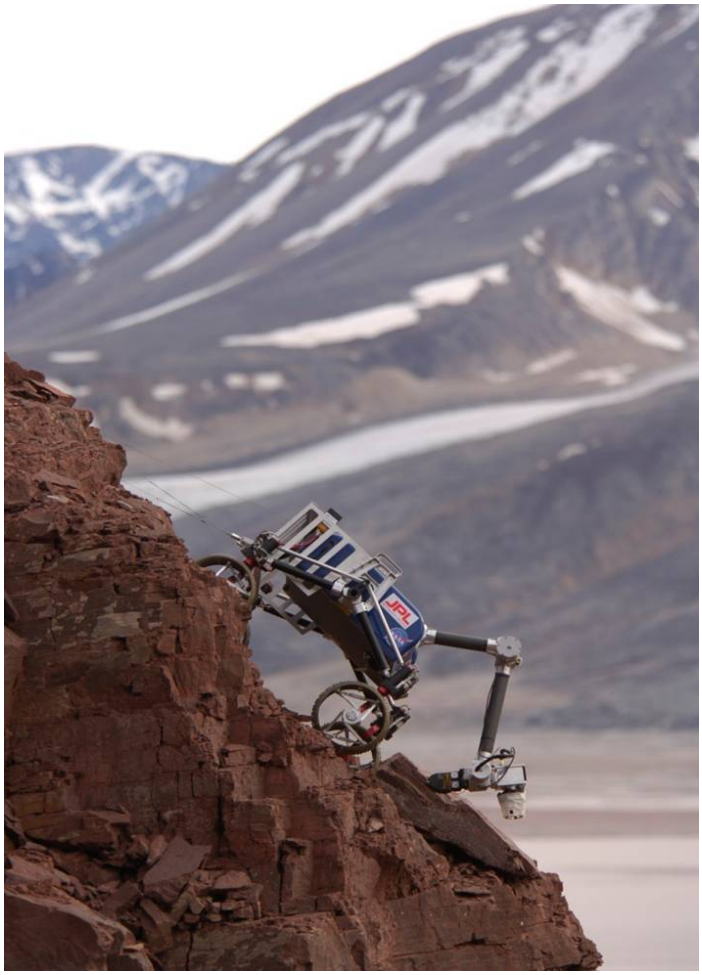
The official opening of NASA's 50th Anniversary took place on October 3, 2007 at the Smithsonian's National Air and Space Museum (NASM) in Washington, D.C. John Mather, 2006 Nobel Laureate for Physics, made a presentation about the James Webb Space Telescope (JWST). Dr. Mather is a cosmologist at NASA Goddard and Senior Project Scientist for the JWST. The JWST is a large, infrared-optimized space telescope, now scheduled for launch in 2013. It will orbit Earth at a height of 1.5 million kilometers. Mather explained how the telescope will help astronomers find the first galaxies formed in the early Universe.

On April 5, 2008, a NASA 50th Anniversary golf tournament took place at the Wildcat Golf Club in Houston. The event was sponsored by Starport, Jacobs, JSCFCU, USA, MEI, Lockheed Martin, Bastion Technologies, Cimarron, Boeing, and Sodexo. Proceeds from the event went to the Starport Scholarship Fund. NASA has also released 50th Anniversary golf balls and other commemorative items for sale at Space Center Houston and NASA Exchange shops.

On May 23, 2008, Ascension Island commemorated the anniversary with the release of six postage stamps depicting the NACA Bell X-1 plane, the 1969 Lunar Landing of Apollo 11, the Lunar Roving Vehicle, the Space Shuttle, Hubble Space Telescope, and the International Space Station. The



Above: New book cover (NASA image)



Bottom left: The tethered Cliffbot system descending a steep incline during field trials in Norway (NASA photo)
Bottom right: The NASA 50th Anniversary golf tournament in Houston (NASA photo)

Above: Ascension's commemorative stamp series (Source: http://www.collectspace.com)

island, a British dependency, had been used as a tracking station, and its expanded airfield is an emergency runway for the Space Shuttle.

On June 20, 2008, the US Senate approved the NASA 50th Anniversary Commemorative Coin Act (S.2159). "The Congress finds that– the National Aeronautics and Space Administration has been involved in many defining events which have shaped the course of human history and demonstrated to the world the character of the people of the United States." The Act goes on to list dozens of those defining events and accomplishments.

This bill requires the US Treasury to mint a limited edition set of coins, including a $50 gold coin and nine $1 silver coins with a required surcharge and proceeds to be distributed as follows: the first four million dollars will go to the NASA Family Assistance Fund, "for financial assistance to the families of NASA personnel who die as a result of injuries suffered in the performance of their official duties." The second million dollars goes to two scientific literacy programs:

"$1,000,000 to each of the following:

(A) The Dr. Ronald E. McNair Educational (D.R.E.M.E.) Science Literacy Foundation for the purposes of improving and strengthening the process of teaching and learning science, math, and technology at all educational levels, elementary through college through the promotion of innovative educational programs.

(B) The Challenger Center for Space Science Education, for the purposes of creating positive learning experiences using space science as a theme that raise student expectations of success, fostering a long-term interest in mathematics, science, and technology, and motivating students to pursue careers in these fields."

The remainder of the surcharges will be used to preserve NASA artifacts at the Smithsonian's National Air and Space Museum. Read the fascinating descriptions of these new coins online at http://www.coinnews.net/coin-legislation/s-2159-nasa-50th-anniversary-commemorative-coin-act/.

In June and July of 2008, the US Park Service highlighted NASA's 50th anniversary at the 42nd annual Smithsonian Folklife Festival in Washington, D.C.

Looking Forward: Upcoming 50th Anniversary Events

Throughout the spring and

fall of 2008, NASA 50th Anniversary promotions will appear on local cable stations near JSC. In September of 2008, NASA will coordinate an agency-wide Fun Run/ Walk.

From September 9-11, 2008, the AIAA is coordinating the AIAA Space 2008 conference in San Diego, California. Several panels and sessions will evaluate the last 50 years of spaceflight. The conference will bring industry and academic scientists and leaders together in a forum to review the past and to debate and plan the future of aerospace.

On September 14, 2008 (now rescheduled for November 9, 2008, due to Hurricane Ike, and for now it is unknows whether Reliant Stadium will still host its NASA Day on that date), there will be a NASA Day held at Reliant Stadium with the Houston Texans vs. the Baltimore Ravens. This will be a NASA 50th Anniversary-themed game with visiting astronauts. NASA employees can purchase discounted tickets.

On September 24, 2008, the AIAA will organize a NASA 50th Anniversary Celebration Gala at the National Air and Space Museum in Washington, D.C. On September 27, 2008 (postponed until November 22, 2008, due to Hurricane Ike), Johnson Space Center will host a 50th Anniversary gala at the San Luis Resort in Galveston. Tickets for the black-tie JSC Golden Celebration include dinner, dancing, and entertainment. The event will recreate different eras of NASA's history. For an additional fee, guests can also attend an Astronaut Wine and Cheese reception an hour before the main gala, but our latest information tells us that this extra event is sold out. For more information and tickets, check the StarPort page. [http://starport.jsc.nasa.gov/] A required password is found in a daily e-mail note called JSC Today.

On October 1st (This took place as planned.), Johnson Space Center will host an on-site 50th Anniversary event with food, drinks, ice cream, group photos, and live bands. Participants are invited to wear their the NASA 50th t-shirts. Also in October, NASA will distribute a commemorative 50th Anniversary magazine to all NASA employees.

Other NASA 50th Anniversary exhibits and related events will take place at the Wings Over Houston Airshow on October 25-26, 2008 at Ellington Airfield. (This airshow will take place as planned despite the effects of Hurricane Ike's arrival on Friday, September 12, 2008. AIAA Houston Section will be there at a booth shared with our hosts, the Houston Chapter of the Experimental Aircraft Association. This issue of our newsletter Horizons arrived just in time for us to show a few printed copies there.)

There was to be a 50th Anniversary Open House for the Ballunar Liftoff Festival on October 31-November 2 at Johnson Space Center, but it was canceled this year due to Hurricane Ike.

Below: Galveston Island Convention Center (GICC) at the San Luis Resort (GICC photo)

Historic Sites

AIAA Historic Sites in Houston

DOUG YAZELL, PAST CHAIR

Top left and right: Storm damage at the 1940 Air Terminal at Hobby
Bottom left and right: AIAA plaque honoring NASA/JSC, located near the rocket park

Two of the 30 or 40 worldwide AIAA Historic Aerospace Sites are in Houston. In the coming months we will have a ceremony at the site selected in 2008: The 1940 Air Terminal at Hobby Airport. Their web site has their update after Hurricane Ike hit on Friday, September 12, 2008:

"Museum Re-Opened after Hurricane Clean-Up!

"The Museum has been closed for a short period while we cleaned up glass and debris from Hurricane Ike. Only the Theater remains closed during our normal operating hours.
"The 1940 Air Terminal Museum and its hangars felt the brunt of a couple (mini-tornado?) wind gusts, which blew out 6 of 8 windows on our top control tower and several doors off our plane storage hangar. Considering what could have happened though, we are surprisingly less damaged then we could have been. The atrium and north wing have been under construction preparing for our Grand Re-Opening in October, so no artifacts or exhibits were underneath the flood of water we got as a result of the windows being lost in the Terminal. The windows we lost were over 50 years old and had weathered many storms. We had a couple other broken panes in the building and on the museum side flooded a bit from a window being blown inwards but not breaking. Since out building is leaky to begin with we had already moved everything off the floor and away from windows, so we sustained no damage except to gift shop books. The hangar where we keep our vintage Lodestar and other planes was hit pretty hard, with several off the doors blowing off, one onto the Lodestar, causing cosmetic damage to its left wing and engine. The wind must have picked the door up again and pushed it away. The back of this building is also missing the center section."

A ceremony to award the AIAA plaque will be announced in the coming months.

Meanwhile, the 2005 monument citing NASA/JSC has been straightened up after being moved on its base. It was probably bumped lightly by a delivery truck. Thanks to those who fixed that!

