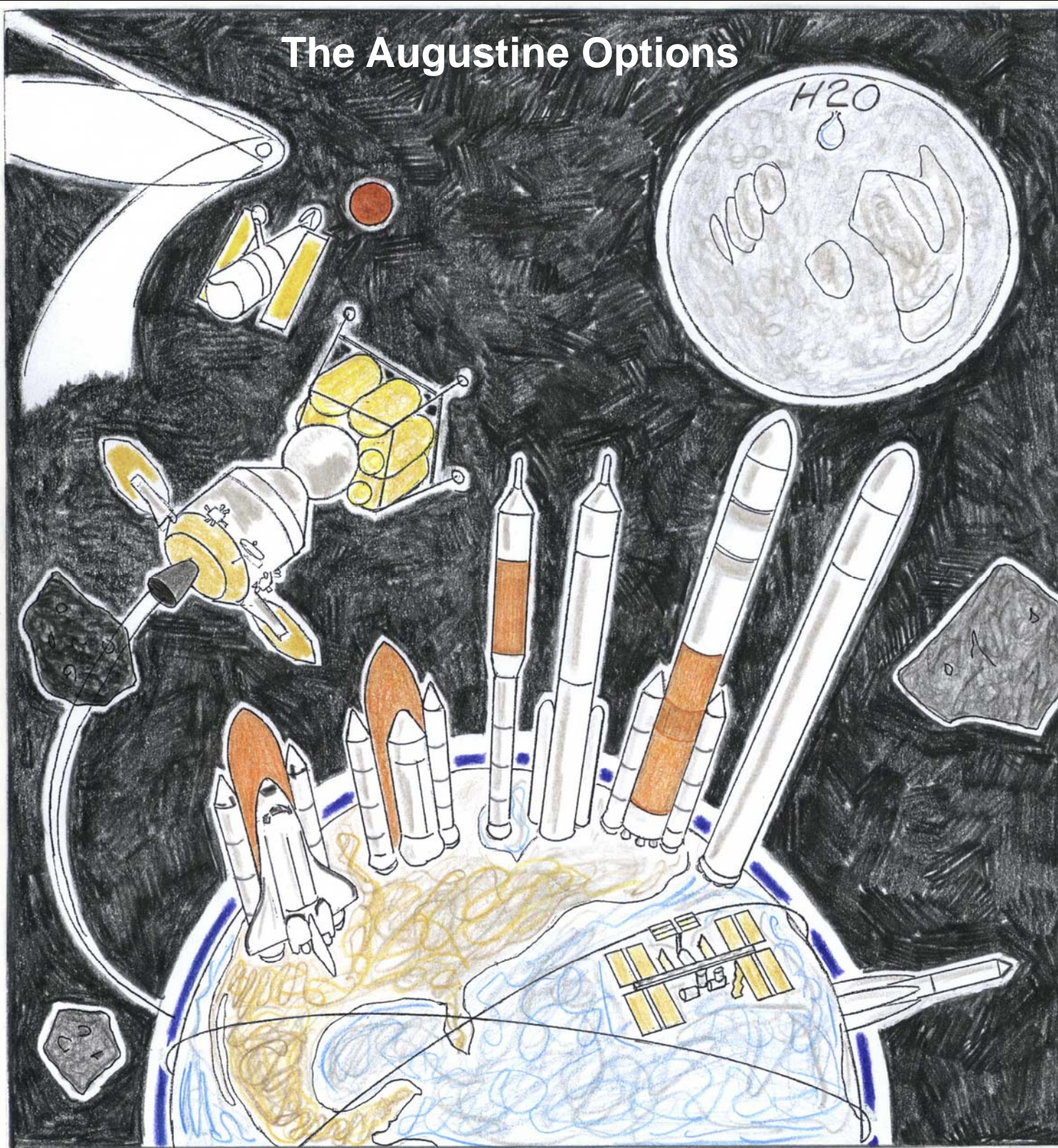


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The Augustine Options

A hand-drawn illustration in a sketchy, artistic style. At the bottom, a blue and white Earth is shown with a yellow and orange launch plume. A space shuttle is launching from the left. Several large, white, pencil-like rockets are shown in various orientations, some with orange segments. In the upper left, a satellite with yellow solar panels is in orbit. A small red circle is also visible. In the upper right, a large, light-colored circular object, possibly the Moon, is labeled 'H2O' and has a small blue drop above it. The background is a dark, textured black.



AIAA HOUSTON
American Institute of Aeronautics and Astronautics

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Fall 2009

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Cover: Various launchers and vehicles being considered in the Augustine Committee report. (Artwork by Don Kulba, see article on page 6)

More information at <http://www.aiaa-houston.org/orgchart>

A Reasonable Path

It has now been almost half a century since human eyes have been laid upon an alien landscape man has dreamed of visiting for centuries. Since then, numerous unmanned vehicles have brought us back fascinating pictures which have revealed more about this place than we had ever originally imagined, but no human visitors have been back, and it is uncertain when we ever will return. It's not the Moon I am referring to, but the deepest point under the ocean, "Challenger Deep" in the Pacific Ocean.

In the bathyscaph *Trieste*, Auguste Piccard and his team made several dives exceeding 35,000 feet there in 1960, becoming the only humans ever to dive that deep. No one has been back since, creating an interesting parallel with our stalled manned visits to the Moon beginning only nine years later. Interestingly, in the same way that Armstrong encountered some technical problems during his descent which could potentially have resulted in an aborted landing attempt or worse, Piccard made the decision to continue his first historic descent after hearing a muffled explosion on the way down, eventually attributed to a cracked viewing port. In the early 1970's, there was even a proposal for a "wetNASA," support for which eventually dried up (pun intended) because of the scarcity of customers for deep

sea submersibles and the drain in our country's resources from the Vietnam War. Some lessons can be learned from the experiences of deep sea exploration, an effort involving its own special technologies and unique challenges.

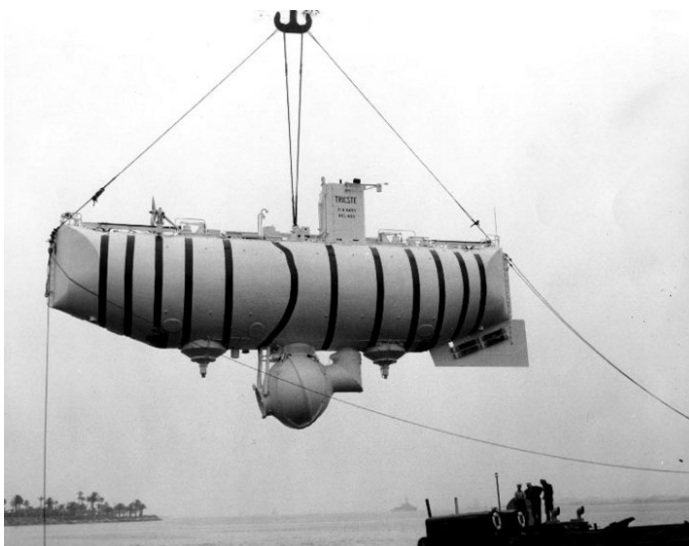
One of the options suggested by the Augustine commission has been termed the "flexible path," consisting of manned fly-bys of the Moon and various asteroids, but no landing. This would, in theory, drive necessary technology development and provide a stepping stone for further manned missions later without requiring the hardware for descent, landing, and ascent on another world, which incurs the greatest complexity and expense in any given mission. We would be forced to rely on unmanned and remotely operated vehicles to give us a sense of presence on these worlds.

