

# Horizons

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AIAA Houston Section [www.aiaa-houston.org](http://www.aiaa-houston.org)

June 2008

*Photo: Courtesy of NASA  
AIAA Houston Section International Space Activities Committee (ISAC)  
Travel to Soyuz Launch of October 10, 2007: Pages 14 & 24*





**AIAA HOUSTON**  
American Institute of Aeronautics and Astronautics

*Horizons is a quarterly publication of the Houston section of the American Institute of Aeronautics and Astronautics.*

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More information at: [www.aiaa-houston.org/orgchart](http://www.aiaa-houston.org/orgchart)

June 2008



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Cover: ISS015-E-34599 (16 Oct. 2007) --- NASA astronaut Peggy A. Whitson (right), Expedition 16 commander; cosmonaut Yuri I. Malenchenko (center), Soyuz commander and flight engineer representing Russia's Federal Space Agency; and Malaysian spaceflight participant Sheikh Muszaphar Shukor pose for a photo in the Destiny laboratory of the International Space Station.

## From the Acting Editor

DOUGLAS YAZELL

We sent the last issue of Horizons to our webmasters on April 18, 2008, in the middle of our 4-state region's Student Paper Conference (SPC 2008). It will be online by April 25, 2008. So this current June 2008 issue of Horizons will be online by June 25, 2008, just before our AIAA year ends on June 30. This issue reports on SPC 2008 (April 18-19), a dinner meeting on May 2 (with guest speaker Congressman Nick Lampson), our section's Annual Technical Symposium (ATS 2008), and a dinner meeting on June 10, our section's annual honors & awards dinner, with guest speaker Dr. Launius from the Smithsonian Institute.

Meanwhile, a cover story about space programs with a Houston connection would be helpful. We can see from the chart on this page that popular past cover stories helped to make our newsletter popular.

Our section's events also help to make our newsletter popular, so they merit a cover story now and then. SPC 2008 is an example of that, since this annual event requires a lot of work, especially by its chair. AIAA Houston Section provides the chair for this regional student conference every other year, and this year our section's secretary Sarah Shull volunteered for the job and followed through with a team whose work resulted in a very successful conference.

We have a few assistant editors, but no editor for the moment. We will work to find our editor at our section's annual leadership retreat in August 2008. Laying out the newslet-

ter in MS Publisher is as easy as working with MS PowerPoint, so a lack of computer skills is not a problem. The editor only needs to be at ease with computers.

The editor also needs to say no to some newsletter submissions. Appropriate content is required. One popular space web site had an article about China's role in space, ending one long paragraph with the

word, "idiots!", describing the straw dummies (probably in our State Department) set up by the author. I would have said no to that in an article, no matter how many downloads it would have generated.

See you next year! Our September 2008 issue should be online late that month. Now I move from acting editor to being one of the assistant editors.

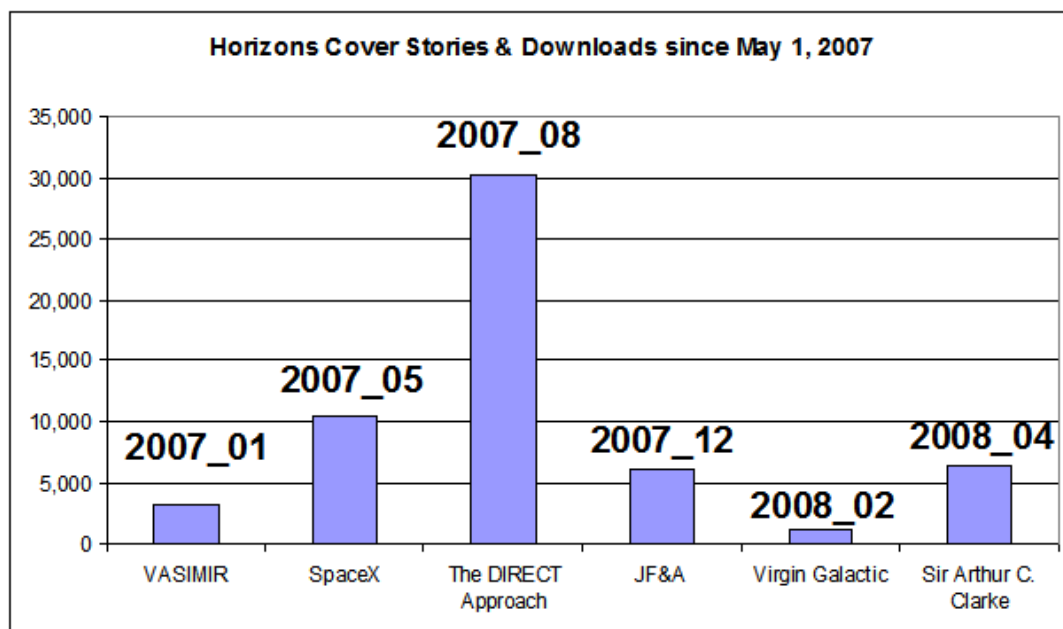


Photo of our next editor



Left: Cars at a recent Wings & Wheels Saturday (3rd Saturday every month) lunch program at the 1940 Air Terminal Museum.

Houston's second AIAA Historic Aerospace Site is the 1940 Air Terminal Building at Hobby Airport. A ceremony to unveil its plaque will take place late this 2008 calendar year or early next year at the museum at Hobby Airport ([www.1940airterminal.org](http://www.1940airterminal.org)).





## Chair's Corner

DOUGLAS YAZELL, AIAA HOUSTON SECTION CHAIR

As I write this the student conference is just past and we are looking forward to our section's Annual Technical Symposium (ATS 2008) and dinner meetings on May 2 and June 10.

We found a section member from next year's team who is willing to attend the annual AIAA Regional Leadership Conference (RLC) July 24-25, 2008, in Hartford, Connecticut. In fact, I prefer to send two people to that from our section, and we have two volunteers, so we will see what our budgets allow. Our section usually has a leadership retreat just after RLC and modeled after RLC, so our new team will probably meet for that in early August of 2008.

Our section's election is in work. Watch for the new org chart at [www.aiaa-houston.org](http://www.aiaa-houston.org) after the new AIAA year starts

on July 1, 2008. Likely election results:

Chair-elect: Ellen Gillespie  
Chair: Chad Brinkley  
Treasurer: Jason Tenenbaum  
Secretary: Sarah Shull  
Vice Chair Ops: Nick Pantazis  
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Donald Barker  
Rafael Munoz  
Prerit Shah  
Holly Feldman  
Ansley Collins  
Lorenna Vega-Martinez

It's not often we see a picture of this Boeing building, but since we co-sponsored Engineer for a Day by the Boeing Black Employees Association there recently, now is a good time to enjoy these recent snapshots. It began as the IBM building for their space shuttle flight software work, and I often heard it called the Taj Mahal. The street sign at the

traffic light on Bay Area Boulevard used to say IBM Drive, and it now says Boeing Way. The building is as nice inside as outside, and a large park is located behind the building. Almost 200 homes nearby form an association called University Park. The University of Houston at Clear Lake (UHCL) is across the street on the other side of Middlebrook Drive, as is the Lunar and Planetary Institute (LPI). Deer can still be seen frequently at UHCL and LPI.

This is a nice end to an active year for AIAA Houston Section: our year ends on June 30, 2008, and this issue of Horizons will be online June 25, 2008. I send my compliments to our past, present, and future volunteers who have done so much in service to our profession. I am sure they would tell you this is helping their careers. We are already setting the stage for the 2012-2013 AIAA year: the 50th anniversary of AIAA Houston Section.



*Photos: Yazell*



## NASA Means Business in Texas & Florida

BEN LONGMIER, PH. D., PROFESSIONAL DEVELOPMENT CHAIR

## Feature Article

The NASA Means Business Student Competition challenges college students to tell NASA's story to the public through a communications plan that will inform, educate and inspire the public to understand and support the nation's space program. Each year, student teams compete against one another and four to five finalist teams are chosen to present their plans to NASA managers, scientists, engineers, and public affairs personnel at the Johnson Space Center in Texas and at the Kennedy Space Center in Florida. From there, one winning team is chosen from the finalists. The winning team presents their communications plan to NASA administration in Washington DC, which includes an all expenses paid 3-day trip travel funding for two team members.