Interview with Norman H. Chaffee: Observations from a Long NASA Career

NASA's 50th Anniversary

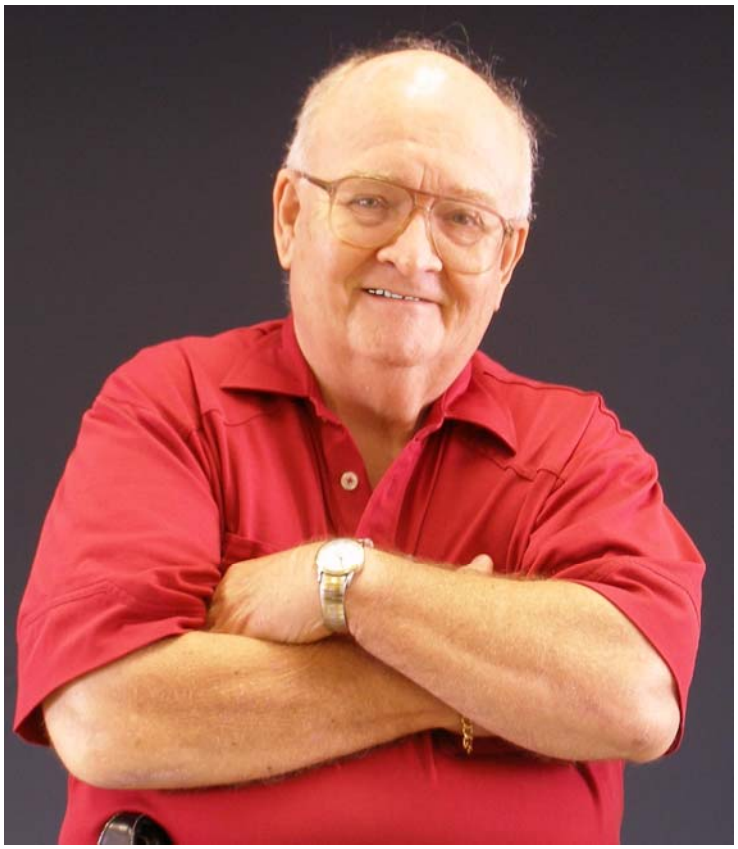
SEAN KEEFE, ASSISTANT EDITOR, HORIZONS

Norman Chaffee is a busy person. You wouldn't guess that he has retired from NASA because he is still involved with so many NASA projects. Norm is one of the first-generation engineers from the early days of NASA. He has played a key role in a number of NASA's biggest and most successful space programs—including the Mercury, Gemini, and Apollo Projects; the Space Transportation System (Space Shuttle) and the International Space Station Program. Norm has spent over four decades working at Johnson Space Center, starting his career there in 1962, and he still maintains an office on-site. AIAA interviewed Norm Chaffee as part of our look back at NASA's first NACA and NASA days and several programs that he was involved with. He shares some fascinating anecdotes and valuable lessons learned from his long career as an engineer and manager, outlining several helpful things that aerospace professionals can do as they move along in their careers.

Norm's own career covered the eras of Sputnik, the Cold War, an the Space Race. It also spanned several stages of development in the early manned missions, Skylab, the Space Shuttle, and the International Space Station. His jobs titles over the years have include "peon" [self-titled], "Reaction Control System/ Rocket Engine Guy," Engineer for the Energy Systems Branch, Deputy Chief of the Propulsion and Power Division, Chief Integration Engineer for Station, and Deputy Chief of Robotics.

Norm studied chemical engineering at Rice University from 1955 to 1958. He holds Bachelors and Masters degrees from Tulsa University in Chemical Engineering, but he doesn't limit himself to that one discipline. Norm's broad interests cover a wide range of subjects, including opera, philosophy, and psychology. He has been a lifelong learner, formally studying management through NASA and the University of Houston and taking continuing education courses in many subjects since the 1970s. Norm excelled in his career, earning several special awards for his engineering, management, and leadership skills—including the NASA Outstanding Leadership Medal. More recently, Norm has been actively involved with educational outreach, for which he was awarded the Exceptional Public Service Medal by NASA.

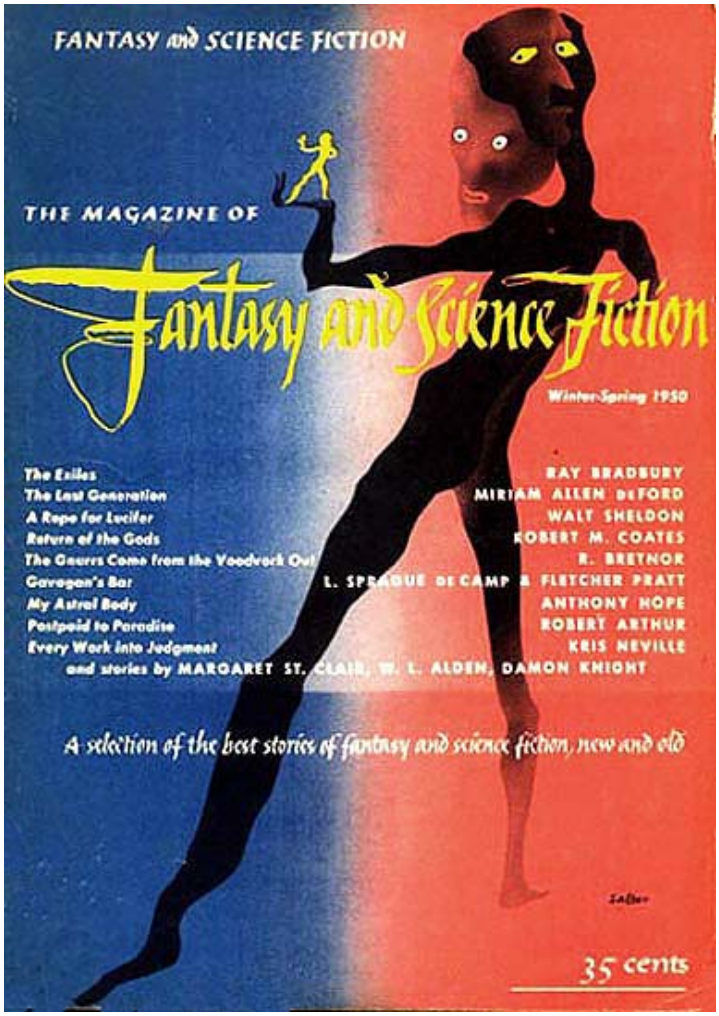
Throughout his career at NASA, Norm has been active in the Houston aerospace community. Since the late 1970s, he has been involved in the Clear Lake Council of Technical Societies. He was the Chairman of the AIAA Houston Chapter from 1980-1981, and later became the chapter Secretary. Norm continues to be active in AIAA, serving as an informal Senior Technical Advisor to the chairs of the Houston chapter. After his official retirement in 1996, Norm kept working for NASA. He took advantage of the retired annuitant program from 1996-1998, working in the Education Office at JSC.



Above: Norm Chaffee (photo by Sean Keefe)

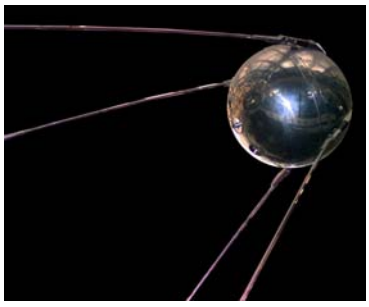
He continued there a contractor for seven years, and since 2005, he has been an enthusiastic Education Outreach Volunteer. Norm is also currently serving as President of the NASA Alumni League's JSC Chapter—an advisory association of engineering and scientific professionals. Norm helps organize lectures, social events, and educational outreach programs for the chapter. He is also active in the JSC chapter of the National Management Association.

How did Norm end up working on the manned space flight program at NASA Johnson Space center for four decades? It was Norm's wonderful imagination and sense of wonder about the Universe



Left: cover from 1950 Fantasy & Science Fiction magazine (source Wikipedia)

Below: Sputnik 1, 1957 (source: NASA)



(Continued from page 23)

that led him to follow his dreams.

AIAA: Tell us what your inspiration was to get involved in the Space Program.

Norm: I was always interested in engineering, but I was always a science fiction nut, too. As a kid, I always had jobs, and so I had a little pocket money through delivering newspapers, cutting grass, and doing yard work for my newspaper customers. I also bagged groceries and I tutored younger kids in math and chemistry and physics, so I always had a fair amount of money. I spent some of it on science fiction books. Back in those days, they had these pulp fiction magazines. There were seven or eight of them that I routinely bought and read avidly from cover to cover, like *Amazing Science Fiction*. That was in the late 40's and early 50's.

So I was always a science fiction fan and dreamed about those kind of things and wondered about them and independently studied astronomy as a young kid to try to understand stuff like that, but I knew that the term 'science fiction' was exactly that. In my youth, the concept of people going into space and going to the Moon or Mars or further out into the solar system—that was fun to think about and speculate about, but it was sheer fiction, and it was never going to happen in my lifetime. And so, lo and behold, the post-second world war Cold War led to this tremendous improvement in rocket technology, primarily for the development and production of missile systems, and the guidance systems, and the other things that went with making war on other people in the world. That led to Sputnik in 1957 of course, and then to the foundation of NASA, and later on to the successful launch in one orbit flight of Yuri Gagarin.

I remember the first time I saw Sputnik coming over. I was at a football game and somebody yelled out "the satellite, the satellite!" And we all looked up. It was the Moon they were talking about, but later on I did get to see Sputnik going over. And of course, we'd get on the ham radio and you could hear the 'chirp, chirp, chirp.' That was pretty exciting. And then when President Kennedy made the announcement that we were going to send humans into space and go to the Moon and bring them back safely in this decade, that greatly excited me. I immediately thought, 'I wonder how do you get involved in that?' Shortly thereafter I heard that the Manned Spacecraft Center was going to be in Houston—and I absolutely loved Houston. I had gone to Rice, and I like the city and I liked the climate, I liked the access to the beach, that kind of thing.

AIAA: Where were you raised, and where did you go to college?

Norm: I was raised in Tulsa, Oklahoma, and I was born up in the Northeast. So, I'm a Yankee by birth, but I left there as soon as possible. I ended up going to Rice University, which at the time was called Rice Institute. I selected Rice because it was very competitive and, if you were admitted to Rice, it was free, so my Dad said, "golly that kind of makes the decision for you, doesn't it?" We didn't have a lot of money. In addition to that, I had a little scholarship which paid for room and board and books.

AIAA: Was your father an engineer, too?

Norm: No, he was an administrator for the Army Corps of Engineers, so he was around engineers a lot. He ran the personnel department. He was really a bright 'people person.' I learned so much from him about how to deal with people. I watched him on the phone at night, when people would call him with their personnel problems. He'd be

Left: Mercury Astronaut Alan Shepard receives NASA Distinguished Service Award after his historic flight in 1961 (source: NASA)

on the phone for hours sometimes, trying to get people through a crisis.

AIAA: And you didn't fall far from that tree, did you, because you were a manager, so you had to deal with engineers, being an engineer yourself still?

Norm: Right, I think I learned a lot about how to deal with people from my father and observing him, but you really learn about that when you have to do it yourself. You can't always learn something just by watching somebody. You can get some insights, and that kind of thing. Anyway, I was working in a refinery, and when I heard that the manned spacecraft center was going to be in Houston, I took very aggressive action and got a job down here. I showed up in early 1962 with a wife and a brand new baby three months old, and I've been here ever since, in various jobs.

AIAA: Can you give us an overview of the projects you've worked on at NASA Johnson Space Center?

Norm: When I first came here, they put me to work in what was called the Energy Systems Branch in the Spacecraft Design Division. That particular branch was responsible for the propulsion and power systems, including things like pyrotechnic devices, the parachutes, the batteries and fuel cells, and the rocket engines. So I was very fortunate to come in and get placed in the little rocket engine group. We worked on the main engine on the spacecraft and on the steering rockets, called the attitude control system, or sometimes the reaction control system. So I was a reaction control system/rocket engine guy when I first came in. As a chemical engineer—although I had never really studied rocket engines, other than doing some homework problems in advanced thermodynamics classes on that—I basically knew what a rocket engine was and how it worked, and what the physics and thermodynamics of the device was. So, you have to talk to some people and read some reports, and go back and get some books out, this kind of thing, but very quickly, I got into the swing of things. I basically learned by on-the-job training. By osmosis, I began to be more comfortable.