It is interesting to note that the diving community essentially adopted this approach years ago when it was realized that even when humans were present in a deep sea submersible, they were still forced to

interact with the landscape through remotely operated devices. Also researchers realized that the greatest expense of an expedition was not the thousand mile journey to the site of the dive on the ocean's surface, but the last few miles of the dive itself. The paradigm has shifted to sending unmanned, remotely operated vehicles to the most inaccessible places on the sea floor. Transmission speeds are fast enough so that these vehicles can be operated anywhere in the world in real time, but true telepresence on another planet would require there to be a human in some proximity, such as an orbiting command module.

As anticlimactic or unromantic as it would be to have looked down on Mars or Ceres but never landed, it would give us some opportunities not open to us under any other approach. Let's not too quickly dismiss this unorthodox, but potentially useful, mode for advancing manned spaceflight. The "flexible path" might be the most reasonable path after all.

From the Editor



Left: Bathyscaphe Trieste, deep-diving research vessel designed by Auguste Piccard.

From the Chair

Chair's Corner

ELLEN GILLESPIE, SECTION CHAIR



Welcome to a new AIAA year! As the school year begins we at AIAA also start anew.

This is an incredible time to be in our industry and in Houston. Space Shuttle, ISS, and Constellation Programs are all active. We're anxiously awaiting the effect of the Augustine Committee Report on our government representatives and NASA budget.

This year is also the 40th anniversary of Apollo, and gives us the opportunity to look back and celebrate those accomplishments at the same time that we look ahead to the next big program.

Our AIAA Houston events for this year give us opportunities to celebrate the past at the same time that we peer into the future. On October 1st our Young Professionals hosted an Apollo 13 movie showing on the Saturn V rocket at JSC Rocket Park. Over 100 people came out to enjoy this special experience, which was kicked off with an introduction by Apollo engineers who supported Apollo 13. An Apollo 12 Panel Dis-

cussion is in the planning stages for November 20th, and Apollo EECOM Sy Liebergot is scheduled to conduct a dinner meeting for us on October 21st.

Our look back also includes the Space Center Lecture Series (<http://www.spacecenterlectureseries.com>) events on space shuttle development (Robert F. Thompson, completed in September) and crew training (Francis E. "Frank" Hughes, October 16, 2009) conducted jointly with UHCL. A Space Shuttle GN&C Development Panel is also in the planning stages.

Looking forward, Dr. Robert Horton plans to speak on UAV development at our June 2010 awards dinner. Norm Augustine also hopes to join us for a 2010 dinner meeting to discuss the findings of his commission. Dr. Franklin Chang Diaz will be the speaker for the November 20 Space Center Lecture Series event, Developing VASIMR. Dr. Paul Abell of the Lunar and Planetary Institute will speak at our Lunch-and-Learn on November 13 about

the Japanese Hayabusa spacecraft returning to Earth with samples from comet Itokawa. Congressman Pete Olson met with us in August, and a report on his dinner meeting is included in this issue.

I hope you were able to visit our Wings Over Houston airshow booth on October 31st, and be sure to join us later this year for an evening of star gazing at the George Observatory.

We're planning four conferences this year. A Workshop on Automation and Robotics, our section's Annual Technical Symposium, the Region IV Student Paper Conference, and the Moon Base colloquium (June 7-8, 2010, in Toulouse, France, with our sister section AAAP TMP: see our web page www.aiaa-houston.org/tc/isac). These events will help round out a full set of opportunities to present current JSC topics and learn about what others are working on here at JSC, in AIAA Region IV, and abroad.

Come out and join us for an exciting and dynamic year!

Pete Olsen Dinner Meeting

MICHAEL KEZERIAN, SECTION MEMBER

Congressman Pete Olson of the 22nd District spoke to 100 AIAA members and guests at the Gilruth Center on Wednesday, September 2, at the inaugural dinner meeting of the 2009-2010 year. Representing the Johnson Space Center, Olson is the Ranking Member of the House Space & Aeronautics Subcommittee.

Olson addressed the bipartisan efforts of the House Subcommittee on the future of NASA's goals in manned space exploration and thoughts on the impact of the Augustine Commission Report, which at the time had not been released. Pete spoke of his personal enthusiasm for the Space Shuttle Program, shared his experiences with school visits in the district, and reminisced about his little league football days when he was coached by astronaut (now retired) Major General Joe H. Engle.

Olson was raised in a military family, eventually settling in Seabrook. Olson attended public school and

graduated from Clear Lake High School in 1981, went to Rice University graduating in 1985, and then on to the University of Texas School of Law in Austin.

Pete began his naval career in Pensacola, FL, where he attended Aviation Officer Candidate School. In his nine-year career as a Naval Aviator, he flew the P-3C Orion. Among other missions, the P-3C Orion is designed to track and destroy ballistic missile submarines. During his deployments, Pete flew missions over the Persian Gulf to enforce the international sanctions levied upon Iraq after Operation Desert Storm. He also flew across much of the Pacific Ocean, the Indian Ocean, the South China Sea, and the Sea of Okhotsk between Japan and Russia. In 1994, Pete's combat aircrew was named Pacific Fleets best in anti-submarine warfare. Pete was transferred to serve on the Joint Chiefs of Staff in 1994 and a year later was assigned to be a Naval Liaison Officer

to the U.S. Senate.

In 1998, Olson became an aide to Texas Senator Phil Gramm, where he worked to promote the interests of Texas premiere military and aerospace. Olson would later serve as Chief of Staff for Senator John Cornyn.

Olson took the oath of office for the 111th Congress on January 6, 2009, for his first term as Congressman for the 22nd District of Texas. Olson serves on the following committees: House Transportation & Infrastructure, Science & Technology (Ranking Member, Space & Aeronautics Subcommittee) and Homeland Security.

Pete and his wife Nancy live in Sugar Land, TX with their two children.

Olson's visit was part of the AIAA *August is for Aerospace* Home Visits Program established so AIAA members could further develop relationships with elected federal officials.

Event



Feature Story

About the Cover

DON KULBA, ASSISTANT EDITOR

The illustration on the cover of this issue of *Horizons* depicts many of the alternatives being considered for NASA's future. These have been discussed by the committee chaired by Norman R. Augustine. Not shown are the French Ariane vehicles (currently not human rated), which are important for sending the Automated Transfer Vehicle (ATV) to the International Space Station (ISS). The rockets shown are the existing US Space Shuttle, Heavy Lift Launch Vehicle (HLV) (a cargo Shuttle variation NASA is investigating with a Crew Exploration Vehicle (CEV) and/or lunar lander in the cargo enclosure that would replace the orbiter), Ares I with CEV, full up Delta IV or modified Atlas V with CEV, Constellation Cargo Launch Vehicle (Ares V), a commercial rocket and the Russian Progress/Soyuz. It is important not to forget that NASA has many other projects outside of human spaceflight, including Earth studies, aircraft and space vehicle research, scientific study in space, biology, oceanography, climate change and other areas.