In general, graduate or undergraduate students studying business, science, engineering, advertising, marketing, Internet solution design, public relations, graphic arts and animation or similar disciplines are encouraged to participate, however a student team may

be composed of any number of disciplines. In order to participate in the NASA Means Business program, students form teams to design and prepare a NASA Spaceflight Promotion Plan - a strategy, and accompanying Internet-centered implementation tools - to effectively increase the number of people that recognize the nation's investment in spaceflight as a valuable source of research and commercial opportunity.

It was my pleasure to serve on the panel of judges for the last stage in the NASA Means Business competition at the Kennedy Space Center, and

the AIAA-Houston section graciously provided travel funding for my trip. The 2008 competition saw 4 remarkable teams present a full suite of

*(Continued on page 6)*



*Top: Gary Kitmacher (second from right) of NASA's Johnson Space Center presents the Miami*

*Middle: Gary Kitmacher (third from right) of NASA's Johnson Space Center presents the Embry Riddle Aeronautical University Worldwide team members with a U.S. flag that had been flown on a space shuttle mission. Burke Fort (second from left), director of the NASA Means Business program, joins team members (from left to right) Darren Marshall, Cristian Martinez, John Bradley Hall, Aaron Griswold and faculty advisor Joseph Caruth.*

*Bottom: The NASA Means Business winning team (University of Wisconsin) with program organizers. Left to right: Burke Fort, Damon Alexander, Luke Hillman, Gary Kitmacher, and Scott Delly.*

## Feature Article

*(continued from page 5)*

outreach and public interest activities that included the creation of comprehensive websites, widgets, public service announcement videos,

newspaper articles, etc. This year's competition saw teams from the University of Wisconsin, Embry Riddle Aeronautical University Worldwide of Eglin Air Force Base, Bentley College, and Miami Inter-

national University of Art & Design.

Comments at the conference included:

"These students demonstrated an amazing depth of knowledge in digital media and the internet, and they brought their perspective into their projects – incorporating new aspects of the online world into promoting the space program."

"The diversity and range of ideas presented were really amazing. This truly reflects the unique Gen Y culture and how they view communications and messaging in today's world."

"All the teams were quite different in their approaches, but all their ideas were rooted in some very thorough research of NASA, its programs, its audiences and all the benefits space exploration has brought to our world and our culture."

"It was truly exciting to see how a younger generation views the U.S. space program and see what initiatives they would infuse into NASA and its outreach efforts. Their thinking was innovative and productive."

Though every team gained an

*(Continued on page 7)*



*Top: Judges panel and 4 university team finalists in the flame trench in front of Space Shuttle Discovery, STS-124.*

*Right: Gary Kitmacher (third from right) of NASA's Johnson Space Center presents the Bentley College team members with a U.S. flag that had been flown on a space shuttle mission. Burke Fort (far left), director of the NASA Means Business program, joins team members (from left to right) Angad Sawhney, Ellen Morris, William P. Connelley and faculty advisor George Fishman.*



Feature  
Article

*(continued from page 6)*

invaluable experience in technical communication and teamwork, the 2008 NASA Means Business competition grand prize went to the University of Wisconsin. Wisconsin team members that made the final presentation to the judges panel at the Kennedy Space Center include: Luke Hillman, Damon Alexander, and Scott Delly, whom are majoring in medical sciences, math and physics, and computer science respectively. The team's website contains their video and promotional plans for NASA

[www.nmbmadison.com](http://www.nmbmadison.com)

Proposals are now being accepted for the 2009 season:

NMB milestones coincide with the academic calendar, with two rounds - one in the Fall 2008 semester and the second in the Spring 2009 semester:

### **Round 1: Fall Semester**

Step 1: Submit Letter of Intent to Propose (early November)

Step 2: Submit Proposal (late November)

Step 3: Selection and Announcement of Finalist Teams (December)

### **Round 2: Spring Semester**

Step 4:

Finalist Teams' Competition

(January-April)

NASA Orientation Seminar at Johnson Space Center

(February)

Midpoint Videoconferences (March)

Step 5: 11th Annual NASA Customer Engagement Conference at Kennedy Space Center (May)

Step 6: NMB Wrap Up (June)

<http://www.tsgc.utexas.edu/nmb>

<http://youtube.com/user/NASAMeansBusiness>



Top: Ben Longmier and Gary Kitmacher on floor of the

Space Station Processing Facility in front of the Cupola, a small ISS module with 7 large windows. The Cupola takes its name from the lookout on the caboose of a freight train.

Middle: NASA Means Business students underneath Space Shuttle Atlantis' heat shield tiles during processing.

Bottom: Judges panel and 4 university team finalists.

## Feature Article

# Constellation Vehicle Summary

JUSTIN KUGLER, AIAA MEMBER

*A member of our section's French sister section asked for an article to update their article from a few years ago on this subject. This is worthwhile for both of our newsletters. - Editor*

The vehicles of Constellation are specifically designed to enable the exploration strategy set forth in the Vision for Space Exploration: sustain an American presence at the International Space Station, provide a robust lunar exploration capability, and establish the infrastructure for exploring Mars and beyond.

The Ares series of launch vehicles will place the Orion

CEV (Crew Exploration Vehicle) and the Altair lunar lander in Earth orbit to proceed with their respective missions. Via the Ares I Crew Launch Vehicle (CLV), the Orion will achieve orbit and continue on to either ISS crew support operations or Earth Orbit Rendezvous with Altair and an Earth Departure Stage (EDS) for lunar missions. The Ares V Cargo Launch Vehicle

(CaLV) is specifically designed to lift both the Altair lunar lander and EDS into a rendezvous orbit with Orion. By utilizing the best technologies from Shuttle and Apollo heritage, NASA plans to make the best use of existing knowledge and infrastructure to accomplish the goals of Constellation Program.

### Ares I

The Ares I Crew Launch Vehicle is being developed at Marshall Space Flight Center in Huntsville, Alabama, and is a two-stage vehicle designed solely for carrying the Orion CEV to Earth orbit. The 94-meter-high, 5.5-meter-tall CLV will be launched from Kennedy Space Center's LC-39B pad (currently supporting Shuttle operations).

The first stage is a five-segment solid rocket booster providing 14,700 kN of thrust and derived from the Space Shuttle's own SRBs (Solid Rocket Boosters). ATK will produce these and the identical boosters used on Ares V. The exhausted first stage will be recovered in the water, just like its predecessor, for testing and performance verification. The second stage is a fully-expendable cryogenic liquid booster to be built by Boeing and powered by a single J-2X engine derived from the second stage of the Saturn V moon rocket. This configuration is projected to deliver 25,000 kg to Low Earth Orbit.

The Orion CEV will sit on top of the second stage and be protected by a Launch Escape

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*Images: Courtesy of NASA*

*(continued from page 8)*

System during the initial stages of flight. The Launch Escape System consists of an aerodynamic protective cover that attaches over the Orion crew capsule and a tower equipped with solid-fueled escape motors and flight control hardware. To avoid a repeat of the Challenger incident, the crew is placed as far away from the actual rocket segments as possible. The Orion can be pulled away from the stack by the Launch Escape System's rocket motors in an emergency. The protective cover prevents damage to the crew capsule from debris and the exhaust of the escape motors.

### Ares V

The Ares V Cargo Launch Vehicle is also in development at Marshall and will be the primary heavy lifter for Constellation. At a height of 109.2 meters and a diameter of 8.40 meters, the Ares V will be comparable in size to the Apollo-era Saturn V. A core stage twice as large as the Shuttle External Tank and powered by five RS-68 engines (rated at 3,340 kN of thrust each) will be supplemented with two five-segment SRBs identical to those used by the Ares I rocket. The core stage will deliver 130,000 kg to Low Earth Orbit from pad LC-39A at Kennedy Space Center.