Then, shortly after I got here, we had the capability to establish our first little laboratory at Ellington Field where we could do rocket engine test work and a little bit of fuel cell work. So we had the opportunity to put together the systems to support that and do some design work of our own, and run the rocket engines out

Above left: Mercury Capsule Model being tested in Langley's spin tunnel, 1959 (original photo by NACA, source: NASA)
Above right: Langley technicians working on the Mercury spacecraft, 1960 (original photo by NACA, source: NASA)

there. So just gradually, you developed an expertise. You could do your own design and get it built and go and test it.

AIAA: Is there much design work going on at JSC now?

Norm: My perception is that there's not as much opportunity for the JSC engineer to get hands-on experience as there used to be. But there are still pockets of capability areas where that is being preserved. And I think maybe the pendulum also is starting to swing back to that. But so much of the work has been given out to contractors, as opposed to the NASA engineers, who have less and less opportunity, it seems to me, to do their own work and learn. However I will tell you that, in the areas that I worked in, my colleagues and my bosses and I tried very hard to get enough funding to always keep some small projects going that we could assign to the staff to do their own engineering, and we would get stuff built in-house.

AIAA: So there was more control from the ranks about the funding, the money, and where the projects went in those days?

Norm: Right. As an example, when I first came to work, the Mercury Program was in full swing. Scott Carpenter's Mercury Flight happened not too long after I first got here, so I worked a little bit on the data reduction from that flight. I didn't really understand really well what I was doing, but I could figure out—from guidance navigation and control system data—what was the response of the vehicle to the firings, and how effective the system was, and what was the propellant usage, what were the temperatures doing as a function of where we were in orbit, and what the attitude of the spacecraft was relative to the sun. Very quickly, I learned that these things were important.

Norm: One of the things that benefitted me greatly was all of the people I worked with had come from the original NACA centers—the precursor of NASA—and the bulk of the people had come from Langley Center in Virginia. In those days, the people in Langley were doing all kinds of work, primarily aeronautics. The core of the Manned Spacecraft Center had come from an organization called PARD, Pilotless Aircraft Research Division, which was headed by Dr. Robert Gilruth. The guy who was later hired very quickly to became my Division Chief, Guy Thibodaux, had been a key member and a section head in that group. He was a solid rocket and a liquid rocket expert.

In those days, if you worked in those organizations, there weren't any contractors, so you did your own design work. There were government draftsmen that helped you get your drawings made. There were government machinists and technicians who helped you with the instrumentation and the manufacture of the device, and putting it up, and getting the launch stand built. All of that work was done by people who were NACA employees, and then when it was all done, you reduced the data and analyzed it yourself. Then you wrote your own report, which was peer-reviewed by a board of managers. And you were quizzed on it, almost like being quizzed on a thesis, and it wasn't published until you had satisfied that group. You weren't promoted until you had done some of these things and had them under your belt.

So it was more of an academic environment than an industrial environment.

AIAA: But still you did some manufacturing and testing here. What's going on with that now at JSC?

Norm: There still is some testing. In the early days, because the leaders came from this culture at Langley, that's what they brought with them. That's what they felt was the right thing to do, so for the first 8-12 years I was here, I was in an organization that encouraged that. They expected you to do testing and provided the resources, including the money, the drafting people, the machinists, and the test facilities, where you could do that.

AIAA: They encouraged you to design. At some point in NASA's past, not too long ago, research was somewhat discouraged here at JSC and it has become more of a management facility. You have that long perspective on how things have changed. Can you comment on that?

Norm: I think that's true, although there are still—at least, in organizations that I was in and people that I worked with who are in the same generation as I was—folks who stayed in control of major organizations up until the last ten years or so. As an example, one of the last organizations I was in, JSC's Automation, Robotics and Simulation Division, was headed by a fellow named Walter Guy. He came out of Langley with that same culture. He was selected to lead the Division and I was picked to be his Deputy. We formed an organization from bits and pieces of about sixteen other groups around JSC and built that division. One of the things we did was work very hard to keep a small stream of funding coming in from various sponsors, so that most of our people could—in addition to overseeing the program engineering and watching the work that the contractors did and managing them—do in-house design, engineering, and testing in the robotics area. And that is still going on: Walt Guy still works at JSC, he never retired. Just in the last couple of years, he moved to a different position from the Robotics area. But even now, if you go to the Robotics area, those Labs over there are still doing a lot of their own work. There is a project called Robonaut, which is a very capable robot that has dexterous hands.

AIAA: So do they take lessons learned from the Canadian robots, the arms on Shuttle and Station, and Dextre and apply then to Robonaut or are they separate, parallel projects?

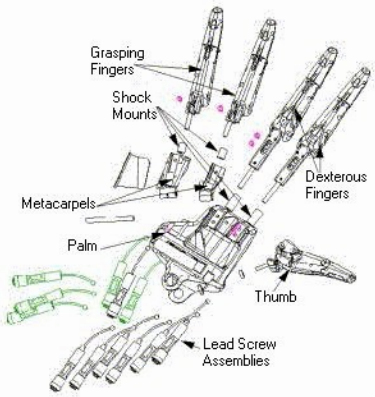
Norm: No, Robonaut was always very far ahead of Dextre. That particular work, one of its purposes is to be able to develop an astronaut EVA helper. It's a robot that could help an astronaut on EVA, handing tools, holding things, going to get things, and bring them back, and has the same dexterity as a gloved astronaut. So it could use the same tools, this type of thing.

AIAA: Does Robonaut have Artificial Intelligence (AI)?

Below: Project Fire Thermal Structures Tunnel Reentry Heating Test at Langley, 1962

Above,: Closeup view of Robonaut's dexterous hands (NASA photo)

Below, left: Exploded view of Robonauts hands (NASA photo) Below, right: Robonaut telepresence demonstration (source: NASA)



Norm: There can be, but right now it's teleoperated. But we are also doing a lot of work with AI, where the control is ported from an astronaut or the slave-master device into the robot itself. But this project has for years and years has been paid for by the DOD's DARPA agency. So, Walt and I would work very hard to keep a stream of funding coming in from either the Space Station Program or the Shuttle Program, promising the managers of those programs that we were working on devices that had the potential to benefit their programs. But over the years, the difficulty of getting those funds, became more, more, more, you really had to fight and be clever to get those funds.

I think DARPA is still funding that research. If you go in that laboratory now, I think they are getting some Constellation Program funds, and they have built some marvelous, robotically-controlled vehicles. You can see a very large-surface, rover-looking vehicle with Robonaut sitting up driving the rover. He drives down the streets around JSC and goes over to the simulated Lunar and Martian surface area that is over in the back area of the Center now. Or, we mount Robonaut—which is just an upper torso, it's a torso of two arms and a head with stereoscopic eyes, TV camera eyes—onto one of these Segway two-wheel, gyroscopically-controlled devices. It's really interesting to be over in Bldg 9 and see this robot on wheels rolling around doing tasks.

AIAA: Do you have young engineers working in that laboratory?

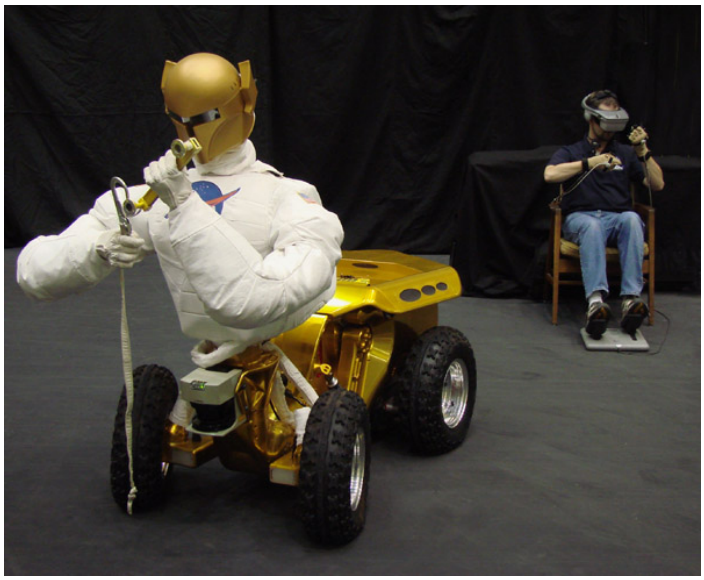
Norm: Yes, and they are doing the design. The hardware is being built in the Building 8 shops.

AIAA: So you think design is on the upswing generally at JSC?

Norm: It's not dead everywhere. I think managers have understood the importance of doing design. And of course, in divisions where you are primarily doing software work, that's a different thing. But when you are talking about hardware—structures and mechanics, life support, propulsion, power—I think it's so important for people to get their hands on hardware and do some work themselves.

AIAA: Can we go back? You started off talking about the first program, Mercury. Can you list the other programs you worked on?

Norm: I started on Mercury, and basically it was support the flights, reduce the data, and try to figure out what happened, what went wrong, what we could do if there were some problems, what could be done. But then very quickly, we got into the early design of the Gemini Program. Gemini was also done by McDonnell Aircraft, which built the Mercury. So Gemini was kind of a 'big Mercury,' and its function was to demonstrate being able to survive two weeks in space in orbit and to demonstrate the rendezvous and docking techniques that were necessary for the proposed approach that we were going to take to send



Left: Gemini capsule being tested in Langley's Unitary Plan Wind Tunnel (source: NASA)

Apollo to the Moon. It would require the lunar module to come up from the lunar surface and dock with the command module, so it was critical that we knew how to do those kinds of things.

So once again, we had a small-rocket engine guy, and I was responsible with a group of folks for the Gemini attitude control system. It had two systems: it had the attitude control system of the two-man capsule—which controlled it during entry into Earth's atmosphere, just like the Mercury did. But it also had an on-orbit system which controlled the spacecraft during the two weeks it was on orbit. So, for all of the mission, except for the final entry, the on-orbit control system did the control. That was a series of 100-pound thrusters, and then small 25-pound thrusters controlled the capsule as it reentered the Earth's atmosphere. It came down just before chute deploy.

AIAA: So, once again you were a design engineer?

Norm: Well, Rocketdyne had the contract for the thrusters and the propulsion system, and McDonnell was doing the system engineering. But they had a lot of problems, and our people were helping at that time because we had independent funding from the Gemini Program office to backstop them. We always had these in-house projects. So, when Rocketdyne and the other subcontractors involved in the system—maybe the guy who was building the propellant tanks, and the guy who was building the pressure regulator or something—when they had problems, we would jump in and look at look at what they were doing, make suggestions, work with them, but also create our own projects to create alternative concepts. There is a lot of the Gemini thruster work that reflects work that we did, that was shown to be better than their approach, which got adopted by them and worked into the system.

AIAA: Once you figured out how the Gemini would work docking with the capsule, then what happened?

Norm: Well, Gemini 3 was the first manned flight with Gus Grissom and John Young, in 1965, and then it ended with Gemini 12 the next year. There were some exciting times. Neil Armstrong was on Gemini 8 when one of our little thrusters actually had a short in the control system of the propellant valves. They opened up, and it turned on and stayed on. They spun the aircraft up so fast that they were just within a minute or so of hitting a rotational velocity where they would have blacked out when they figured out what was going on. Armstrong pulled the circuit breaker for the propulsion system. Then, when they saw that the acceleration wasn't continuing, he knew what was going on. He was able to turn the system back on and control it and get it stopped using other thrusters.