There is evidence that water and hydroxyl (one atom of oxygen per atom of hydrogen) are present on the Moon, but the amounts and potential locations are not known. The north and south poles might contain significant quantities. There are water ice caps on Mars, and there may also be water on other planets and asteroids. If enough water could be

extracted on the Moon, it could have significant implications for planetary exploration. The Moon has about one-sixth of Earth gravity and no atmosphere to create aerodynamic resistance to launch vehicles. These conditions combined with water for supporting astronauts on a lunar base, hydrogen and oxygen for propellant and fuel cells would make the Moon an excellent launch platform for expeditions further into the solar system.

The rocklike objects on the edges of the drawing are near Earth asteroids (NEAs). These may be good destinations for crewed vehicle missions. Asteroids and other objects hit the Earth periodically, and initiatives have been proposed to prevent collisions that pose a significant threat to Earth populations.

The Augustine Committee was appointed this year by President Barack Obama to study the current status of NASA and provide a short list of options for NASA's future. With completion of the ISS scheduled in 2010 or 2011, NASA plans to retire the Space Shuttle after over 30 years of service. Options include the following:

- Extending the service life of the ISS beyond 2016, sending the CEV/lander to the Moon and/or NEAs
- Continued development of the Ares I or changing to the full Delta IV, modified Atlas V or other rocket to launch the

CEV

- Extending use of the Space Shuttle beyond 2011
- Creating the HLV (described above). In this design, the Space Shuttle Main Engines (SSMEs) would be expendable. Costs of the SSMEs are likely to be much less if purchased in higher quantities than NASA has done during the Shuttle program.
- Development of commercial vehicles for launching cargo or crew. NASA has accepted use of commercial vehicles for cargo, but has expressed reservations about using commercial vehicles for transporting humans to orbit until the necessary reliability is proven.

If the Space Shuttle is retired in 2010 or 2011, then NASA must rely solely on the Russian Soyuz to send crewmembers to orbit. If the ISS requires a crew of six to be rotated every six months, then four Soyuz flights would be required each year. If use of the Shuttle were extended, then two Shuttle flights would be required each year. Completion of the CEV is expected to require at least four years after the planned Shuttle retirement, leaving the much publicized gap. One of the functions of the CEV is to transport astronauts to orbit, which would fulfill that function now performed by the Shuttle. One

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(Continued from page 6)

of the reasons for replacing the Shuttle is that the crew compartment is not capable of protecting the crew if the orbiter is critically damaged. A separate capsule is much more reliable in protecting the crew during launch and landing. The heat shield on a capsule is protected by a blast shield (part of the service module), and there is an abort system (rocket) that can take the capsule away from the launch vehicle if an impending critical failure of the launch vehicle is detected, or if it begins to go far off course. A well designed capsule is likely to survive explosion or other catastrophic failure of the launch vehicle. The Soyuz capsule has experienced failure of an umbilical to the service module to separate during entry, and

survived because the capsule eventually broke free during aerodynamic induced vibrations (this was a safety improvement implemented decades ago).

Development of the CEV has slowed because of less funding being provided than expected. CEV is a new project, and many technical challenges must be met. The five segment SRB is more flexible than the four segment SRBs used on the Shuttle, and the ends of the SRB on the Ares I are not fixed to the external tank (ET) as on Shuttle. Early results of a static test firing of an SRB on the Ares I project indicate less vibration than predicted by computer models. This may mean that less capability is required from the vibration isolators planned to address crew and equipment vibration

on the Ares I. The static test does not include the effects of aerodynamics on the vehicle. The successful flight of the Ares I-X test rocket on October 28, 2009, (my birthday) with four active and one inert SRB segments and a dummy upper stage felt the effects of aerodynamic forces and is a further indication that the Ares I may be a good launch vehicle option for the CEV.

The change in NASA's specific objectives in human spaceflight, technical challenges and limitations on the funding Congress is willing to provide in a time of economic and financial difficulty make this a critical time in choosing a direction for NASA's future. The role of the US space program in the international community must also be considered.



APOLLO XIII SCREENING AT ROCKET PARK

Left: Norm Chaffee and others greet the assembled audience



Right: Audience gathered in Saturn V building in JSC Rocket Park viewing Apollo XIII movie projected on side of Saturn V rocket.

Issues in Texas Education

JANICE LARSON, SECTION MEMBER



I need to retract a statement I made at the AIAA Houston Section Annual Technical Symposium on May 15, 2009. Senate Bill No. 1231 does not ban a person from attending a state university for life if they drop six classes for reasons other than illness or being called into active duty. At a Clear Lake Chamber of Commerce education committee meeting, a professor from College of the Mainland and a friend who works for Houston Community College discussed the proposed bill which would have banned anyone who dropped six courses other than for reasons listed in the bill. If they said the word 'proposed', I did not hear it, and thought that they were talking about the final bill. The professor from College of the Mainland and others successfully worked to have the legislature change the proposed bill to an acceptable form. Section 51.907 describes several allowed exceptions to the six course drop rule (<http://www.statutes.legis.state.tx.us/SOTWDocs/ED/htm/ED.51.htm#51.907>). There are several problems I want to point out in this article.

There were several problems involved in the bachelor degree plan. One problem involves limiting all bachelor degrees to 120 credit hours (<http://www.theccb.state.tx.us/reports/PDF/1705.PDF>). Some professors are aware of the limitation but may not know about the exception in Section 61.0595 of the Texas Education Code. Texas

changing a five-year degree to a four year-degree would handicap Texas graduates who must compete with graduates who obtained five year degrees. Texas Education Code, Section 61.0595, provides an exception if the institution determines that there is a compelling academic reason for requiring completion of additional semester credit hours for the degree some science and engineering degree plans qualify (<http://www.statutes.legis.state.tx.us/SOTWDocs/ED/htm/ED.61.htm>). It is very important for science and engineering departments to request additional hours for their degrees. Many do not know the option exists, and if they do know about the option, they do not know how to apply. Undergraduate students who graduate with a cumulative grade point average (GPA) of at least 3.0 on a four point scale without exceeding the minimum number of hours allocated for their degree can apply for a rebate of a portion of the undergraduate tuition the student has paid under Section 54.0065. The rebate is based on Section 56.462(1) (A) for four year degree plans or (B) for five year degree in engineering, architecture, or any other program determined by the coordinating board to require more than four years to complete, to qualify for forgiveness of a Texas B-On-time loan (<http://www.statutes.legis.state.tx.us/SOTWDocs/ED/htm/ED.56.htm>). Students who take an excessive number of hours and are Texas residents

may be required to pay the rate charged to nonresident undergraduate students. Section 54.014 allows the university to exempt a student from the payment of that higher rate if the student is subject to the payment of the higher rate solely as a result of hardship as determined by the institution under the policy (<http://www.statutes.legis.state.tx.us/SOTWDocs/ED/htm/ED.54.htm>). There is not a clear cut way for all department heads, professors or students to know how to take advantage of existing exceptions when needed.