The Earth Departure Stage will function as a second stage to circularize the rendezvous orbit with its single J-2X engine and, then, provide the impulse to deliver 65,000 kg to lunar orbit. The Altair lunar lander will rest upon the EDS during launch and only

detach upon disposal of the EDS into a solar orbit. As Ares V will not carry crew, it does not have a Launch Es-

cape System. An aerodynamic shell protects Altair during launch and is discarded

*(Continued on page 10)*

## Feature Article



## Feature Article

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during ascent as soon as atmospheric drag become negligible.

### Orion CEV

The Orion Crew Exploration Vehicle is the heart of Constellation and is a product of Lockheed Martin. Orion will carry either six crew to the International Space Station or four crew to the moon.

The Crew Module (CM) itself will have an internal volume more than twice that of the Apollo capsule and will include the latest in 'glass cockpit' avionics, improved life support systems, and advanced computers. The Orion CM will also have "partial reusability" for up to ten flights. This capability comes from its aluminum-lithium alloy construction, nomex thermal protection blankets, reusable nomex recovery parachutes, and an improved heat shield derived from the Phenolic Impregnated Carbon Ablator used on the Stardust mission.

The Service Module carried behind the Orion CM will provide propulsion, thermal management, solar power generation, and expendables storage. A single Aerojet hypergolic engine will provide thrust. Upon mission completion, the Service Module will itself be jettisoned and the Crew Module will return to Earth alone. At present, water landings like those in the Apollo program are planned to avoid incurring weight penalties from carrying the necessary equipment for land recovery. However, a contingency land recovery requirement for emergencies has been retained.

### Altair

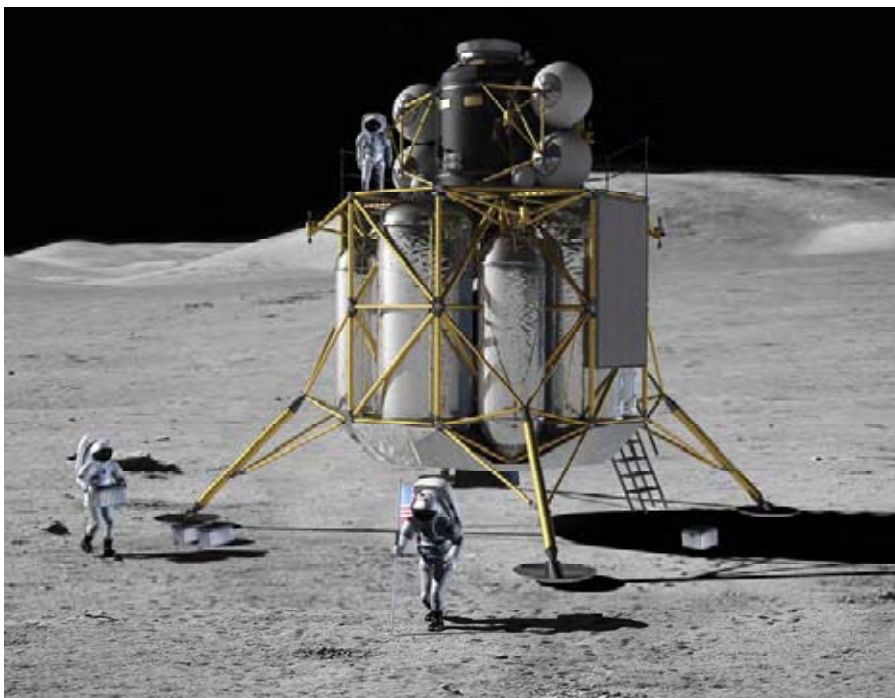
The Altair lunar lander will carry all four crew to the surface for lunar missions. This is unlike the Apollo missions where one crew member remained in the capsule during lunar sorties. For Constellation, the Orion will remain in lunar orbit and unmanned until

Lunar Orbit Rendezvous with the Altair ascent stage. Current requirements state that Altair will have "global" access to lunar sites, including the poles.

While Altair is still in preliminary design at Johnson Space Center in Houston, Texas, we do know that it will consist of a descent stage sized to carry either crew or cargo to the lunar surface – much like the Apollo Applications Project "LM Truck" concept – and an ascent stage that will return the crew to Orion at the end of the mission. A separate airlock module, sized for two people at any given time, will be on the same level as the ascent stage, but left with the descent stage upon departure from the Moon.

NASA originally considered LOX/methane propulsion for the ascent stage, but technology and cost constraints have driven Altair to rely upon cryogenic fuel for now. Pressure-fed RL-10 engines (one on ascent, four on descent) have been selected because of their reliability.

Much like the Orion Service Module, fuel, power supplies, and crew expendables for the mission will be carried on the descent stage. During one-week lunar sortie missions, the Altair will also serve as the crew's habitat. For lunar outpost missions, Altair will serve as both a crew return vehicle and an unmanned cargo delivery vehicle. For cargo delivery missions, the ascent stage will be deleted in favor of the selected cargo module. Used descent stages, left behind on the surface, may even be scavenged for parts by lunar outpost crews.



## Space Settlement Design Competition

DOUGLAS YAZELL, ACTING EDITOR

Anita Gale once again led a large team of volunteers the weekend of May 9, 2008, at NASA Johnson Space Center, making this event another huge success.

We extend our appreciation to AIAA Houston Section mem-

ber Norman Chaffee whose many contributions include obtaining permission to use the NASA facilities. The standing ovation for Mr. Chaffee from 150 exhausted high school students (mostly from Iowa) on the last day of this event was deafening and long

lasting. Norman did not allow back surgery nor a broken hip (with a hip replacement in his near future) to slow him down much. Many thanks to Mr. Chaffee for this remarkable service to our profession.

SSDC



## Election Results

## AIAA Houston Section Election Results

DOUGLAS YAZELL, ACTING EDITOR

With nine candidates for eight councilor seats, it was a close race this year.

Newly elected officers:

Chair: Chad Brinkley  
Chair-Elect: Ellen Gillespie  
Vice Chair Operations: Nick Pantazis  
Vice Chair Technical: Sean Carter  
Treasurer: Jason Tenenbaum

Secretary: Sarah Shull

Councilors (two-year terms starting July 1, 2008):

Donald Barker  
Ansley Collins  
Holly Feldman  
Rafael Munoz  
Tim Propp  
Natasha Rowell  
Prerit Shah  
Lorenn Vega-Martinez

## Astrodynamics

## Course Offering at UHCL this Fall: Astrodynamics

DOUGLAS YAZELL, ACTING EDITOR

Quite a few engineers in the Houston Clear Lake area would take this course this fall at the University of Houston at Clear Lake if they knew about it, so we hope this article helps to attract students to the class.

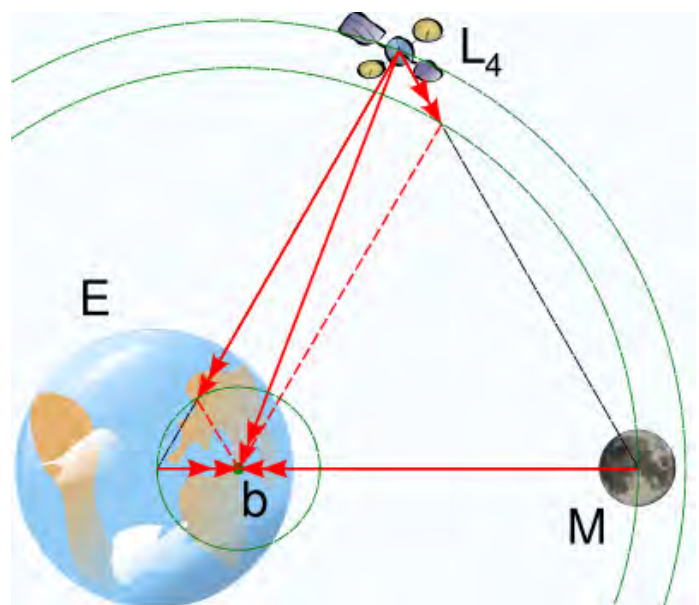
The teacher is Dr. Timothy Crain of NASA Johnson Space Center, who works with this subject in his career. He is also a member of AIAA Houston Section's astrodynamics technical committee, and we hope students completing his course will join him on that committee whose web page is found at [www.aiaa-houston.org/tc/astrodynamics](http://www.aiaa-houston.org/tc/astrodynamics).