AIAA: That's not a story you hear very often.

Norm: That was as close in the Gemini Program as we came to losing a crew. We learned a lot about system cleanliness in there, because we'd have thrusters go up, and then we would find out that their effective thrust was much, much less than they should have been.

When we'd analyze the part that came back—the crew capsule—we'd find a lot of trash in the propellant lines that had gotten caught in the filters. And in some cases, the filters were not in the right place and there had been insufficient cleaning of the lines. Trash got down in the valves and plugged things up. Mostly it was the filters—they would get so plugged up with braised material and trash that hadn't been sufficiently cleaned out of the system that

Above: Gemini 4 prime crew in elevator preparing to enter Gemini capsule (source: NASA)

you couldn't get enough propellant through there to make the thrust that the engine was designed to produce. So those provisions on the Apollo Program benefited from that learning experience. The Apollo systems were much, much cleaner. The filters were better positioned, better designed, the electrical design of the valve was such that, if there was a short, it didn't turn the valve on.

Below: A view of Gemini 6 from Gemini 7 window (source: NASA)

AIAA: Did you go over budget in those days? Did you duke it out over the money?

Norm: Yes, but at a very low level. In those days, the early days, the program manager for the Gemini Program or Apollo Program had a tax on his money to give, like, 10% to divisions like mine for support, including independent research and development. But that R&D had to be focused on an area that would support his program, and he could veto your research. But we had a pot of money that belonged to our vision. And then we had to go back and sell the program manager on the value of what we were going to do with it. And in addition to that, within the manned space area at HQ, there was a research division which had its own budget for applied research. So we could go back and say we had an idea for a new fuel cell approach, or we got an idea for a new material to make the rocket engines out of or a different valve concept or a different package. It had to be focused on what the center was doing because they didn't want a lot of resources working on independent sandboxes out here.

AIAA: Do you think that still happens today, that, you'd be working on a particular request for someone above but you'd also put in your own request, not just for capital equipment but to do some kind of research?

Norm: It has to have an application that the program manager can see, otherwise you'll not get it.

AIAA: But applied research money…that probably happens less and less now at JSC?

Norm: Right.

AIAA: And you think the trend is swinging the other way now?

Norm: Right. In the years I was in Automation and Robotics, two things were very successful. The AerCAM/Sprint was one project. It was a little round flyaround robot that actually flew on one the shuttle missions, STS-87. It was about the size of a large basketball. It was a free-flyer with its own little propulsion system in it. It used nitrogen gas-powered thrusters and it had two TV cameras in it, so it could fly around and do inspection.

AIAA: Was that the precursor to the SAFER?

Norm: The SAFER is a backpack. SAFER was the other thing I was going to mention. It's a little like a fanny pack on the back of an astronaut, who, if he becomes detethered, can reach back and activate this thing. Pull out the control stick and fly himself or herself back into the airlock.

AIAA: Well, we've talked a lot about Gemini and a little about Apollo, and about Robotics, so obviously there's a lot in between those projects, and you worked on Shuttle.

Norm: Yes, we went from Gemini and segued directly into Apollo because it turns out that the thrusters on the Gemini orbital attitude control system essentially were identical to the command

module thrusters, until we gave Rocketdyne a contract with the idea that this is going to be identical, we won't have a new development cost. First thing Rocketdyne did was set up a new organization out there, and then the design immediately began to diverge and get different and that kind of thing. So it was a fight with the contractors.

AIAA: Do you think that was a slow-down?

Norm: We wanted it to be the same, and then for some good reasons, it ended up that it had to be a little bit different. So we were in a very good position to manage the command module thrusters and still did a lot of work here. And one thing I'll tell you, a big part of what we did was to get early versions of the contractor's hardware, and bring them down here and do independent tests. That's because contractors frequently would not want to test outside the range of specification requirements. And one of the things we wanted to know was, what are the limits of this hardware, because that is very important to Ops, the people in mission control, this kind of stuff. So we would get hardware, either get the program to give us hardware, or we would take some of our money and independently buy some pieces of hardware from the contractor. We would bring it down here and just really wring it out to see—What if the pressures got real high or real low, or the temps got real high or low, or the pressures were mismatched, or what is the effect on the hardware?

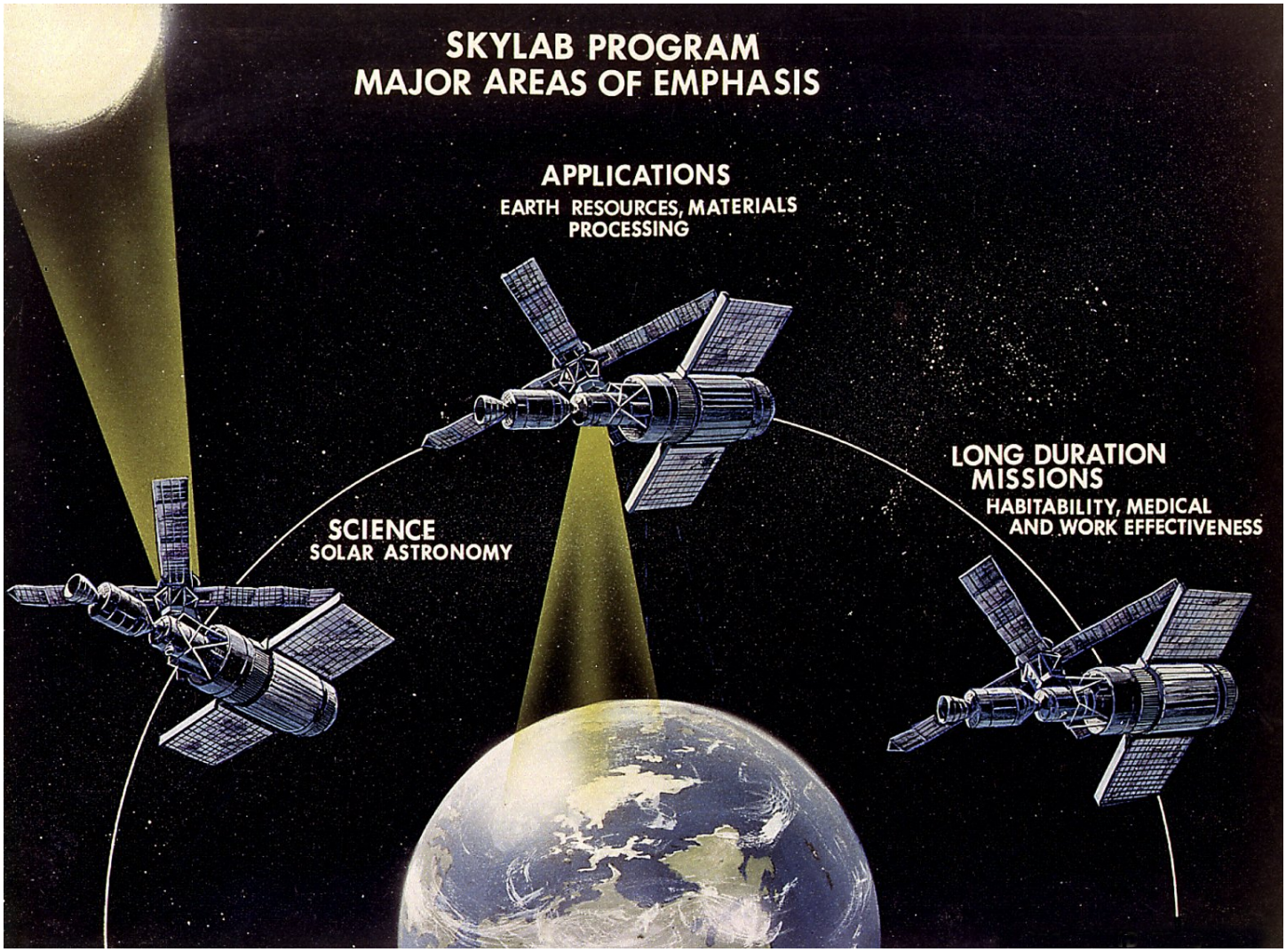
AIAA: Is that done today at JSC?

Above: AerCAM being retrieved after testing during STS-87 (NASA photo)

Norm: I don't think they do near as much of that as we did back in those days. So I worked on the command module thrusters and on the Service Module and Lunar Module thrusters, which were of a different type, all the way through the Apollo program. Through Apollo, I was basically an RCS or Attitude Control Systems guy, with an emphasis on the rocket engine. But I also was familiar with the tank design and their problems and the various other system components like check valves and relief valves and pressure regulators and filters and things of that nature.

So I became a systems guy, and at the end of Apollo, and even well before the last Apollo flights, I was diverted off into the early days of the Shuttle design, and got going on that with some of the early technology. I did Phase A and Phase B studies, and some of the early hardware technology studies that we did to see what was going to be possible at the time. We hoped the Shuttle could be an all-hydrogen/oxygen system, with not only the booster engines being liquid hydrogen/liquid oxygen, but also the on-board main engine of the spacecraft, the attitude control system, the

Below: Astronaut Mark C. Lee tests the new Simplified Aid for EVA Rescue (SAFER) system (NASA photo)



Above: Illustration of the Skylab Program (source: NASA Marshall Space Flight Center Collection)

auxiliary power unit, and the fuel cell being hydrogen/oxygen. And the benefit of that is, you get common tankage, you can share propellants between systems, it's not toxic, and it's not corrosive. It is explosive, but you can breath it and it doesn't wipe you out.

And we did an awful lot of work on that in the early days, and it turned out that the technology level and the cost was not going to be compatible with what the program ended up having, and so we went back to the same kinds of systems that we had on Gemini and Apollo. But, in the meantime, I worked a little bit on Skylab. Really the center of gravity for that was at Marshall Space flight Center, because they were doing the lab. They turned the third stage, the S4B stage, into the Lab. We were basically flying Apollo hardware and supporting that. But I supported that Skylab program, and the first flight when they launched the laboratory, the thermal shield on the laboratory ripped off during launch. So we had to figure out how to protect that module from getting overheated. One of the things we did was come up with a solar parasol that got poked out of the side of the lab and deployed like a big umbrella, basically. That shielded the spacecraft from sunlight, so that it didn't overheat. And then the question became, is the parasol strong enough to withstand the exhaust from the attitude control engines as the command module service module approached? The parasol was made out of aluminized Mylar, which was subjected to the RCS jets firing for docking. We used the large vacuum chamber, Chamber A in Building 32, to test the parasol with pulses of plume. It buffeted it but didn't destroy it.

AIAA: Let's talk about your Space Station ca-

reer.

Norm: I went to Station in the early 80s. At the time, I was Deputy Chief of the Propulsion and Power Division, but I felt like I had command of that domain and was ready for some new adventures. I got invited to the Level 2 Program Office—that is the level that coordinates the individual project activities at the centers. I was Chief Integration Engineer for Space Station. My job was to show that we could technically put all of these pieces on-orbit and have 47 different configurations of vehicle, each of which was a viable, stand-alone spacecraft. I did all the analysis for that. So I wrote the Systems, Engineering, and Integration Plan, or was responsible for it, and pulled together all of the activities of the NASA centers. For instance, everybody had a different drawing system and everybody had a different way of expressing interfaces, so we had to standardize all of these things so that we could talk to one another and all the hardware would be compatible. The politics and management techniques of doing that were probably much more challenging than the engineering.