The problem of limiting the number of credit hours in a degree plan does not only exist in bachelor degree; it extends to doctoral degree. The second concern is that Doctoral students face a 99-credit hour limitation to the number of hours required. Section 54.012 (<http://www.statutes.legis.state.tx.us/SOTWDocs/ED/htm/ED.54.htm#54.012>) provides that resident doctoral students who have more hours of doctoral work than allowed for purposes of state funding are charged nonresident tuition. However, there are exceptions for doctoral students who have a total of 100 or more semester hours. Section 61.059 Item (I)(2) describes a method of approving semester hours in excess of 100 but not exceeding 130 total semester credit hours for a doctoral student if the student's field of study requires a higher number of semester credit hours to maintain nationally competitive stan-

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dards, the student's program or research is likely to provide substantial benefit to medical or scientific advancement or there are other compelling reasons to support an exception (<http://www.statutes.legis.state.tx.us/SOTWDocs/ED/htm/ED.61.htm#61.059>). Again, some professors and students are not aware of the exceptions.

The third concern involves junior level (and above) students who must transfer universities due to a job change or some other unforeseen occurrence. Freshman and sophomore students can transfer from one institution to another without significant repercussions. Junior level or above students should have access to transfer information as easily as a freshman or sophomore student has.

Freshman and sophomore students can easily transfer course hours in Texas. Texas laws cover core curriculum, the courses all bachelor degrees must contain, field of study curriculum, and the courses required for a bachelor degree in a specific field such as computer science ([http://info.sos.state.tx.us/pls/pub/readtac\\$ext.ViewTAC?tac_view=5&ti=19&pt=1&ch=4&sch=B&rl=Y](http://info.sos.state.tx.us/pls/pub/readtac$ext.ViewTAC?tac_view=5&ti=19&pt=1&ch=4&sch=B&rl=Y)). RULE §4.23 defines core curriculum, field of study curriculum (FOSC), and Texas Common course numbering system (TCCNS). Students are able to transfer freshman and sophomore courses in the core curriculum and field of study curriculum. RULE §4.25 explains the rules for transferring freshman and

sophomore courses. Links to RULE §4.23 and RULE §4.25 may be found at [http://info.sos.state.tx.us/pls/pub/readtac\\$ext.ViewTAC?tac_view=5&ti=19&pt=1&ch=4&sch=B&rl=Y](http://info.sos.state.tx.us/pls/pub/readtac$ext.ViewTAC?tac_view=5&ti=19&pt=1&ch=4&sch=B&rl=Y).

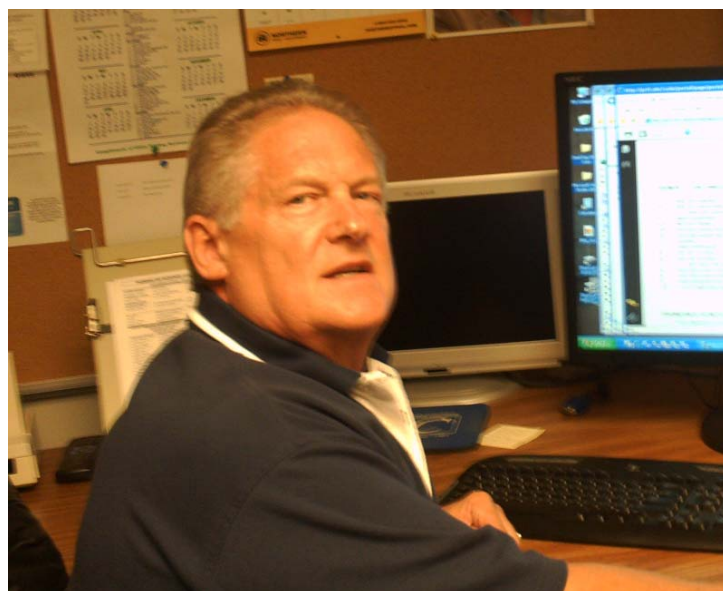
Any department head, professor or student who has access to the Internet can find information about transferring freshman and sophomore credit hours at <http://www.theccb.state.tx.us/index.cfm?objectid=1515E6CD-DE05-2552-8701C2C5E22FA65A> by clicking on "Texas Core Webcenter" to link to <http://statecore.its.txstate.edu/>. Information about core curricula for various universities and colleges may be found at that site. Any department head, professor or student who has access to the Internet can find information about field of study curricula by going to <http://www.theccb.state.tx.us/index.cfm?objectid=1515E6CD-DE05-2552-8701C2C5E22FA65A>, scrolling down to "Approved Field of Study Curricula" and selecting a field such as Computer Science, Engineering or Engineering Technology. A common course numbering system is available for freshman and sophomore courses taught at Texas universities and can be accessed at <http://www.tccns.org/tccns/>. There is no confusion or ambiguity about transferring freshman and sophomore course hours to another institution in Texas.

Unfortunately, junior level students (and above) have a harder time transferring courses. Section 54.014 (a) allows universities and colleges to charge under-

graduate resident students as though they are nonresident students if they exceed by at least 30 hours the number of hours required for completion of the degree. Undergraduate students enrolled before the 2006 fall semester do not pay nonresident fees until the number of semester hours exceeds that required for the student's degree by at least 45 hours. Then, 54.014 (f) provides that an institution of higher education may charge a resident undergraduate student tuition at a higher rate than the rate charged to other resident undergraduate students, not to exceed the rate charged to nonresident undergraduate students, for any course in which the student enrolls that is the same as or substantively identical to a course for which the student previously completed. That can happen if a student transfers from one institution to another and the receiving university does an articulation agreement with the sending university. There is an exception if the student is

(Continued on page 10)

Below: Jim Helm, Division Chair of Computer Engineering at University of Houston Clear Lake, viewing the 2 + 2 transfer screen for Computer Engineering that should ease the transition for incoming students.



(Continued from page 9)

enrolled in the course solely as a result of a hardship or other good cause. Unfortunately, not all transfer students and their teachers are aware of the exception. Section 54.014 can be found at <http://www.statutes.legis.state.tx.us/SOTWDocs/ED/htm/ED.54.htm#54.014>.

Examples of exceeding the limit:

Excess hours may be due to

- 1) a student dropping over six courses in a manner compliant with Texas Administrative Code Title 19 Part 1 Chapter 4 Subchapter A Rule RULE §4. ([http://info.sos.state.tx.us/pls/pub/readtac\\$ext.TacPage?sl=R&app=9&p_dir=&p_rloc=&p_tloc=&p_ploc=&pg=1&p_tac=&ti=19&pt=1&ch=4&rl=10](http://info.sos.state.tx.us/pls/pub/readtac$ext.TacPage?sl=R&app=9&p_dir=&p_rloc=&p_tloc=&p_ploc=&pg=1&p_tac=&ti=19&pt=1&ch=4&rl=10))
- 2) a course grade that is below C and
- 3) any additional reasons a course would not count toward a bachelor degree, which should be stated in university cata-

logs. Information that would be useful to potential University of Clear Lake graduates enrolling in community college is available at <http://prtl.uhcl.edu/XDR/Render/catalog/02/#A0123> and at <http://prtl.uhcl.edu/XDR/Render/catalog/02/#A0125>. University of Clear Lake catalog general program requirements for undergraduate degree requirements can be found at <http://prtl.uhcl.edu/XDR/Render/catalog/archives/125/06/#A03>.