The class will be from 11:00 to 12:30, 11:30 to 1:00, or 12:00 to 1:30 on Tuesdays and Thursdays, probably meeting for 75 minutes or less each time. Cost information is found at [www.uhcl.edu](http://www.uhcl.edu). Open registration is April 25 until noon on August 22, 2008. Au-

gust 25 is the first day of class for fall of 2008.

Among past teachers of this course is Victor Bond, co-author of the book *Modern Astrodynamics*.

Dr. Crain is a recent graduate of the University of Texas at Austin where he studied with Dr. Robert Bishop.



Source: Wikipedia (Lagrange points)

## The Dragon in Space: China

MARLO GRAVES, INTERNATIONAL SPACE ACTIVITIES COMMITTEE

## Feature Article

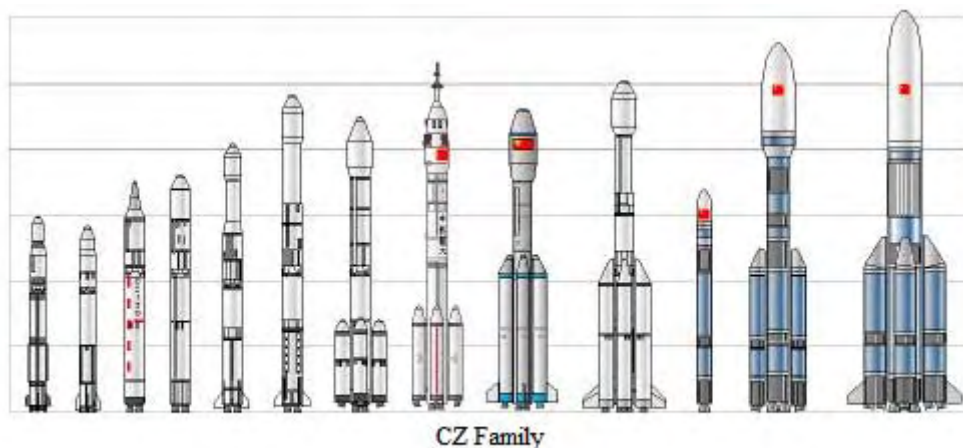
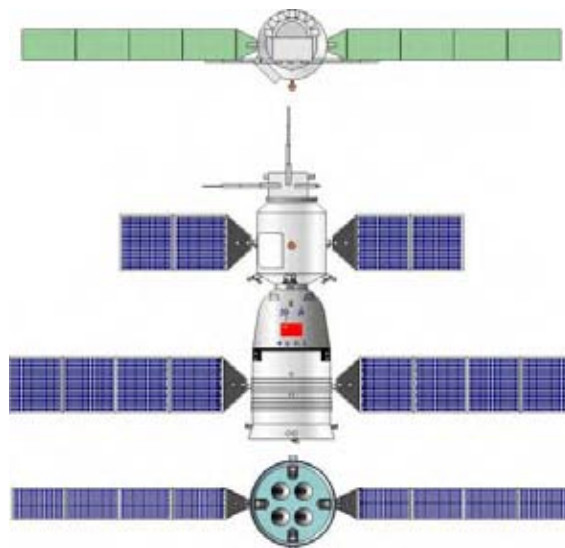
The Chinese have a legend about man named Wan Hu. He was supposed to have been a Chinese nobleman who lived during the Ming dynasty. The legend says that Wan Hu wanted to travel into space, so he built a chair and tied forty-seven rockets to it. He had forty-seven of his servants come out and simultaneously ignite each of the rockets and then run for cover. This was followed by a large explosion and when the smoke cleared Wan Hu and his chair were gone, never to be seen again. Now fast forward over five hundred years after the legendary Wan Hu attempted his ill-fated trip into space, and you find another Chinese adventurer is heading into space. On October 15, 2003 at 9:00 am Beijing time, China successfully launched its first citizen, Yang Liwei, into space aboard the Shenzhou V rocket. He orbited the Earth fourteen times and spent a total of twenty-one hours in space. Two years later on October 12, 2005, again at 9:00 am local

time, China launched two more astronauts into space. Like their predecessor, Yang Liwei, these two astronauts, Fei Junlong and Nie Haisheng were military men. These flights made China only the third nation in the world to be able to launch humans into space on their own. While Chinese astronauts are commonly referred to as taikonauts by the Western media, they prefer the term astronaut and use this term in their English language publications. However if one prefers to call them astronaut in their native tongue, the word is “yuhangyuan”. The capsule in which the astronauts fly is called Shenzhou while the rocket upon which the capsule launches is called the Long

March. The Shenzhou is a capsule similar to that of a Soyuz except the Shenzhou is larger. It burns thrusters to deorbit and then parachutes down to a landing site in Inner Mongolia.

I spent the summer of 2007 in Beijing, China as a staff member for International Space University (ISU). During this time, I had the opportunity to learn a lot about China and their space program. The Chi-

*(Continued on page 14)*



Credit - © Mark Wade

*Credit: www.astronautix.com*

*Shenzou spacecraft and Long March and other rockets*

## Feature Article

(Continued from page 13)

nese warmly welcomed the ISU students and staff. I met engineers working in the Chinese space program and toured a few of their facilities. One such tour was at the Chinese Mission Control Center (MCC). The Chinese MCC resembles that of the Apollo and Shuttle MCCs. It is a large room filled with consoles facing even larger screens. The Chinese, however prefer to have their back room controllers in the front with the rest of the flight controllers so their MCC is about three times the size of NASA's. There is, however, very little space between each controller. (Not pictured in the photo below is a fourth row of consoles similar to the first three.) The MCC is located in Beijing.

The Chinese space program is completely government run and employs over 100,000 people. The government has created large state run corporations to operate its space program. One such company is the China Aerospace Science and Technology Corporation (CASC). CASC produces vari-

ous rockets including the Shenzhou and Long March series. As of the summer of 2007, the Chinese had 88 launches with the Long March rockets with a 90% success rate. In addition to developing and testing launch vehicles and man-rated spacecrafts, CASC also creates satellites and tactical missiles. CASC also has eight subsidiaries which include the following companies (<http://ssp07.buaa.edu.cn/department/CASC-subsidiaries.htm>):

1. China Academy of Launch Vehicle Technology
2. Academy of Aerospace Solid Propulsion Technology
3. China Academy of Space Technology
4. Academy of Aerospace Liquid Propulsion Technology
5. Sichuan Academy of Aerospace Technology
6. Shanghai Academy of Space Flight Technology
7. China Aerospace Times Electronics Corporation
8. China Academy of Aerospace Aerodynamics
9. China Great Wall Industry Corporation
10. China Aerospace Engineering Consultation Center

These companies develop and

create products for information technology, automobile parts and do research into new materials and advanced energy. They also produce products for military and civilian use.

China is seeking other international partners in addition to the West for general commerce as well as for partners in space ventures. China has a very active relationship with Brazil. They have an entire organization called CRESDA which is devoted to working on the China-Brazilian Earth Resources Satellite. China has also partnered with Nigeria to build a satellite. Because of ITAR issues, no American-made satellite may be launched on a Chinese rocket. As a result, the Chinese build and launch satellites for other nations and then train engineers from those nations on how to operate their satellite.