AIAA: How successful was that? Can you give us a lesson learned from that integration experience?

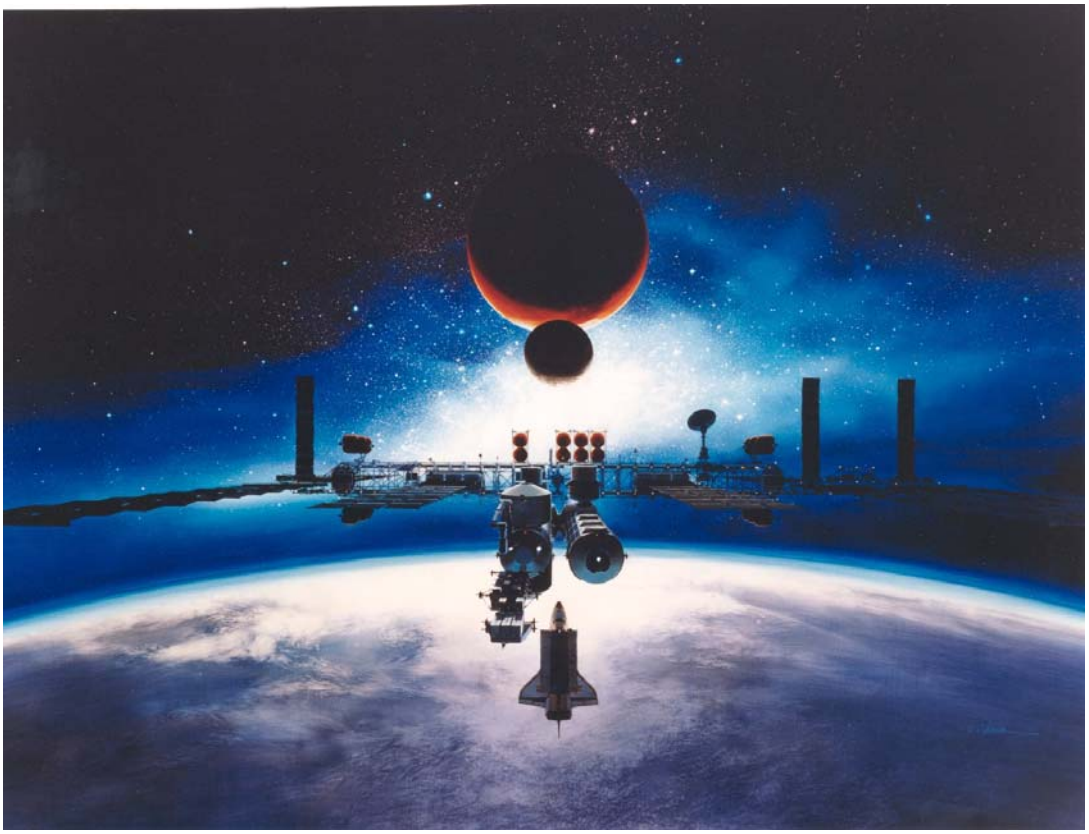
Norm: I think it was successful. The technical challenge was much less than the political challenge of trying to get several disparate groups of people who had their own ways of doing business to agree on one way. This wasn't as difficult as trying to work with the Japanese or the Russians or the Europeans, but each NASA center had its own drawing system and way of doing things, and suddenly we were in this system where everybody was in each other knickers, and so you have to have common systems.

On Apollo, the interfaces were real clean, because Marshall did the booster, there was a real simple interface where the spacecraft that we did sat on top of the booster, so you had a mechanical joint and some electrical connections and some computer connections and that kind of stuff, so that was fairly simple. Now, when we got to the Space Station, you've got Marshall building the structure, and Lewis [now Glenn] building some of the other systems so everyone was in each others knickers all over the place. Making the compromises was hard.

We also worked very hard on the concept of knowledge capture. We knew that this was going to be a multi-generational program and that the folks who made key decisions in the early days were going to be gone, or dead and gone. We knew we had to have a system to capture all the logic, not only what we did, and how we did it, but why we did it, so that we can easily go back and track that, to see what the implications would be for making a change 30 years from now or whatever.

Knowledge capture was a very difficult problem. The center is just now coming to grips with it. They got a lady named Jean Engle who has been appointed to be a Chief Knowledge Officer, and she's trying to capture stuff like this and figure out what the systems are. In my capacity as President of the JSC Chapter of the NASA Alumni League,

Below: Artist's rendition of Space Station Freedom, 1991 (Artist: Alan Chinchar. Source: NASA Great Images in NASA Collection)



Jean has called me and said, "Hey, can we get some of your members who have been through this in the past back together? Let's make sure we've got the lessons learned and the rationale and logic as well as trying to find out what is a system for setting up stuff for the future." Occasionally, I still get calls from other people. For instance, the propulsion system on CEV will be very similar to Apollo—although they'll reflect increases in materials and electronics—but the propellants will be the same. So I'll get a call asking, "we've heard that this and this happened, and is that the case, and why was it, and what did you do about it?"

AIAA: Up to now, it sounds like there were people who had been on the previous project every step of the way during your career at NASA, and new people coming in all the time still doing design work, but now there is a gap with CEV. So how do you close that gap?

Norm: With the knowledge capture and this mentorship and the transfer of knowledge from one generation to the next; by having an ongoing program of in-house work, where an older engineer who has been through something can work with a younger engineer who is trying to improve or making something else. He can say, well, look, nitrogen titroxide behaves like this in a vacuum and you've got to be careful, and you can't use this or that material.

AIAA: So they are acting as mentors for NASA engineers?

Norm: There is a mentoring program, and I've participated in it for a number of years, but as a more senior guy, I tend to mentor people in mid-career. They're looking not so much at technical things as career decisions, and how should I deal with this management situation or career option. There are some training programs now for engineers that are moving up into management, because being an engineer as an individual performer is a completely different thing from being a supervisor of a group of engineers.

I had a very hard time making that transition myself. As an individual engineer, I set very high standards and had high expectations for myself and was a very good individual performer, which resulted in my being promoted to Section Head. Suddenly, I was head of 18 people who on Friday had been my colleagues, and on Monday they were my employees. It was difficult for them to see me in a different light, and for me to see them in a different light. But the thing that I struggled with was that I had to review their work. And frequently I would find myself nitpicking it, or it wasn't the way I would have written it, or wasn't quite the way I would have done it. So I was sending it back and getting some complaints. I remember one night that I had taken work home—I was working on memos and reports that people had written that were getting ready to go out. It was about three o'clock in the morning, and I was sitting there reading this guy's report. I was red-lining it and editing it, and finally I thought, "well, you know, it's 3 o'clock in the morning, here I can hardly keep my eyes open, I'm working on this guy's draft report. He's home, happily asleep," you know. I thought, "let me step back. Does this report communicate what he did and communicate the results? Yes, it does. It's not as good as I could have done it, but it's good enough. So I have to quit doing this."

I had another experience when I first moved to the Space Station program office. We had a system for processing engineering changes called the change board, with a Requirements Change Board and an Engineering Change Board. And I was kind of the manager of part of that and would help set up the board agenda. The heads of all the major departments would sit on the boards, along with reps from individual NASA centers that were participating and the Program Manager. We had a regular agenda that got put together every week of issues that came before the disposition. The philosophy behind the process was that you'd work all your issues out before it got to the board. You'd only bring up things to the board that you'd reached an impasse on, otherwise stuff came just for rubber-stamping and information only. But it got to the point where the politics of inter-center agreement was so difficult that nothing ever got agreed to before it got to the board.

I had gone early on to the Program Manager, who was an ex-flight controller, very well thought-of guy, very brilliant guy, excellent manager, that kind of stuff, except in this case. I told him, "look, I put together the agenda for you, and I'll research each of the agenda issues. I need an hour on your schedule every day before the board meeting, and I will come give you a quick summary of what the

issues are, what centers are for what, and what our staff's recommendations are." And he said, "no, that's a waste of my time and your time. I'm a flight director, and I'm used to taking in huge amounts of data and making a decision on the fly and I can do that." As a result, they would start those board meetings at 8:30 in the morning on Friday morning and sometimes at 10:00 on Friday night they were still going on. Because they were arguing the nitty-gritty of the issues at this very high level.

AIAA: They had the same issue as you did as a new manager, they were nit-picking?

Norm: Right. I remember the first time that everybody was out of town, and they said, "Norm, you chair the board this week." The meeting was over at 10:30 am the day I chaired it, because the issue would come up, and I'd ask, "have you coordinated this with the other centers?" "Well, no." And I'd say, "OK, issue postponed. Next issue!" I wouldn't listen to the discussion. I said, "I don't know enough about it, people around this table don't know enough about it, you people have got to boil this down to decide on some of these things, and only on the kernel issues."

AIAA: So eventually you learned those efficiencies, you learned how to deal with people and how to be diplomatic and still get things done?

Norm: At a lower level, in the Shuttle program, I learned how to guide and manage that system because I was a leader of the propulsion and power team. Once a week, we had to meet with the board or the Program Manager to tell them what our progress had been in the previous week and bring up any issues and changes that we needed. And when I had something that the Program Manager was very resistant to—because it was going to cost him money or cost him schedule or something like that—I would get my ducks all lined up within my organization, so I knew for sure what all our people thought, and we were all in agreement with it. Then I would go around to the members of the board, the head of engineering, head of ops, head of SRQA, head of manufacturing, and say, "listen, I need 15 minutes of your time to pre-brief you on this issue, you know, and tell you what's going on, what the problem is, what we need and why we need it." I would go around and do my pre-briefing like that, so when it got up to the board, we would make our presentation. Initially, the Program Manager would disagree with our recommendation for money reasons or whatever, but frequently the other participants would agree such that he would be convinced and they would end up being adopted. So, I learned how to manage the system.

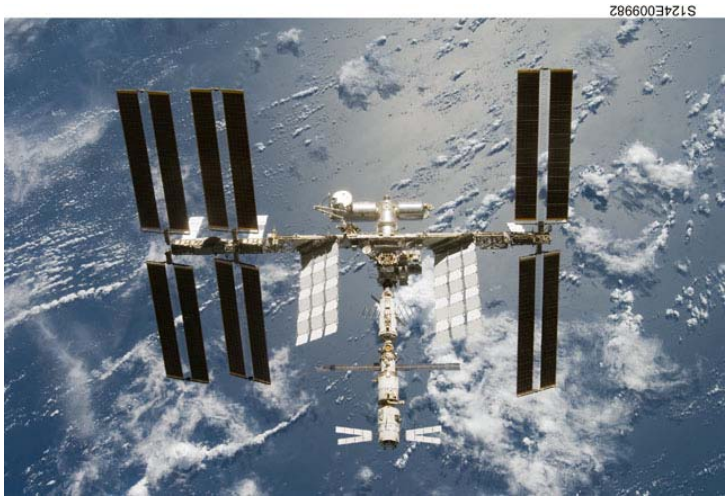
AIAA: Well, you're brilliant, but not every engineer can get to that point. You can become a technical expert in what you do, even though you might not get that title, or you can get into management, although you may lose technical skills. So, what can engineers do in order to become good managers, either in college or during their careers, to step into that role and not have to go through those painful mistakes, learn from what has gone before?