Doctoral students run into the same problem when a student takes longer than the State estimated time to complete their dissertations or the students move and the accepting university does not accept the student's transfer courses. (<http://www.statutes.legis.state.tx.us/SOTWDocs/ED/htm/ED.54.htm#54.012>).

Even students who transfer from one institution to another institution in the same system may not get credit for similar courses they

have already completed. It is only logical that universities within a system should have articulation agreements between departments and an explanation of why a course is not part of an articulation agreement when one is not approved. The major university systems need to go through articulation of authority procedures or alternative certificate of authority processes with each other for any department that has not done so already.

Articulation Agreements

Many colleges and universities make partner-style agreements that allow for the transfer of additional or different courses. Students should check with the college or university where they are enrolled or intend to transfer to find out whether there is a specific articulation agreement for their intended degree plan/major (<http://www.theccb.state.tx.us/index.cfm?objectid=63621394-0902-9B75-78693B79EA98A0F6>).



Congratulations to Jon S. Berndt of Jacobs Technology, AIAA Houston member and former Horizons newsletter editor-in-chief, on being selected as an Associate Fellow, class of 2010!

To be selected for the grade of Associate Fellow an individual must be an AIAA Senior Member with at least twelve years professional experience in his or her field, and have been recommended by a minimum of three AIAA members who are already Associate Fellows.

The 2010 Associate Fellows will be honored at the AIAA Associate Fellows Dinner on Monday, January 4, 2010 at the Orlando World Center Marriott, Orlando, Fla., as part of the 48th AIAA Aerospace Sciences Meeting.

STS-127 Crew Return to Houston

DOUGLAS YAZELL, ASSISTANT EDITOR

Space shuttle Endeavour and its seven-member crew landed at 9:48 a.m. CDT Friday at Kennedy Space Center in Florida, capping off a 16-day mission to complete assembly of the International Space Station's Japanese research laboratory.

Endeavour's main landing gear touched down at 9:48:08 a.m., followed by the nose gear at 9:48:21 a.m. The shuttle's wheels stopped at 9:49:13 a.m., bringing the mission's elapsed time to 15 days, 16 hours, 44 minutes, 58 seconds. Endeavour traveled 6,547,853 statute miles over 248 orbits.

Endeavour Commander Mark Polansky, Pilot Doug Hurley and Mission Specialists Chris Cassidy, Dave Wolf, Tom Marshburn, Julie Payette of the Canadian Space Agency and Koichi Wakata of the Japan Aerospace Exploration Agency left the shuttle less than an hour after landing to return to crew quarters.

Wakata is returning after serving aboard the International Space Station as a flight engineer for the past four months. Wakata spent 138 days in space, including 133 days aboard the space station. Astronaut Tim Kopra launched aboard Endeavour and remains on the station as a member of the Expedition 20 crew.

Endeavour's crew completed the construction of the station's Japanese Kibo science laboratory by joining a new external experiment platform to the primary science enclosure and separate stowage module. The platform,

called the Japanese Exposed Facility, will serve as a type of porch for experiments that require direct exposure to space. Five spacewalks were conducted to install that platform and to swap out six batteries for the station's oldest set of solar array wings. The crew also delivered spare parts needed for the space station's future operations.

Julie Payette in NASA's Hangar 990 at Ellington Field in Houston, Saturday, August 1, 2009:

"Can I tell you how incredible this has been? Five astonishing spacewalks, having been conducted by my colleagues and their EVA teams on the ground. Two weeks of an intricate robotics mission, very complex orbital maneuvers, expertly followed by our pilot here, and by their support team on the ground, a very complicated transfer of equipment and supplies for space station, all done with systems and equipment performing flawlessly.

"This wouldn't have been possible if it hadn't have been for you doing your jobs, and you supporting the space

program. We went to the International Space Station instead of Mars. It is a tribute to human perseverance, human effort, and an example of what we can do when we work together, despite where we come from, what language we speak, and where we were born. It is a marvel because it is the first time in history that we have six people on board, and Koichi was one of those members: very, very dedicated fellows. And a very accomplished team right here on the ground.

"So when you go home tonight, whether you work at the Johnson Space Center, or whether you support someone that works at the Johnson Space Center, or whether you are here because you support the space program at large, let's stand tall and be proud, and don't be ashamed to tell your friends and family that you are in the business of exploration, that you pulled it off with us, yet again, on another challenging mission, and that you work to shape a wider, broader generation with us. Thank you."

Event



http://www.nasa.gov/mission_pages/shuttle/shuttlemissions/sts127/news/STS-127-32.html

11:30 a.m. CDT Friday,
July 31, 2009
Mission Control Center,
Houston, Texas
07.31.09

Below: STS-127 crew at welcome back ceremony at Ellington Airport



Sloane Gallery

The First Aviators in Texas and Houston, 1910-1911

DOUGLAS YAZELL, ASSISTANT EDITOR



Above: Mr. Story Jones Sloane III discussing early aviation in Houston, Texas, at the 1940 Air Terminal Museum.

On Saturday, March 21, 2009, listening to a presentation at the 1940 Air Terminal Museum (<http://www.1940airterminal.org>) I was surprised and pleased to learn of French connections to early aviation in Houston in 1910 and 1911, especially since our section works with our French sister section in Toulouse, France, the home of Airbus and other aviation and space centers.

Mr. Story Jones Sloane III (<http://www.sloane-gallery.com>,

storyart@sloane-gallery.com, 713-782-5011) was the speaker. The Story Sloane Gallery at 2616 Fondren, just a block or less north of Westheimer in Houston, specializes in Houston photography from the 1920s and the 1930s. He recently published a very affordable book containing photos and captions from that era, mostly by professional photographer Calvin Wheat.

Mr. Sloane obtained some negatives related to early aviation in Houston and he recognized their historical significance.

From <http://www.sloane-gallery.com/houston-air-meet-of-1911.htm>:

AIR SHOW, Houston, Texas, 1911

The first flight of an airplane in Texas occurred on the prairies just south of Houston on February 18, 1910. The Houston POST and Western Land Co. paid French aviator Louis Paulhan \$20,000 (over \$900,000 today) to demon-

strate his aircraft...and a crowd of over two thousand gathered (at \$1 a head) to witness the historic event of Paulhan flying his Farman biplane.

Of course this being Texas, one pilot and a few planes does not a grand air show make, so on January 27-30 of 1911 the "Moisants International Aviators" came to town. John Moisant organized this aviation troupe after the Belmont air meet of October 1910. Eight aviators of international reputation were involved, touring the country by train.

These barnstorming pilots (before there were 'barnstormers'), exhibiting the latest technology in aviation, awed a crowd of over 20,000 Houstonians. The large tents and grandstands traveled with the troupe. Box seats were \$1.50, general admission 50 cents, kids two-bits.

Unfortunately, John Moisant - who started this 'flying circus' - died in New Orleans shortly before this Houston show.

Houston sportsman John Winter - capturing a rare and important part of aviation history - photographed this 1911 Houston air show.