The Chinese intend to land on the moon in the next decade or two. Their space program is a source of national pride. The optimism in China, whether it pertains to their space program or general business, is palpable. The Chinese are eager to do business and interact with the West. Many US companies are already very established in China. Microsoft's Beijing office was walking distance from my hotel while the Chinese offices of Boeing, Google and Sun could be reached by a short taxi ride. I witnessed young Chinese university students rising early to practice their English aloud in a park next to the library. They grasped their textbooks as a theatre student would and proclaimed their monologues into the wind or the ears of any

(Continued on page 15)



The Chinese Mission Control Center. Photo: Marlo Graves

(Continued from page 14)

passerby. Most of these students have never left China and have studied English within China from non-native English speakers but they still have a firm grasp of the English language and their accent is comprehensible.

### AIAA Sister Sections

AIAA Houston Section has an International Space Activities Committee (ISAC, see [www.aiaa-houston.org/tc/isac](http://www.aiaa-houston.org/tc/isac)) whose creation dates back to sometime between 1962 and 1987. AIAA member and former section chair (1971-1972) James C. McLane, Jr. was the leader in starting a sister section relationship with the Shanghai Astronautical Society (SAS) in 1987. This sister section relationship was most active from 1987 to 1992, and in 2003 or 2004, AIAA Houston Section member and programs chair Chris Taylor enjoyed dinner at a restaurant with SAS members in Shanghai. In 1988 and 1992, Houston delegations visited China for about 3 weeks at a time, hosted by SAS, visiting tourist sites and space facilities around the country. In 1990, a Chinese delegation visited Houston in the spirit of citizen-to-citizen diplomacy. A 1992 Houston delegation member gave our section 270 of his very professional snapshots from that visit to China, on a DVD with high resolution

such that some photos have a file size as high as 10 megabytes. He scanned these photos in 2008 and delivered the DVD to me and others in our section in May of 2008.

Several more AIAA Houston Section sister sections around the world came and went since 1987. Starting this past December of 2007, we have a new sister section in Toulouse, France, l'Association Aéronautique et Astronautique de France, Toulouse – Midi-Pyrenees branch, AAAF TMP. We exchanged a few newsletter articles and section chair Douglas Yazell and his wife will visit them June 24-28, 2008. A feasibility study is in progress related to having a conference in Toulouse the second half of 2010. In order to be of service to our profession by working with Russians in Houston and elsewhere, our section supported travel by our new ISAC chair Ludmila Dmitriev-Odier to see the Soyuz launch in Baikonur on October 10, 2007, where she

had a VIP pass as a part of a group of cosmonaut family and friends. Mila later invited Congressman Lampson to be our section's dinner speaker, and she arranged for several guests of honor at that dinner, including four Russians, one a worldwide opera star who appeared in La Boheme at the Houston Grand Opera, Mr. Nikolay Didenko. After Mr. Lampson's dinner speech, Mr. Didenko sang two songs, a Russian folk song and an Italian song. Mila volunteers to chair ISAC again next year for the 12 months starting July 1, 2008.

Houston Section will continue working with SAS in the coming year in addition to creating

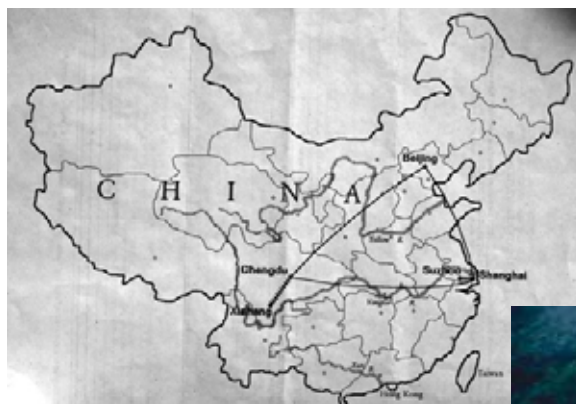
(Continued on page 16)

## Feature Article



Above: Logos for AIAA Houston Section and our French sister section

Below: A few snapshots & documents from the 1992 visit: an AIAA Houston Section delegation visiting China hosted by our Chinese sister section, the Shanghai Astronautical Society of the Chinese Society of Astronautics



**ITINERARY** The Delegation will visit Beijing, Chengdu, Xichang (launch site), and Shanghai, with a daytime excursion Suzhou from Shanghai. Final selection of specific facilities, laboratories and institutes to be visited will be made after special technical interests of the delegates is known. The delegation may be split up for simultaneous visits to different facilities in some cases where there is specialized interest. Visits to principal tourist attractions will be included.



**TRANSPORTATION AND ACCOMMODATIONS** Continental Airlines and China East Airlines will provide air transportation between Houston, Los Angeles and mainland China. Air and surface transportation in mainland China has been arranged by the CSA. Overnight trains between Chengdu and Xichang will feature soft berth accommodations. Hotel accommodations will generally be rated 4 Star (example: International Hotel in Beijing); however, in Xichang the only hotel for foreigners is the Xichang Satellite Hotel.

Right: launch site in Xichang (1992 visit by AIAA Houston Section delegation)



## Feature Article

(Continued from page 15)  
a new sister section in Beijing. We can begin by contacting ISU alumni who work for the Chinese space program in Beijing. We can also exchange newsletters between the Chinese and American sister sections (ours is free to all, quarterly, and online only). Information exchanged will be within the bounds allowed by both governments. As the contact person for our Chinese sister sections, I will work to visit Beijing, China this year (November 24-28, 2008 are

penciled in as travel dates) in this capacity, and we will work on having Chinese sister section members visit Houston next year. Our goal is to create citizen-to-citizen diplomacy, cultural interchanges, professional contacts, and more that will be of service to the aerospace profession.

### International Space University

My trip to China was made possible by ISU (see [www.isunet.edu](http://www.isunet.edu)). ISU describes itself as a university that “provides graduate-level training to the future leaders of the emerging global space community”. This university has a two-month Summer Session Program that meets in a different location every year and a year long Masters degree program that is located at the permanent campus in Strasbourg, France. Students may participate in either the summer session or the Masters

program or both. ISU prides itself on being Interdisciplinary, International and Intercultural or the 3I’s as ISU fondly refers to it. The curriculum consists of lectures in several core areas – space science, space engineering, systems engineering, space policy and law, life sciences, business and management, and space and society. In addition to core lectures students participate in a team project. This project not only works to solve a problem but strives to teach the participants how to work in an international and intercultural team. During the summer of 2006 I was a student at the Summer Session Program that was held in Strasbourg, France and during the summer of 2007 I was a staff member at the Summer Session in Beijing, China. The missions of ISU and AIAA are very similar. Both organizations have a global outreach. I am working with AIAA Houston Section’s ISAC to partner with ISU alumni from around the world to enhance the education and international outreach of our members.

### China’s Past and Future

China is arguably the oldest continuous civilization on the planet. The Chinese are credited with inventing rockets, fireworks, paper, the compass and moveable type. Having such a rich technical history upon which to draw, it will be amazing to see what they contribute to world civilization and space programs in the near future.



## Membership

LISA VOILES, MEMBERSHIP CHAIR

### Please welcome our newest AIAA Houston Members!

#### As of May 1, 2008: MEMBERS:

Kent Adams  
Mary Arszulowicz  
Anousheh Ashouri  
Lawrence Baitland  
Sharm Baker  
Perakath Benjamin  
John Brewer  
Jaime Bustamante  
Marc Church  
James Clutter  
*Ansley Collins, Councilor for  
a 2-year term starting July 1,  
2008*  
Alan Deluna  
Michael Ferullo  
Doyle Hensley  
*Don Kulba, Assistant editor  
for Horizons*  
Christopher Leslie  
Glenn Stromme  
Elliott Potter

#### STUDENT MEMBERS:

Mark Anderson  
Selcuk Belek  
Marco Cienega

Mandakh Enkh  
Kristen Holmstrom  
Adam Johnson  
Atilla Kilicarslan  
Natalie Pilzner  
David Schrock  
Mithun Singla  
Chad Smith  
Brock Spratlen  
Matthew Stephens  
Keenan Turner  
John Walters  
Michael Yager