Norm: You can do a little bit of it academically, people can learn the tools of the trade and some of the principles by getting a degree in business management or information management. There are training courses now that NASA has, and there are systems engineering curricula and program management curricula that have happened after I retired. I'm not sure if they are required or not, but even when I became a Section Manager, there were courses that were required that you had to take within a year after you got that job.

AIAA: How do you learn how well you're applying those skills in a management job? How did you do that in such a big bureaucracy as NASA?

Norm: We had a 'culture of responsible conflict' at JSC. We'd have some very, very spirited discussions amongst ourselves and with other centers about how to do things and what was right and you know, you'd be pounding the table and yell, "that's crap!" But when the meeting was over, you could all go out and have a beer together, and you're buddy-buddies. You could have technical disagreements at a very strenuous, deep level and respect one another. I've always had that, even up to the day I retired. I had no problem going to a project manager—you know, I wouldn't be impolite, but I'd say, "you've got that wrong, Aaron."

I remember at one point,



Above: Current ISS configuration (Source: NASA)

when I was still in the Propulsion and Power Division, we had a disagreement on the kinds of seals that were being used in the actuators for the aeronautical systems, the flaps, elevons, body flap. The people who built the actuators were in the GNC system, and I had the hydraulic system that supplied the fluid to the actuators. It was a complex interface, and we had a disagreement over the kinds of seals we ought to be using to prevent fluid leakage and seepage—both the design and the material. And we got in front of the Orbiter Program Manager, a guy named Aaron Cohen, and there was a presentation by the GN&C guys. Something about the seals came up, and they said they felt like best way to go was such-and-such. I was in the meeting, and I said, "hey, that isn't right, we need this different kind of seal that has demonstrated much greater life, there is less leakage, you know, it doesn't take a set under pressure."

Aaron got real angry about the fact that we were in disagreement in that big meeting, so he reamed me right in front of the meeting. He said, "you get out to Rockwell, and you get this resolved." I said, "OK, I'll go down, make travel plans, I'll be out there tomorrow." "No," he says, "I want you out there tonight!" And I said, "well, I have to go pack my bag and get orders," and he said, "I want you out there tonight!" So I said, "yes sir, I'll get out there tonight." I called my wife and asked her to pack a bag quick, and I got my secretary to get me travel, and a little team was formed, and we went out. The next morning, we walked into the meeting room with the Rockwell guys, and they were listening apparently to our meeting, because they said, "Oh, we see you got yourself out here!" And then later Aaron called me on the phone and said, "hey, I'm sorry I said that and got angry with you." And we're still good buddies.

AIAA: What is your hope for Station? Do you hope that it's going to outlive its design specs like Mir did?

Norm: I certainly hope so. I'm worried about the big rotating joints, the SARJ. There is a lot of threading of the races and bearings. We've been to the point where we haven't been able to make very good utilization of Station as a science laboratory because so much of the time is going into operations and maintenance and assembly. Now that we get there, we have to be very careful that the amount of effort that goes into those kind of things gets minimized, and that a large portion of the crew of 6 or 8 or whatever it's going to be can focus on doing research that can only be done in a zero gravity environment.

AIAA: Are you concerned that Station seems to become more of a European, Japanese, Russian experiment than an American experiment?

Norm: It looks to me like the US is getting ready to kind of walk away from the Station. We've been the chief architect and chief engineer. I think we can minimize our staff that's focused on maintenance, and I think it needs to be an important United States research facility. I think the role of Station is to be a very multi-functional space laboratory, a working laboratory that has a variety of capabilities. I think it's important to get the full complement of crew up there. At one time, there was going to be a crew of 8, I think now they're talking about 6, and they have two Soyuz vehicles to get everybody back. At one point, there was going to be a US emergency recovery vehicle, which, to our credit, we were building ourselves over at Bldg 33 or 228. But they pulled the plug on it because of money. That was the X-38. I used to take tours over there to look at it. It was a winged vehicle that could house 8 people, designed as an emergency vehicle. It was going to be docked to Station, all 8 people could get into it and hit the big red button and it would essentially separate and fly itself back on Earth even if the crew was partially incapacitated.

AIAA: Let's talk about the future. China has a plan to land a manned spacecraft on the Moon by 2025. Is that realistic?

Norm: I really don't know much about their program. I think they have a flight planned in the next year.

I read recently that they had moved a launch vehicle to their launch site. What they've done gets a lot of press, but they're where we were in the 1960s, although their technology obviously has taken advantage of things that have come along in electronics.

AIAA: Do you think that a feeling of competitiveness with China is going to be good for NASA?

Norm: Yes, competitiveness drives accomplishment in many cases. If you don't have a goad to push you, then you're going to be happy with the *status quo*, because need is the mother of invention. A program manger told me a long time ago that 'better is the enemy of good.' When you're a program manager, when you get something that's good enough to do your program, then you quit spending money on making it better until there's a driving need to make it better. But we're hoping to get back to the Moon by 2020, and then have a semblance of a base there fairly early on. The early missions are obviously going to be just a few people on the Moon for a few days, but later on when we have the capability to land a habitat where we can stay there…

AIAA: There is discussion that, with all these private rocket companies coming up, that could basically put NASA out of the launch business.

Norm: I think that would be good.

AIAA: And then, what would NASA focus on, ideally?

Norm: We could have a reliable domestic source of propulsion, but what you have to realize is that the government is going to be also the sole customer for that, basically. For instance, in my own mind, in robotic control, we would in doing a teleoperatic robot in a complex and busy environment, we would put on a VR helmet, which was not operating in VR, instead, the little eyesecreens would see what the TV cameras of the robot eyes were seeing, so you could essentially become a robot. If you had controls on your own hands and arms, and on your head, where the robot would emulate what you did.

AIAA: Is that where things are going: telerobotics?

Norm: You know, we spent some money early on trying to develop better helmets and VR things in Automation, Robotics and Simulation until we realized that the gaming people were spending a whole lot more money doing that and making greater progress. So we figured, hey there's no point in us doing any research in this, let's just let those guys drive the capability and we'll buy their products, and that's what we ended up doing. So, in areas where private industry, for other reasons, is driving the technology, there's no point in the government doing that. But there are certain areas like rocket engines, where almost always the government

Right: The X-38 flies free after release from the B-52's wing (source: NASA)

NASA Dryden Flight Research Center Photo Collection
http://www.dfrc.nasa.gov/gallery/photo/index.html
NASA Photo: EC01-0204-2 Date: July 10, 2001 Photo by: Jim Ross

X-38 flies free from NASA's B-52 mothership, July 10, 2001

is going to be the primary customer. It's good to have a private company do that. I'm impressed with Elon Musk and his company, and he's had some failures now, but I know the guy. I bet he's going to come along and do a good job. I think the government can get to the point where they can hand off the technology, or maybe do the manufacturing and stay in a lower-cost, advanced technology thing like VASIMR, some fun stuff like that.

AIAA: Things that are launched from space.

Norm: Yeah.

AIAA: So, knowing what you know about Elon Musk and VASIMR and robotics and all these things, what is the most likely scenario for future Mars missions?

Norm: There are going to be more landers and ever more capable rovers. Spirit and Opportunity, what tremendous job they both have done. And the one that's up there now, Phoenix, it's not mobile, but it has dug a trench. If you can get a VW-sized or bigger device up there that's mobile, a tracked or wheeled vehicle, that has a lot of end effectors and robotic devices, where it can roam around and pick things up and observe them—something like Robonaut, that we're working on over on the Building 9 facilities right now—it could take core samples and do a whole variety of things to investigate a site on Mars. Without a doubt, the early missions will be robotic missions, including some that are very sophisticated mobile robots before they commit humans. That is because the Mars mission is basically a three-year mission. You're talking about going for seven or eight months travel time, 23 months on the surface before the planets are in position for you to return, and then eight months coming back.

AIAA: Unless you get some propulsion system that gets you there fast with a lot of mass somehow.

Norm: Unless it gets there fast.

AIAA: Norm, do you have any general advice for engineers?

Norm: When you have a decision to make, you have to make it in a timely manner. But all decisions are made with incomplete information. So, if you later get additional or better information that indicates you need to change your decision, don't be too proud to change it. Then explain to those affected why the change was made.

AIAA: Finally, what project or accomplishments during your many years at NASA are you most proud of?

Norm: My greatest legacy hasn't been my personal contributions to any of the programs or projects I have worked on at NASA. I am most proud of my contribution as a manager who tried to effectively develop my employees professionally, to mentor them in their career progress so they could maximize their contributions and success. I feel like I have helped some of the folks who are now in key positions in our return to the Moon and the planning for Mars exploration.

Membership

LISA VOILES, MEMBERSHIP CHAIR

Please welcome our newest AIAA Houston Members from July & August!

MEMBERS:
Christopher Aiken
Laura Allen
Jennifer Allred
James Baker
Daniel Bauman
Richard Barton
Raktim Bhattacharya
Raktim Bhattacharya
Suman Chakravorty
Jacob Collins
Gerald Condon
William Davidson
Christopher Draper
Samuel Flores
Michael Frostad
Timothy Fuller
Tim Glover
Lyndon-Michael Gordon
Melissa Gordon
Michael Graul
Gene Grush
Neal Hammond
David Hash
David Hyland
Rebecca Heller
Eric Hurlbert
Professor David Hyland
Matthew Jessick
Harry Johnson
Kanthi Kannan
Robert Kowalski
Monica Lee
Greg Loe
Brian Lusby
Michael McCulley
Sara Mercer
Matthew Mickle
Miroslav Mihalj
Walter Miller
Angie Najarian
Jeffrey Osterlund
Jason Palmer
Leah Pate
Moonish Patel
Eric Petersen
Jeremy Rea
Dr. Junuthula Reddy
Michelle Smith
Nebojsa Solunac
Patricia Stratton
Benjamin Sullivan
Byron Wing
Keith Van Tassel
Arturo Vasquez
Michael Weeks

STUDENT MEMBERS:
Faye Allen
Christopher Aul
Thomas Brenner
Nick Denissen
Parikshit Dutta
Matthew Evans
Raymond Fontenot
Joseph Harvey
Kevin Kreitz
Jonathan Lawrence
Agustin Maqui
Brent Mayorga
Vinh Nguyen
Avinash Prabhakar
Kristina Rojdev
Brandon Rotavera
Nathan Sanders
Truong-Dzuy Truong-Cao
Mana Vautier
Drew Woodbury

EDUCATOR ASSOCIATES:
Dr. William Hitchcock (*Conroe ISD – Academy for Science and Health*)
Mary Parker (*Conroe ISD – Academy for Science and Health*)
Major Bjorn Sundet (*Civil Air Patrol*)
Krystal Sims (*Willow Creek Elementary*)
Deetrice Wallace (*HISD*)

Congratulations to Houston chapter's newest AIAA Associate Fellows:

Darby Cooper
Larry Friesen
John E. Hurtado
Michael Kezirian
Patrick Rodi
William West

Above: New member Greg Loe was a co-presenter and co-author for the presentation, "Orion Entry Flight Control Modifications and Performance" at the AIAA GN&C conference in Hawaii on August 18-21, 2008. The photo is from AIAA Houston Section's Annual Technical Symposium of 2007 at the NASA/JSC Gilruth Center.
Below: New member Michael Frostad displays his enthusiasm for manned spaceflight

Update Your Membership Records

Please verify your AIAA member record is up to date. Knowing where our members are working is vital to the Houston Section in obtaining corporate support for local AIAA activities (such as our monthly dinner meeting, workshops, etc.).