The locals were greatly impressed. Houston's earliest aviators were Guy Hahn, L.F. (greasy) Smith and L.L. (shorty) Walker. They constructed planes and participated in the Houston air show of Nov 12, 1911.

Soon to follow would be air transport, air mail services and passenger airlines. From public fascination to commercial ap-

(Continued on page 13)

Below: A few of the airplanes at the 1911 Houston airshow



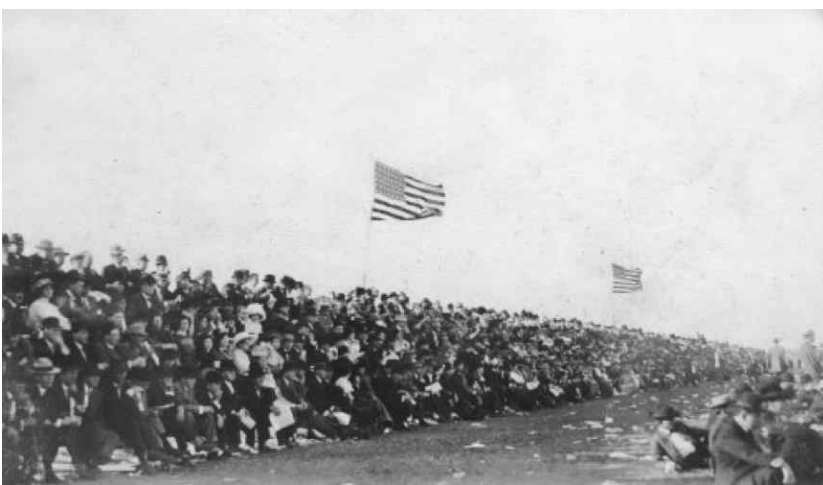
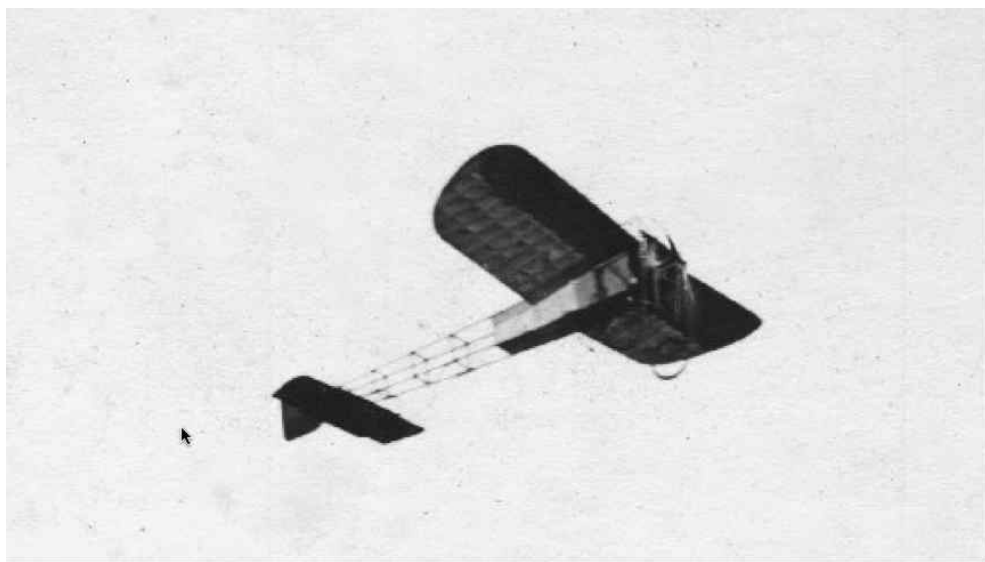
(Continued from page 12)

plication, the thrill of flight in Houston has taken us to the stars.

From Wikipedia:

The Stade de Roland Garros (Roland Garros Stadium) is located in the 16th arrondissement of Paris, France, and is home of the French Open Grand Slam tennis tournament, played every year in May and June. The stadium is named after Roland Garros (October 6, 1888 – October 5, 1918), an early French aviator and a fighter aircraft pilot during World War I, who, on September 23, 1913, had become the first man to fly a plane.

Louis Blériot (1 July 1872 in Cambrai, France – 1 August 1936 in Paris, France) was a French aviator, inventor and engineer. In 1909 he completed the first flight across a large body of water in a heavier-than-air craft when he crossed the English Channel, receiving a prize of 1000 British pounds for doing so. He also is credited as the first person to make a working monoplane. Blériot was a pioneer of the sport of air racing.



Top: Airshow pilots and others, sitting, l-r: Joseph Seymour, John Frisbie, Rene Simon ('flying fool'), Edmund Audemars, Rene Barrier, Roland Garros, Peter Young (manager), and Charles Hamilton (standing).

Above: A Bleriot airplane in flight at the 1911 Houston airshow.

Left: The crowd at the 1911 Houston airshow.

Wings and Wheels

The 1940 Air Terminal Museum at Hobby Airport

DOUGLAS YAZELL, ASSISTANT EDITOR

The monthly Wings and Wheels program (every 3rd Saturday) at the museum (www.1940airterminal.org) is always worthwhile. For August 2009, it was Experimental Aircraft Day. Here are some notes from their web site.

“This was a fantastic and record-setting Wings & Wheels event! It was described by many as one of the best we've ever had! We set a new record with 22 fly-in aircraft on our ramp at the same time.

“In addition to the museum's raffle Cessna 175 (which could be yours for \$50!), we had two Cessna 172's, a North American Navion, a Navy T-34C primary trainer aircraft from the Naval Air Station in Corpus Christi, TX, and 17 RV aircraft of various models. The RV series are the most popular kit-built airplanes in the world among home-builders.

“They range from single-seat aerobatic planes all the way through four-seat ver-



sions popular with families who travel. Many of the RV's that were there belonged to the members of the Houston RV Builder's Association, and four of them came from a group called Falcon Flight, which is an all-RV formation flying demonstration team based near Austin, TX. We even had a couple of RV's fly in from the Dallas/Fort Worth, TX area!

“On the street side of the museum, we had more than twenty Porsche cars from the Houston Porsche Club, and several classic Chevrolets from the Houston Classic

Chevy club. No matter your interest, Wings or Wheels, it was a great day for everyone!”

And the museum itself is an unforgettable visit. Its restoration is going well. The main lobby is huge, luxurious, completely restored, and ready for visitors. Upcoming Wings and Wheels themes:

November 2009: Salute to veterans and warbird fly-in
December 2009: Houston Spotters & Museum Volunteers Appreciation Day



EAA Corner



EAA Chapter 12 Meetings for 2009-2010:

Future Meeting/Event Ideas: Others - Young Eagles, LSA, Alternate Engines, Fly-ins,

....