#### EDUCATOR ASSOCI-

#### ATES:

Edith Cruz

#### As of June 1, 2008:

#### MEMBERS:

*George Abbey, Jr., member of  
our section's International  
Space Activities Committee  
(ISAC): see www.aiaa-  
houston.org/tc/isac*  
Amy Brzezinski  
Nathaniel Clark  
*Michaela Benda, former lec-  
turer at our section's Annual  
Technical Symposium (solar  
sails)*

Gary Cooper  
Matt Dennis  
Roberto Egusquiza  
James Engle  
*Marlo Graves, our section's  
contact person for Chinese  
sister sections, member of our  
section's International Space  
Activities Committee (ISAC):  
see www.aiaa-houston.org/tc/  
isac*

Joe Hammond  
Neal Hammond  
Caris Hatfield  
Richard Hieb  
Juniper Jairala  
William O'Keefe  
Michael Raftery  
Larry Roberts  
Brian Salinas  
Robert Scheid  
Daryl Schuck  
Justin Thomas  
George Watts  
Melanie Williams-Vail  
Ross Winn

#### STUDENT MEMBERS:

Melissa Caldwell  
Alberto Rivas-Cardona

## Membership

### Update Your 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](mailto:membership@aiaa-houston.org).

The membership total from May 1, 2008, was 1153, which included 839 professional members, 227 student members, and 87 educator associates. As of June 1, 2008, there are 1158 members 849 professional members, 222 student members, and 87 educator associates.

Not a member? See the end page.

To nominate someone for AIAA's top awards, please see [www.aiaa.org](http://www.aiaa.org). These relate to service to AIAA or the professions of aeronautics and astronautics.

From the lunch-and-learn of May 29, 2008:

Left to right:

Michael Zhang of the Asian-American Engineering Society (120 members in Houston)

New member Marlo Graves, contact person for AIAA Houston Section Chinese sister sections

(In back): Ken Young, Houston space program veteran since the days of the Mercury program (still working half-time)

James C. McLane III, AIAA Houston Section International Space Activities Committee (ISAC) member  
James C. McLane, Jr., former Chair (1971-1972) of AIAA Houston Section, leader of the team that created the sister section relationship between the Shanghai Astronautical Society and our section, a relationship that is still going strong today, 21 years later.



## Lunch-and-Learn Summary

[www.aiaa-houston.org/tc/isac](http://www.aiaa-houston.org/tc/isac)

## The Rise of China's Space Program: The International Space University Beijing Session & AIAA Houston Section Sister Sections

DOUGLAS YAZELL, ACTING EDITOR



This lunch-and-learn drew a crowd of 49 people on May 29, 2008, at NASA Johnson Space Center's Gilruth Center. Appetizers and iced tea were compliments of AIAA Houston Section.

From our publicity flyer:

"In October 2003, China launched its first human space mission with astronaut Yang Liwei. This milestone made China only the third nation in history capable of independently putting a human into space. In October 2005, China launched two more astronauts into space, Fei Junlong and Nie Haisheng on a five day mission. China's space ambitions include sending people to the Moon. This summer, AIAA members Marlo Graves & Stephen (Brad) Abrams participated in the International Space University (ISU) Summer Session Program'07 (SSP07) held in Beijing,

China. They were able to hear lectures and panel discussions from Chinese and other international space experts as well as visit major Chinese space facilities such as the Chinese Mission Control Center. During this Lunch & Learn they will share their experiences in Beijing and the plans AIAA Houston Section has to create a sister section in Beijing and continue the section's 22-year-old tradition (since 1986, thanks to James C. McLane, Jr.) of maintaining our sister section relationship with the Shanghai Astronautical Society (SAS), whose current contact person in Shanghai is the SAS Secretary General Wu Wenxuan.

*Top: part of the artwork used by ISU to advertise the 2007 summer session in Beijing*

*Right: Marlo Graves (at right) and fellow ISU students and personnel in China for the 2007 summer session*

*Bottom: Photo by Marlo Graves in 2007: Chinese Academy of Launch Vehicle Technology*



Marlo Graves has worked in the space industry since January 1998. She currently works for The Boeing Company in the Space Shuttle Systems Integration Group. During the summer of 2006, Ms. Graves was a student at ISU for the session that was held in Strasbourg, France. During the summer of 2007, she was an ISU staff member for the session in Beijing, China. Ms. Graves is currently learning Chinese and is leading AIAA Houston Section's work to create a sister section in Beijing. Her educational background is in aerospace. She received a BSE in Mechanical & Aerospace Engineering from Princeton University in 1995 and an MS in Space Architecture from the University

of Houston in 2004.

"Stephen (Brad) Abrams grew up in San Antonio, Texas. From an early age he was tinkering in the garage and showing interest in science and engineering. Brad attended Tufts University in Medford, Massachusetts for his Bachelor of Science in Mechanical Engineering. After graduation, Brad was employed by Lockheed Martin, working on small hardware projects for both the Space Shuttle and International Space Station programs. He then left Lockheed to join Boeing in 1998, where he performed as a test engineer for the Space Station's Active Thermal Control System. After two years, he began project engineering and management, where he continues to support

three of Boeing's contracts - Space Shuttle, Constellation (Ares), and Secure Border Initiative (SBI)."

Someone in our audience asked if a space race is possible in the near future, similar to the space race of the 1960's, which was won when Neil Armstrong and Buzz Aldrin walked on the Moon and returned home safely. Brad answered that he is not the right person to ask, but in his humble opinion, we are already in a space race with the Chinese and the American space program leaders don't know it yet.

## Lunch-and-Learn Summary

[www.aiaa-houston.org/tc/isac](http://www.aiaa-houston.org/tc/isac)



Top right: James C. McLane, Jr., Brad Abrams, Marlo Graves, and Douglas Yazell

Top left: An ISU souvenir from the 2007 summer session in Beijing



Left: Opening ceremonies in Beijing for the ISU summer session of 2007

Bottom: A crowd of 49 people at the Gilruth Center Lonestar room at NASA/JSC in Houston, for this lunch-and-learn of May 29, 2008.



## Magazine Review

## Aerospace Projects Review

DOUGLAS YAZELL, SCOTT LOWTHER, & AL JACKSON



### Orion to Mars: 1964!

Lessons learned are easy to overlook: consider this new source. Aerospace Projects Review is a new electronic magazine containing priceless old engineering drawings (lots of them), artwork (old and new), and short, newly written articles about past industry and government projects which were never built. All material is for sale (and affordable: see [www.up-ship.com](http://www.up-ship.com)) from Scott Lowther, who works from home in Utah. He holds the copyright to all of this content that he publishes (“and don’t you forget it”) except for the new artwork. Various sources

are used to obtain the content, including government agencies administering the Freedom of Information Act (FOIA).

APR is published about six times per year. All prices are subject to change, but as an example, these new rates were announced in May of 2008: US CD-ROM subscription: \$32 (\$38 outside of the USA), and worldwide download subscriptions: \$28.

Obviously “aeronutronic” from “Figure 56” on the next page is not a well-known word today. This word is related to the Aeronutronic Division of

Philco Corporation, subsidiary of the Ford Motor Company. Around the year 1964, they designed this lifting body Mars Excursion Module (MEM, a lander), but not the larger Orion nuclear pulse vehicle.

These Orion and MEM vehicles are the subjects of an article in the latest issue, volume 1, number 5. From the table of contents, Project Orion is listed three times, with small US Air Force vehicles starting on page 16, small NASA vehicles, starting on page 60, and launch systems starting on page 83 (to page 87). Pages 3 to 6 might be of interest to our

readers, too: North American Ten Passenger Reusable Orbital Carrier, written by Dennis R. Jenkins.

Volume 1, number 2, which has about 89 pages, skips the table of contents and starts articles about flyback boosters for space shuttle concepts. The boosters discussed here in these first 62 pages were derived from the Apollo Saturn V first stage, the S-IC. Boeing presented one such concept in 1962, the Model 922. The Lockheed

(Continued on page 21)



Figure 63: MEM on surface of Mars (Philco) 61

From APR magazine issue #5, Project Orion: Small NASA Vehicles, by Scott Lowther. This conceptual artwork is from 1964. MEM: Mars Excursion Module

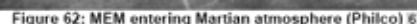
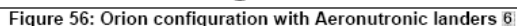
Martin concept shown on this page is from about 1971.