Please take a few minutes and visit the AIAA website at http://www.aiaa.org/ to update your member information or call customer service at 1-800-NEW-AIAA (639-2422).

You may always contact us at membership@aiaa-houston.org

The membership total from July 1, 2008, was 1173, which included 856 professional members, 229 student members, and 88 educator associates. As of August 1,2008, there are 1202 members which includes 869 professional members, 243 student members, and 90 educator associates.

Important notes:

- *Not a member? See the end page.*

Nominate a Colleague for One of AIAA's Top Awards

Do you know of a colleague who has made significant contributions to aeronautics or astronautics or to AIAA? Nominate them for one of AIAA's top awards.

Visit http://www.aiaa.org

Book Review

A View From the Doghouse

DOUGLAS YAZELL, PAST CHAIR

This 321-page book from 2004 was available both in hardcover and softcover when I bought my copy from the author (Celeste Graves, www.celestegraves.org) at the 1940 Air Terminal Museum at Hobby Airport recently. It is my first introduction to the WASP (Women Airforce Service Pilots) of World War II. For me, it was educational, entertaining, and uplifting, with a nice mix of photographs (lots of them) and text. The full title is *A View From the Doghouse of the 319th AAFWFTD*, which

Above: Homer Jones and Jimmy Craddock and the Doghouse, 1942.
Below: The cover photograph for the book, Celeste Graves at the Doghouse, circa 1942 (photos provided by Celeste Graves)

Above: Celeste Graves, circa 2002, with Fifinella, the WASP mascot from Walt Disney. Note another book by Celeste G. Graves, Magnolia Memories.

was the Army Air Force Woman's Flight Training Detachment. Aviation Enterprises won the contract and the training started in November of 1942 at Houston Municipal Airport, whose terminal building is now the 1940 Air Terminal Museum at Hobby Airport.

This book's focus is the three WASP classes who trained at Houston Municipal Airport starting in November of 1942. The first class graduated at Ellington Field, and the last two classes graduated at Avenger Field in Sweetwater, Texas, a 460-mile drive to the northwest from Hobby Airport. A fourth class started their training in Houston and finished in Sweetwater, along with other trainees who started in Sweetwater. The first class of Houston trainees were called the Guinea Pigs, since no one would have been surprised if the entire program of training these women as ferry pilots were cancelled. More publicity has been given to the history of the WASP in Sweetwater, but the WASP started in Houston, where their hard-earned success made the WASP a reality.

Author Celeste Graves worked for Aviation Enterprises at the Houston Municipal Airport during the early years of World War II. Her office was a small building on the flight line with windows on three sides. It was called The Doghouse. She kept flight logs for student pilots who were all men and she was surprised to

see the first class of women who were later (in August of 1943) named WASP.

These women were brave and determined enough to be experienced pilots before their applications for this training in Houston were accepted. They replaced military pilots in the continental USA so that those male pilots could go overseas in combat roles. Once the women graduated, they ferried all kinds of military airplanes around the USA, a dangerous assignment at times, sometimes fatal. They often towed targets so that soldiers could train with anti-aircraft weapons. Live ammunition was used, and the soldiers sometimes led the target too much and hit the tow plane.

The book consists of short biographies or autobiographies of all of these women and some of the male trainers. The women were promised these jobs as military roles in advance, then were told that was not true once they arrived, and benefits were not awarded until 30 years later.

Each life story in the book has photographs of the subject person, all with some photos from the 1940s, and some with photos from as late as the 1980s or 1990s. One of my favorites is of Marion Florsheim in the 1940's after the war years with one of her Afghan hounds, standing in front of a top-of-the-line private aircraft, a Fairchild 24W (see "Odds and Ends" on page 46).

It's a privilege to get to know these WASP and some of their trainers from the stories and photographs in this book. Imagine Celeste Graves' good fortune in this regard, from the acknowledgments page in the book, "Special thanks to Mary Lou Neale, Geri Nyman, Betty Blake, Marion DeGregario, and Lois Hailey for helping me in so many ways. I may have been rather dim in their memories but they were vivid in mine!" Celeste Graves knew many of them starting in 1942 and in the years leading up to 2004 when this book was published.

These pages will inspire and educate any reader with stories worth telling and well told.

Above, left: Main reception area of the 1940 Air Terminal Museum at Hobby Airport on July 19, 2008 (Wings & Wheels program, which is around the lunch hour on the 3rd Saturday of every month). Celeste Graves is seated and looking to her left, with her books and other materials on the table.
Above & left: Scenes from that day's Wings & Wheels (Photos from www.1940airterminal.org)

Aerospace Projects Review

APR Corner

SCOTT LOWTHER

APR Corner is the first in a series of articles from Scott Lowther, whose unique electronic publication is described as a "journal devoted to the untold tales of aerospacecraft design". More information, including subscription prices, may be found at the following address:

Scott Lowther
PO Box 2220
Elkton, MD 21922
scottlowther@ix.netcom.com
www.up-ship.com

As manufacturer of the Saturn V first stage, the S-IC, Boeing was naturally inclined to try to sell more units. To that end, Boeings designers and planners came up with new missions for the Saturn V and S-IC, as well as designs for modified versions of the S-IC. Perhaps the most interesting was the S-ID stage from 1967. Visually similar to the S-IC, the S-ID differed in that the outer ring of four F-1 engines was intended to be shut down and dropped in flight.

Much as the outboard booster engines on the Atlas were dropped, the result of this would be not only a reduction in thrust, but a major reduction in dry weight. While this would be useful for standard multi-stage launches, the most interesting effect of this change was the ability for the S-ID to serve as a stage-and-a-half vehicle, with a planned payload of 50,000 or more pounds.

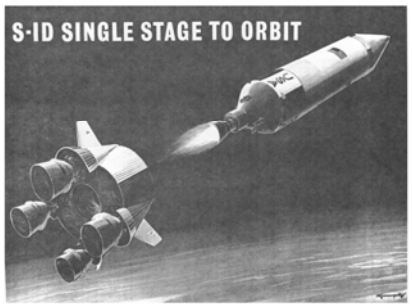
As the single-stage S-ID consumed about 70% of its propellant, the valves for the outer four engines would be closed. The thrust structure would then be separated from the forward thrust ring, and the assembly separated from the main stage. The stage would then continue on to orbit using the central F-1 sustainer engine, which would have to operate for a total of 192 seconds. The booster engines and their support structure, meanwhile, would plummet towards the ocean. Boeing considered it technically feasible and financially practical to recover (via parachutes) this high-value item for refurbishment and reuse.

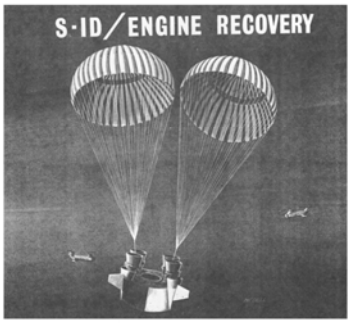
Standard S-IC structures, including tanks, intertank structures, F-1 engines and much of the thrust structure, would be used for the S-ID vehicle. However, by stretching the tanks a total of 20 feet, the mass ratio could be improved, giving a total payload of 65,000 pounds. It's not known if versions were studied using the more advanced F-1A engines, though it's very likely that further performance gains would have been possible.

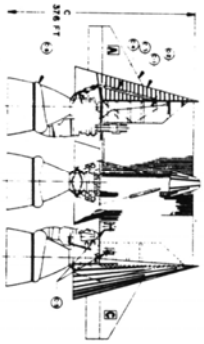
The S-ID, once in orbit, would have had no good way to return safely to Earth for refurbishment and reuse. However, propellant tanks the size of the RP-1 and LOX tanks that the S-ID was equipped with would have been massively useful on orbit… not only for, say, deep space missions, but also as raw materials and as the basis for large "wet lab" space stations. A single launch, with a payload of densely packed space station essentials, would have formed the nucleus of a "wet lab" space station far larger and more capable than Skylab or ISS… not with many launches by the Space Shuttle and the Russians, but in a single launch.

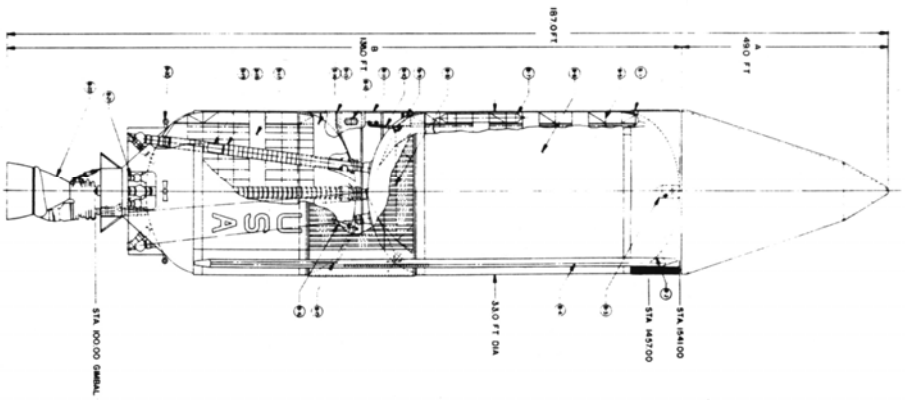
A. PAYLOAD
B. S-ID SUSTAINER STAGE
- B-1 FORWARD SKIRT
- B-2 FORWARD BULKHEAD, LOX TANK
- B-3 GOX DISTRIBUTOR
- B-4 GOX LINE
- B-5 RING SLOSH BAFFLES
- B-6 LOX TANK
- B-7 HELIUM BOTTLE (4)*
- B-8 CRUCIFORM BAFFLES
- B-9 AFT BULKHEAD LOX TANK
- B-10 LOX FILL AND DRAIN LINE
- B-11 INTERTANK
- B-12 INTERTANK ACCESS
- B-13 FUEL VENT LINE
- B-14 FORWARD BULKHEAD, FUEL TANK
- B-15 FUEL PRESSURE LINE
- B-16 HELIUM DISTRIBUTOR
- B-17 FUEL TANK
- B-18 SUCTION LINE TUNNEL (5)
- B-19 LOX SUCTION LINE (5)
- B-20 ROLL CONTROL ENGINES
- B-21 FUEL DUCTS (10)
- B-22 F-1 ENGINE

C. S-ID BOOSTER STAGE
- C-1 ENGINE FAIRINGS (4)
- C-2 THRUST STRUCTURE
- C-3 FIN (4)
- C-4 THRUST VECTORING SYSTEM
- C-5 UMBILICAL PLATE
- C-6 F-1 ENGINE (4)









Aerospace's Role in the Prevention of Terrorism

Dinner Meeting

NICK PANTAZIS, VICE CHAIR OPERATIONS

Aerospace's Role in the Prevention of Terrorism was the topic of the September 4, 2008 AIAA Houston Section dinner meeting held at the Johnson Space Center's (JSC) Gilruth Center. Our guest speaker was Mr. Sam Brinkley, Vice President Homeland & International, Security Services Office, Wackenhut Services, Inc. Mr. Brinkley, a retired marine, has served in a variety of security and training positions throughout his career for the Federal Aviation Administration, Department of Energy, Department of State, and the National Commission on Terrorist Attacks upon the United States (9-11 Commission). He has also worked with a number of senior level US and international leaders and currently provides counterterrorism consulting services to several large urban area police departments. Mr. Brinkley urged all of us as Americans to unite and work from the ground up to protect our communities and businesses. He noted that on September 11, 2001, terrorists successfully hit 3 of their 4 targets, and only missed the fourth, the Capital building, because that flight was delayed 45 minutes before finally taking off. He pointed out that we tend to forget about the role that industry and citizens should play in the prevention of terrorism.