Ideas for or want to give a meeting? Contact Richard at rtsessions@earthlink.net

Scheduled/Preliminary Chapter 12 Event/Meeting Ideas:

- 03 Nov 09: Chapter Monthly Meeting: Aircraft Antennas Part II – Lab, Lance Borden,
2010/2012 Officer Elections
- 17 Nov 09: Safety Day Conference – Hobby Airport Enterprise Jet Center <http://www.houstonaviationalliance.com/safetyday/safetyday09.pdf>
- 01 Dec 09: Chapter Monthly Meeting: Aircraft Brakes, Richard Sessions or Aircraft Hardware, Central Aviation Supply, Irene Hatfield – Hobby Airport?
- 3 - 5 Dec 09: EAA Foundation's B-17 Aluminum Overcast in Houston/Conroe, Young Eagles Event – Volunteers and aircraft needed to work both events

We have firmed up the EAA Foundation's B-17, Aluminum Overcast, stop as being at Conroe's Lone Star Executive Airport with flight dates of 4 and 5 Dec 09 (on a weekend and not right after the airshow to boot!). Conroe's General Aviation was enthusiastic at hosting the airplane and we just need to work out details on the airport. We will be needing 6 to 10 volunteers to help staff the event (need not be a Chapter 12 or EAA member) as well as donors of hotel rooms or a crew vehicle. Those donors or volunteers will be in a drawing on Saturday for 6 to fly on the airplane to the next stop in Shreveport LA on 6 Dec. The last guys actually logged some dual B-17 time! Mark your calendars as this is also a good fund raiser for us - unless you want to sell peanuts or magazines.....(smile).

- 05 Jan 10: Chapter Monthly Meeting: Annual Chapter Business Meeting, New Officer Installments
- 2 Feb 10: Builder's Visit: Dave Forrester' Searay, Polly Ranch?
- 2 Mar 10: Spring Builders Series: Basic Ribbed Wing Construction – Part I, Introduction
- 6 Apr 10: Spring Builders Series: Basic Ribbed Wing Construction – Part II, Workshop
- 4 May 10: Spring Builders Series: Basic Ribbed Wing Construction – Part II, Workshop

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)
- 1st Saturday of Each Month – Waco/Macgregor TX (KPWG), Far East Side of Field, Chap 59, Pancake Breakfast with all the goodies 8-10 AM, Dale Breedlove,
jdbvmt@netscape.com
- 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)
- Last Saturday of Every Month – Denton Fly-In 11AM-2 PM (KDTO)

Aerospace Projects Review

APR Corner SCOTT LOWTHER

APR Corner is presented by 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:

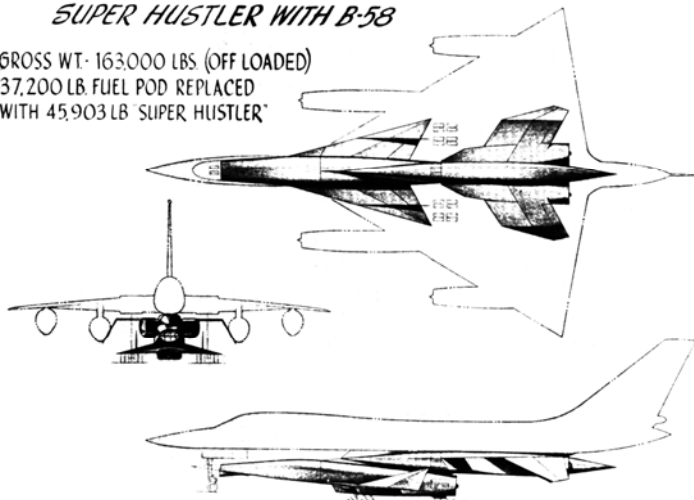
Scott Lowther
11305 W 10400 N
Thatcher, UT 84337
scottlowther@ix.netcom.com
<http://www.up-ship.com>

Late in 1957, Convair proposed to the Air Force the "Super Hustler," a solution to long range reconnaissance and strategic bombing. The Super Hustler was not, as the name might suggest, an advanced version of Convairs B-58 Hustler, but instead was a two-stage composite aircraft carried aloft by the Hustler.

One component was an unmanned ramjet powered booster, while the other was a manned ramjet powered high-speed aircraft. The composite aircraft was carried beneath the B-58, replacing the standard fuel/bomb pod. The unmanned component contained the fuel needed for the outbound flight to the target, as well as the warhead. By using a multi-stage vehicle, the propulsion systems and aerodynamics could be optimized for specific flight regimes, meaning a remarkably small vehicle could fly a very long distance

SUPER HUSTLER WITH B-58

- GROSS WT: 163,000 LBS. (OFF LOADED)
- 37,200 LB. FUEL POD REPLACED WITH 45,903 LB "SUPER HUSTLER"



at a high cruise speed. Additionally, the use of a minimally modified existing aircraft would not only make development and testing easier, it would also simplify basing and operations.

Cruise speed was Mach 4 at 80,000 feet altitude for the composite vehicle, and Mach 4 and 91,000 feet for the manned

vehicle alone. Using standard JP fuel, the bomb (and hence the unmanned component) would be dropped at 2020 nautical miles range (downrange from B-58 release), and the manned component would land 4290 nautical miles downrange from the B-58. If high energy fuel (such as boron-based "zip fuel") was used, those ranges would be extended to 2920 and 6230 nautical miles, respectively. The warhead could be replaced with additional fuel to increase range for recon missions.

The manned component of the Super Hustler had a fairly simple configuration... a flat-bottomed fuselage mated to simple faceted swept wings each fitted with similarly simple vertical fins. The ramjet propulsion system in the tail was fed through an underside inlet, which also fed the small J-58 turbojet engine used for control and go-around at landing. Two primary versions of the manned component were

(Continued on page 17)

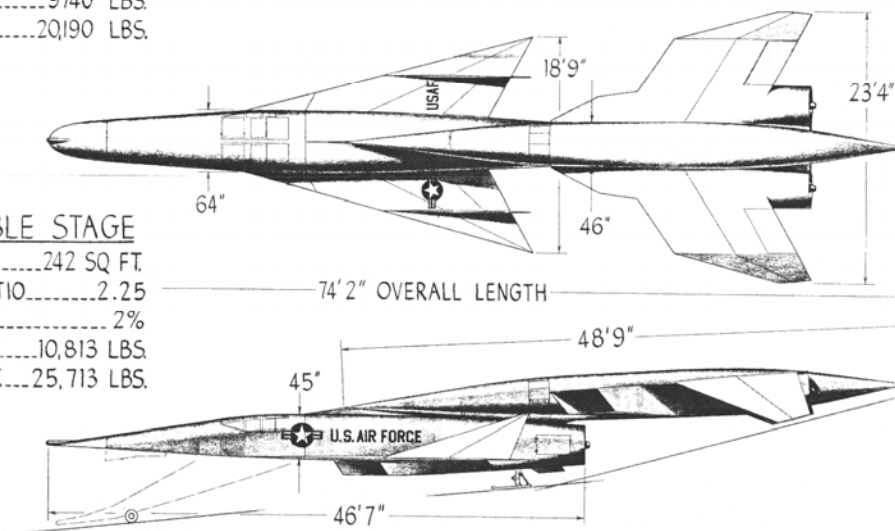
MANNED STAGE

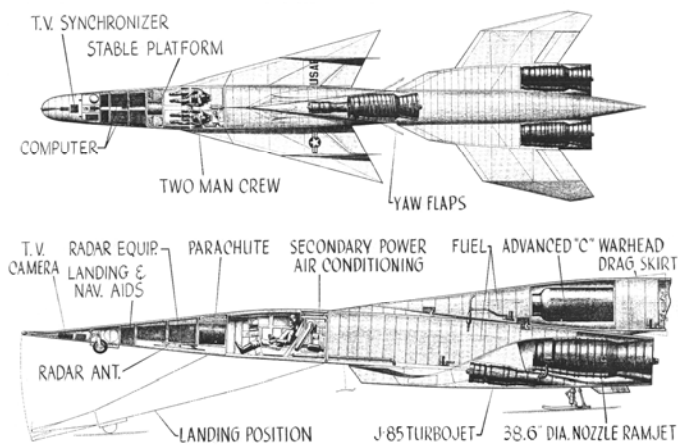
WING AREA.....278 SQ.FT.
ASPECT RATIO.....1.263
 t/c2%
WT. EMPTY.....9740 LBS.
GROSS WT.....20190 LBS.