Mr. Lowther kindly accepted our invitation to be a regular contributor to Horizons. We work to have a strong visual impact in this newsletter, and Mr. Lowther's magazine, APR, is a natural fit in that category. Each article, which we might call APR Corner, might be as small as half of one page, and will contain contact information for APR.

## Aerospace Projects Review

provides valuable services to our professions of aeronautics and astronautics, including history, inspiration, and lessons learned.

## Magazine Review



*From Aerospace Projects Review volume 1, issue #5: Project Orion: Small NASA Vehicles, by Scott Lowther.*

## Student Conference

## Student Paper Conference (SPC 2008)

SARAH SHULL, AIAA HOUSTON SECTION SECRETARY & SPC CHAIR

Our Region IV 2008 Student Paper Conference (SPC) was held April 18-19, 2008, at NASA Johnson Space Center's Gilruth Center in Houston, Texas. Conference planning was provided by AIAA Houston Section (secretary Sarah Shull serving as co-chair) and the University of Arkansas student chapter. We are happy to report that 82 students attended from 7 different Region IV schools, and 26 papers were presented. This was a very successful conference.

Professor Adam Huang at the University of Arkansas was the other co-chair. In Houston the conference committee consisted of Linda Phonharath, Douglas Yazell, Dr. Gary Turner, Chad Brink-

ley, James "JJ" Johnson, Tim Propp, Jim Palmer, Munir Kundawala, and Jayant Ramakrishnan. University of Arkansas students on the planning committee were Jordan Baumberger, Drew Fleming, Randall Long, and Blake Baldwin.

The Young Professional panel discussion was very popular, led by AIAA Houston Section Young Professionals Chair Jim Palmer. Panel members were Davor Komljenovic, Jide Akinyode, Dr. Ben Longmier, Linda Phonharath, Munir

Kundawala, Helen Vaccaro, and Holly Feldman.

Featured speakers were John Connolly from the NASA JSC Lunar Lander Program Office and Dean Eppler, a geologist who has worked with various NASA programs which took him to the Arctic and the Antarctic. Mr. Eppler also served as the prime space suit test subject for NASA's advanced planetary space suit development and geologic field testing program (Desert RATS).

A long list of generous sponsors made this event possible. Many thanks go to Lockheed Martin Aeronautics, Cimarron Software Services, Inc., Lockheed Martin Space Systems, ARES Corporation, MRI Technologies, Booz Allen Hamilton, Bastion Technologies, Jacobs Engineering, S&K Technologies, United Space Alliance, SGT, The Boeing Company, PACA of New Mexico, AIAA Houston Section, AIAA Albuquerque Section, and The University of Arkansas Department of Mechanical Engineering.

From our professional community, about 30 online judges and 12 oral judges did

*(Continued on page 23)*



(Continued from page 22)

excellent work, and several of them joined the students and organizers for the Saturday luncheon on the second day of the conference.

#### Winners:

Grant Atkinson, 1st place, history division, Gemini Applications: The Promise of the Gusmobile

#### Undergraduate:

Alex Bayeh, 1st place, Analysis of Mach Disks

Kotaro Tagawa, 2nd place, An Automated Probe Drive for Surveying a Low-Speed Wind Tunnel

Clark Moody, 3rd place, Neural Network

#### Masters:

Kenton Kirkpatrick, 1st place, Reinforcement Learning for Active Length Control of Shape Memory Alloys

Shane Schouten, 2nd place,

Flight-Test Measurement of the Canard Wake on a Velocity XL-5 RG

Shalom Johnson, 3rd place, Rotating Stall Suppression Test Rig Using Oscillatory Blowing Actuation on Blades

#### Team:

Texas A&M University, Space Engineering Institute, 1st place

Louisiana State University, 2nd place: Micro Air Vehicle, Numerical Optimization of a Coaxial Rotor Blade Design

Louisiana State University, 3rd place, The Aerospike Nozzle: An Investigation into a Single Stage to Orbit Rocket Engine

With about 60 students from Texas A&M University, we are delighted with their support and with the work of their teachers such as Professor John Valasek. We need to persuade other big colleges in our region that this conference is worth their while.

This conference moves around the region from year to year, landing in Houston every other year. In most ways this was the biggest event of the year for AIAA Houston Section, and many thanks go to the big team whose hard work and talent made this event a pleasant success.

## Student Conference



## Lunch and Learn Summary

## Lunar Communications Updated

BEBE KELLY-SERRATO

AIAA HOUSTON SECTION SPACE OPERATIONS TECHNICAL COMMITTEE CHAIR

Our thanks go to NASA/JSC and Oron Schmidt (EV 16) for this presentation in JSC building 16 (rooms 111/113) on February 13, 2008: Lunar Communications Updated. Only badged employees (civil servants and contractors) with US citizenship were allowed to attend, but this picture and the following text from our publicity flyer was given wide circulation:

*"We explored the Moon during six Apollo missions beginning in 1969 and ending in 1972. NASA's Constellation Program is planning to go back to the Moon beginning in 2021. Whereas Apollo lunar surface communication links provided constant communica-*

*tion between two EVA crewmen and Mission Control, the communications planned for the future lunar program provides more surface-to-surface capabilities. Lunar surface-to-surface data networks will tie numerous elements such as Landers, habitats, rovers, and EVA crews together. This presentation will cover some of the proposals for providing updated communications for the new lunar program in preparation for later missions to Mars. Oron Schmidt is a NASA/JSC engineer and has been involved in manned spacecraft communications for over 43 years. His experience includes participation in the development of communication systems for Apollo, the*

*Space Shuttle and the Space Station. His current activities involve the development of candidate communication subsystems for Lunar Landers, Habitats and EVA backpacks."*

AIAA Space Operations technical committee has more such events planned for the new AIAA year starting July 1, 2008.

This technical committee is always looking for qualified members who seek to help their careers while being of service to the profession. Interested parties can contact us at [spaceops@aiaa-houston.org](mailto:spaceops@aiaa-houston.org) or [vicechair-tech@aiaa-houston.org](mailto:vicechair-tech@aiaa-houston.org).



## Key Turning Points in the History of the Space Age Dr. Roger Launius, The Smithsonian Institute

DOUGLAS YAZELL, ACTING EDITOR

## Dinner Meeting Summary



*Our section's annual honors & awards dinner had a crowd of 72 people to hear Dr. Launius and his popular presentation with assertions such as saying the Kennedy assassination was more of a turning point for space than the Sputnik launch.*

*Right: Communications Chair Gabe Garrett: Outstanding Achievement*

*Below: Council members from left: Ellen Gillespie, Linda Phonharath, Shirley Brandt, Lorenn Vega-Martinez, Sean Carter, Doug Schwaab, Chester Vaughan, Ben Longmier (continued below)...*



*Above: (continued): Al Jackson, Gabe Garrett, Amy Efting, Sarah Shull, Lisa Voiles, Robert Beremand, and Svetlana Hanson.*

*Below: Some of the new officers starting July 1, 2008: Jason Tenenbaum, Lorenn Vega-Martinez, Prerit Shah, Holly Feldman, Sean Carter, Ellen Gillespie, JJ Johnson, Sarah Shull, and Douglas Yazell*

*Below: Councilor Ellen Gillespie stands in for Chair-Elect Chad Brinkley as the gavel is handed over from Chair Douglas Yazell*



## Dinner Meeting Summary

## Current & Future Human Space Programs A View From the Hill: Congressman Nick Lampson

DOUGLAS YAZELL, ACTING EDITOR

A crowd of about 100 people enjoyed our dinner program at NASA Johnson Space Center's Gilruth Center Alamo Ballroom, Friday, May 2, 2008.

Congressman Lampson first spoke about a financial crisis facing our country in the next five years.