Mr. Brinkley began his presentation with a video about terrorism. He then defined prevention as the ability to DETER, DETECT, DISRUPT, and DENY a terrorist attack. He noted that it takes an absence of complacency and increasing our ability to disrupt the operational process of terrorists. Mr. Brinkley informed us that as individuals, our role in helping to prevent terrorism is to be "somewhat selfish" and keep an eye out in our neighborhoods for uncharacteristic behavior. We should understand the indicators and warnings of the terrorist planning process and hold our Local, State, and Federal officials accountable for Prevention, he counseled. Companies should cooperate with local Law Enforcement to support intelligence-led policing in order to help prevent terrorism. They should also invest in research and development that will reap benefits across the Homeland Security community. Mr. Brinkley provided us with several examples of what is being done to prevent terrorism at the federal, state and local levels. He also explained that terrorists can enter our country like an immigrant does and that security personnel, in airports and other areas, are being trained to recognize suspicious behavior in people's responses simply by talking with them in a casual manner. Mr. Brinkley concluded his discussion by noting that preventing terrorism is not "Rocket Science", but it is just as hard.

The meeting finished with a lively question and answer session. One person asked a question about cyber attacks. Another asked about the recent background questionnaires required for NASA employees and some NASA contractors as well as how that information would be used. A third noted that he recently went to renew his driver license. On arrival in the parking lot, he took out the envelope which was mailed to him as a reminder, and he read that a social security card would be required. However, he lost his social security card years ago and had not replaced it. When he went inside, he read signs on the wall explaining that the only scenario requiring a social security card is a person faltering when asked to recite their social security number at the counter. In response to this story, Mr. Brinkley mentioned that people pretending to be someone else can be detected, sometimes with very little effort, and that it is extremely difficult for someone to stay in character all of the time. He gave the example of James Bond the British secret agent. James Bond carries many false passports, but when he arrives at his destination, he goes back to his James Bond identity ("vodka martini, shaken, not stirred") because it would be nearly impossible to stay in character as a different person…even for "Bond, James Bond."

Above: Mr. Sam Brinkley, Vice President Homeland & International, Security Services Office, Wackenhut Services

EAA Corner

Meeting Schedule 2008-2009

October 25 - 26, 2008 – Wings Over Houston – EAA/AIAA Hanger Party on Saturday Only, If you are going to the air show, we have a place to drop your gear, use a real restroom and sit to watch the air show. AIAA actually has a planning committee to help – love those space guys! (AIAA's initial publicity for an open hangar event was modified to move it to a booth on the Ramp next to the General Aviation area: the EAA/AIAA booth – look for our banners.)
October 27 - 30, 2008 – EAAs B-17 Tour Houston Please e-mail if you can help volunteer for the event and please forward to anyone that might be interested in volunteering or booking a ride. Good fund raiser, but need volunteers to help the 3 days, 5 to 6 of the volunteers will be picked at random to fly on to the next stop in Austin on 30 Oct free of charge – a really outstanding prize and the odds are really great! Volunteers do not need to be aviation inclined, but what a thrill! If anyone has contacts at the local media outlets, please contact Phil Perry at phil.perry@netapp.com (thanks for taking this on Phil!)
Need the Following Help for This Event: - Staffing: 5 people on 28 and 29 Oct (whole or half day) to help with their concession (2 sitting/trailer positions if that helps), "crowd" control (no need to be an EAA member), Hotel: Tour is looking for donated hotel rooms for the crew on 27, 28 and 29 for anyone that has connections near Ellington or even really reduced rates. Donation will get you in the raffle for the ride to the next stop. We also need some help for publicity, signs, etc. All are eligible for the ride raffle. Drawing Information: One slot per person, 1 chance per half day worked (work 2 whole days – 4 chances!), 2 Chances for a donated car for the duration (ground the kids from the car for 3 days and take advantage…(smile)), 1 chance for each 3 nights of Hotel donated (we have to have them in the same hotel). Raffle winners or their designees must: be over 18, be able to travel unassisted/alone on the airplane (requires ability to get in out and through the aircraft unassisted), provide their own travel back to Houston (carpool back?). Contact: Richard Sessions at rtsessions@earthlink.net to sign-up or more information. Please advise as soon as possible on volunteer support so we can make sure we have enough people to cover. This event will have a lot of competition for attentions with the wonderful local aviation resources and the air show, but why not build on it by forwarding to everyone you can and pitching at organizations – might bring you good luck if one can believe the zillions of good luck e-mails for a lot of other things.

EAA Workshop, E-LSA Inspection and Maintenance Course – Back On for 7-9 November? – EAA had advised they can cover, but trying to determine if feasible to fill the 16 slots at this point with the delays – Will advise. Ellington? This has not really started rolling, but anyone wishing to help should contact Richard Sessions at rtsessions@earthlink.net. I have a space at Ellington – VoloAviation, but and Todd Fowler or Bradley Aerospace is donating the E-LSA aircraft for the class. Class Information: http://www.sportair.com/workshops/Repairman%20(LSA)%20Inspection-Airplane.html
Please let me know if you are interested in attending the class, even if rescheduled.

November 8, 2008, Chapter Party - Tentative, 6 to 10 PM, VoloAviation, Ellington Field, Pot-luck cookout – other volunteers if not here? – Will likely follow the E-LSA workshop unless someone wants to host.

February/March 2009 – 1940 Air Museum EAA Day – Tentative, Hobby Airport

Recurring Events

Monthly Meeting: Chapter 302 Monthly Meeting, 2nd Saturday, 10 AM, Lone Star Builder's Center, Lone Star Executive, Conroe TX
1st Saturday of Each Month – La Grange TX BBQ Fly-In, Fayette Regional (3T5)
2nd Saturday of Each Month – Lufkin TX Fajita Fly-In (LFK)
2nd Saturday of Each Month – New Braunfels TX Pancake Fly-In
3rd Saturday of Each Month – Jasper TX BBQ Lunch Fly-In (JAS)
3rd Saturday of Each Month – Tyler TX Breakfast Fly-In, 8-11, Pounds Field (TYR)
4th Saturday of Each Month – Denton TX Tex-Mex Fly-In
4th Saturday of Each Month – Leesville LA Lunch Fly-In (L39)
4th Saturday of Each Month – Shreveport LA Lunch Fly-In (DTN)

EAA Chapter 12 Associates

American Institute of Aeronautics and Astronautics – Lots of activities in the local area and some announcements of our meetings! www.aiaa-houston.org
Houston Aviation Alliance, First Monday of each month at the Hobby Airport Hilton: www.houstonaviationalliance.com/
America's Flyways Magazine – Local Houston Editor - Jim Hartley, A great read: www.americasflyways.com/
Collings Aviation Foundation (some great war birds including jets and barnstormer vintage): www.collingsfoundation.org/menu.htm
EAA's B-17, Aluminum Overcast: http://www.b17.org – Scheduled to be in Houston 28-29 October 2008

Chapter Mission

The Experimental Aircraft Association's Chapter 12, located at Ellington Field in Houston, is an organization that promotes all forms of recreational aviation. The organization includes interest in homebuilt, experimental, antique and classic, warbirds, aerobatic aircraft, ultralights, helicopters and commercially manufactured aircraft and the associated technologies. This organization brings people together with an interest in recreational aviation, facilitating social interaction and info mation sharing between aviation enthusiasts. Many of the services that EAA offers provide valuable support resources for those that wish develop and improve various skills related to aircraft construction and restoration, piloting, aviation safety, and aviation education. Every individual and organization with an interest in aviation and aviation technology is encouraged to participate (EAA membership is not required, but encouraged). Meetings are generally from 6:30 PM to 9 PM at Ellington Field in Houston Texas. We welcome everyone. Come as you are and bring a guest; we are an all aviation friendly organization!

Contact Information

Please update e-mail information, host a meeting, present a topic or sponsor an event or make recommendations, please contact:
Richard Sessions at rtsessions@earthlink.net
EAA Chapter 12 Home Page: http://www.eaa12.org/
EAA National Home Page: http://www.eaa.org/

Odds and Ends

SPECIAL EVENTS, PICTORIALS, ETC.

Author Celeste Graves kindly sent us a color photograph of one of the WASP (Women Airforce Service Pilots). Only the black and white version was published in her book A View from the Doghouse of the 319th AAFWFTD. *WASP trainee Marion Flosheim is the subject of this photograph. She was in the first class of WASP trainees, and they trained at what is now Hobby Airport. Marion did not graduate with the WASP for medical reasons. From the book, "She was a New Yorker and preferred to live alone, so she shared an apartment in the Warwick Hotel with the two Afghan hounds she brought with her. She was a lovely redhead and was quite a picture exercising her hounds each day... Later she took up interior decorating and was a member of the National Committee of the National Society of Interior Designers who redid the International Reception Room at the White House for President and Mrs. Eisenhower - and again refurbished it for President and Mrs. Kennedy... Marion spent her time between living in New York and France."*

Above: Photo from 1992 Shanghai visit by delegates from AIAA Houston section, led by James C. McLane, Jr. and Li Furong. (Photo by delegate Tuyen Hua)

Below: Chad Brinkley (Chair, AIAA Houston Section), Ellen Gillespie (Chair Elect), Dr. Gary Turner (College and Co-op Chair), and Professor Andrew Meade visit during a July 2008 meeting at Rice University

Cranium Cruncher

BILL MILLER, SENIOR MEMBER

Last issue's problem was derived from another one given by Lewis Carroll in the year 1880. The following individuals submitted correct answers:

Sina Gibson
Douglas Yazell
Thomas Morrow
Bob Maraia
Ronny Newman
Alan Simon
Ludmila Dmitriev-Odier.

They all got correct answers for the payload weights (in metric tonnes), as follows:

Alpha - 5.5
Bravo - 6.5
Charlie - 7.0
Delta - 4.5
Echo - 3.5

Thanks to all who participated (a large response this time).

This issue's problem:

An JSC engineer is visiting KSC and is looking at one of the Orbiters in the Orbiter Processing Facility. He asks a technicians how old the Orbiter is. The technician replies:

"Well, I've just finished checking out the robotic arm on this Orbiter, which was installed quite a while after the orbiter was delivered. So, to answer your question, this Orbiter is twice as old as its arm was when the Orbiter was as old as its arm is now."

Seeing the baffled look on the engineer's face, the tech adds "Also, the combined age of the arm and the Orbiter is 30 years."

How old is the Orbiter?

Send your solutions to Bill Miller at wbmilleriii@comcast.net Names of the solvers, references, and the answer will be given in the next isue.

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