COMPOSITE GROSS WEIGHT
45,903 LBS.

EXPENDABLE STAGE

WING AREA.....242 SQ.FT.
ASPECT RATIO.....2.25
 t/c2%
WT. EMPTY.....10,813 LBS.
GROSS WT.....25,713 LBS.





(Continued from page 16)

designed, differing only in the number of ramjet engines on the manned stage... one 38.6 inch diameter ramjet or two 33.5 inch diameter ramjets (identical to those on the expendable stage).

The basic means of launch was to use a B-58 Hustler bomber as a carrier aircraft, with separation occurring at Mach 2. Little modification of the B-58 would be required for this role. However, the Super Hustler combination was too long to fit underneath the B-58 with the carrier aircrafts landing gear down; as a result, the nose of the Super

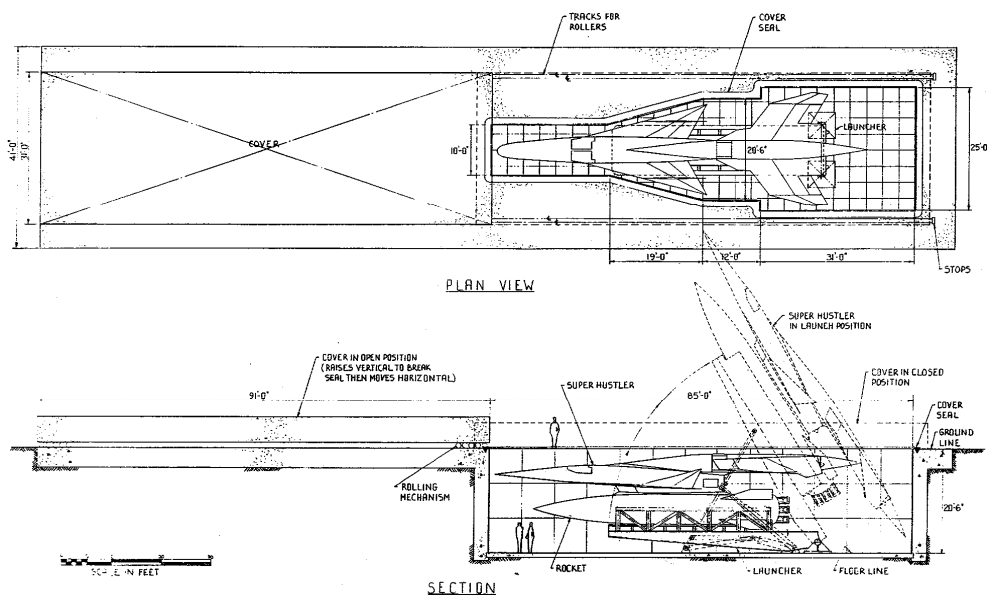
Hustler would have to be folded back during takeoff (and landing, if still beneath the B-58). Another launch option replaced the B-58 with a large solid rocket motor. This would greatly reduce range as well as operational flexibility, but it would also be cheaper. The intent would be to launch the Super Hustlers from fixed emplacements, and they would serve as manned intercontinental cruise missiles. The fixed emplacements were similar in concept to the early Atlas ICBM facilities, where the missiles were stored horizontally and raised to vertical prior to launch through large

armored doors.

The gross weight of the Super Hustler composite vehicle was to be 45,903 pounds for the three-engine design and 47,150 pounds for the four-engine design.

As work on the Super Hustler continued, the design lost its bomber role and its unmanned component. By late 1958 the resulting one-man aircraft, carried by a stretched B-58, was a dedicated Mach 4 recon bird known as "Fish." Fish in turn transformed by July 1959 into the stand-alone "Kingfish" design that competed against the Lockheed A-12, which itself became the SR-71.

Note: An article describing the relationship between Super Hustler and early Convair spaceplanes and exoatmospheric bombers was published in the V2N4 issue of *Aerospace Projects Review* (<http://www.up-ship.com>).



Calendar

November 13

Lunch-and-Learn

Dr. Paul Abell, Japanese Hayabusa Spacecraft Returning with Samples from Comet Ito-kawa

Location: Gilruth Center Lone Star Room

Time: Noon to 1:00 pm (pizza lunch optional: service starts at 11:45 am)

November 20

Lunch-and-Learn

Apollo 12 panel discussion with Emil Schiesser (an MPAD engineer who worked on a pin-point landing next to Surveyor 3 when the Moon's gravity was not well known), Francis E. "Frank" Hughes (experienced with Apollo Simulator Training), and Floyd Bennett (an Apollo 12 flight controller).

Location: Gilruth Center Lone Star Room

Time: Noon to 1:00 pm (pizza lunch optional)

November 20

Space Center Lecture Series - Developing VASIMR

Speaker: Dr. Franklin Chang Diaz

Location: UHCL Bayou Bldg. Theater

Time: 7:00-9:00 pm

December 7

Council Meeting (All current and prospective council members are welcome.)

Location: JSC Gilruth Center - San Jacinto Room

Time: 5:30-6:30 pm

January 11

Council Meeting (All current and prospective council members are welcome.)

Location: JSC Gilruth Center - San Jacinto Room

Time: 5:30-6:30 pm

January 16

AIAA-Houston Night at the George Observatory

Location: George Observatory

Time: 5-10 pm

February 1

Council Meeting (All current and prospective council members are welcome.)

Location: JSC Gilruth Center - San Jacinto Room

Horizons published quarterly, online late March, June, September and December.

See <http://www.aiaa-houston.org/horizons>

Cranium Cruncher

STEVE EVERETT, HORIZONS EDITOR

Unfortunately, due to an error in the puzzle in the last issue, it was impossible for any correct answers to be submitted. Thanks to those of you who tried...

This time, let's consider the crew of astronauts taking up residence at the lunar base Armstrong at the south pole crater Shackleton. Their lunar rover is temporarily inoperational, and an additional crew member is needed at the nearby base Aldrin. The trip is a six hour walk, but the air tanks available to the extravehicular suits can supply only four hours worth of air. Assuming air tanks can be swapped out between suits, how many of the crew must start out on the journey to ensure at least one member makes it to Aldrin base?

Send your solutions to Steve Everett at editor@aiaa-houston.org. Names of the solvers and the answer will be given in the next issue.





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