*(Continued on page 27)*

*Photo courtesy of  
www.ndidenko.com*



Our guest of honor Mr. Nikolay Didenko is the Russian bass soloist of the Moscow New Opera recently performing in Houston Grand Opera's "La Boheme". The list of his performances includes appearances in the USA, Europe, Australia, Japan, and Taiwan.

He is often invited to gatherings with NASA, the European Space Agency, and Russian cosmonauts. On April 12, 2007, Cosmonauts' Day (also called Yuri's Night), he was a guest of honor in the Mission Control Center in Moscow to perform Russian folk songs for the International Space Station crew members of Expeditions 14 and 15.

One year later, on April 12, 2008, he accepted the invitation of Russian flight directors, mission specialists, and cosmonauts in Houston to join them for Cosmonauts' Day. Several recitals with participation of Mr. Didenko in the Houston Clear Lake area were well supported and appreciated by NASA Johnson Space Center, NASA contractors, and local businesses.

Mr. Didenko kindly accepted our invitation to perform two songs, a Russian folk song and an Italian song.

### Guests of honor:

Mr. Victor Blagov, Vostok/Voshod veteran, Deputy to the Flight Director General at the Mission Control Center in Moscow – "Mir" and ISS programs, a major Contributor to the US-Russia Space Program, currently Head (Distinguished) Specialist of the RSC-Energia (Rocket-Space Corporation)

Mr. Yuri Nelovkin/RSC-Energia (Russian Flight Director, SRP and RRGU- Russian Regional Mission Support- Group Lead) and Mr. Alexander Komanda/TsNIIMASH, Mission Support/ IT Specialist/RRGU – Russian Regional Mission Support. Mr. Nelovkin and Mr. Komanda are supporting missions at the Mission Control Centers in Moscow and in Houston.

Mr. Robert Brown and Mr. William Mackey, representing the Canadian Space Agency in Houston

Dr. Andrew Thomas and Dr. Shannon Walker, NASA astronaut office



*(Continued from page 26)*

Mr. Lampson mentioned that he favors about two more space shuttle missions than allowed by current plans which call for an end to space shuttle operations at the end of 2010.

As reported elsewhere in this issue, our AIAA Houston Section was represented by William Atwell in Washington, DC, in April this year during

Congressional Visits Day. Our section's Public Policy Chair, Munir Kundawala, prepared some literature for that event and ensured it was delivered to the Houston office of Senator John Cornyn.

Congressman received a loud round of applause after his prepared remarks and an enthusiastic standing ovation after the question and answer session.

AIAA Houston Section thanks the many volunteers making such events possible, including our section's chair for our International Space Activities Committee (ISAC), Ludmila Dmitriev-Odier, who invited the NASA photographer and all of these honored guests. The evening concluded with a fantastic performance by international opera star Mr. Didenko.



*Left to right: Mr. Victor Blagov, Douglas Yazell, Ludmila Dmitriev-Odier, Congressman Nick Lampson, and Mr. Nikolay*



*Above: 3rd from left: Dr. Andrew Thomas, NASA astronaut office, with the STS-114 crew. Photo: courtesy of NASA*



*Mr. William Mackey of the Canadian Space Agency in Houston at Ellington Field for the STS-123 crew return. Photo: courtesy of NASA*



*Left: Dr. Shannon Walker, NASA astronaut office. Photo: courtesy of NASA*



*Ludmila Dmitriev-Odier, Congressman Lampson, and Mr. Robert Brown of the Canadian Space Agency office in Houston*

## Dinner Meeting Summary

## College and Co-op

### Rice University AIAA Student Section

LINDA PHONHARATH, COLLEGE & CO-OP CHAIR

Professor Andrew Meade continues to be of service to the new AIAA student section of Rice University, led by its chair, Rice University student Alex Stoll. Two issues ago (Horizons on our web site in the winter 2007/2008 issue, pages 20 and 21) we reported on an event at Rice University February 11, 2008: AIAA Houston Section extra-vehicular activity (EVA) technical committee chair Bill West spoke about his past

EVA work in the USA and Russia, and he brought a Russian Orlan spacesuit with him.

Other events this semester include these notes from Alex:

*February 8th: NASA NBL Tour with astronaut Michael Massimino Dr. Massimino and NASA engineers gave us a behind-the-scenes tour of astronaut training at the Neutral Buoyancy Lab (see photos).*

*March 18th: Sky Walking - talk by Dr. Tom Jones The talk cov-*

*ered highlights from his astronaut career and our future in space, as well as a little about flying the B-52*

*March 24th: Lunar exploration presentation, Justin Kugler (L-3 Communications) Presentation detailing NASA's planned lunar exploration missions*

Alex Stoll and Professor Meade were provided their charter for their AIAA Student Branch during this year's Region IV Student Paper Conference hosted by the Houston

Photos: Rice student section



Section on April 19, 2008.

We note that the first chair of AIAA Houston Section, in our 1962/1963 year, was working at Rice University: Alan J. Chapman. Professor Chapman attended the celebration of our section's 40th anniversary a few years ago. We have taken a few steps already to prepare for our section's 50th anniversary during our AIAA year of 2012/2013.

## Money Management Workshop

JIM PALMER, YOUNG PROFESSIONALS CHAIR

## Young Professionals

Catching up on our year which ends June 30, 2008, we note that we are late in reporting on a popular Young Professionals (YP) Money Management workshop organized by our section's YP chair Jim Palmer: A Money Management Workshop. About 50 people attended this event after work on Tuesday, September 25, 2007, in the NASA/JSC Gilruth Center Coronado room. Featured speakers:

Lance Hutchins – Vice President of Wealth Management, Smith Barney

Tarl Anderson – Real estate broker, mortgage consultant, investor

The flyer was short and to the point:

“Learn how to invest in the stock market and/or real estate from a leading professional.

The stock market presentation will include basics of investing, retirement planning, and wealth creation. The real estate presentation will include basics of purchasing/financing

a house, various investment strategies, and opportunities in today's market. All questions welcome!”



*Lance Hutchins – Vice President of Wealth Management, Smith Barney*



*Tarl Anderson – Real estate broker, mortgage consultant, investor*

## Public Policy Congressional Visits Day

WILLIAM ATWELL, CHAIR, AIAA HOUSTON SECTION LIFE SCIENCES, SPACE PROCESSES, & HUMAN FACTORS TECHNICAL COMMITTEE

Congressional Visits Day (CVD) brings scientists, engineers, researchers, educators, and technology executives to Washington to raise the visibility of and support for science, engineering, and technology. CVD consists of a series of briefings and meetings with Congressional representatives through face-to-face meetings with Members of Congress, congressional staff, key Administration officials, and other decision-makers, CVD raises their awareness of the long-term value that science, engineering and technology bring to America.

This year, the 11th Annual AIAA Congressional Visits Day took place at the Hotel Monaco in Washington, DC, on 15-16 April 2008, with pre-CVD briefings (15<sup>th</sup>) and Capitol Hill visits on the 16<sup>th</sup>, and CVD concluded with an AIAA Congressional Reception on Capitol Hill. I attended CVD this year and represented Texas with visits to six Texas Senate and House members (Senate: KB Hutchinson and John Cornyn; House: Lampson, McCaul, Culber-son, and Ralph Hall).

Preparatory to CVD, the AIAA Houston Section Public Policy Committee prepared a “Key Issues” presentation, which I discussed with each Member that I visited. The AIAA Houston section main topics I presented to the Hill Members (or Staff representatives) included:

- The AIAA Vision & Mission
- The Nation’s Vision for Space Exploration
  - Defining the Program
  - Actively Managing the Transition
  - Providing for the Future
- Substantial Benefits from Space Exploration
- Affordability of the Vision for Space Exploration
- Challenges – Safe Execution of Current Operations
- Challenges – Continued Access to Space
- Continuing Congressional Support is Vital
- Summary

In addition, the AIAA Public Policy Committee prepares an annual “Top Policy Issues.” For 2008, these issues are:

- Maintain Leadership in Aeronautics Through a Robust and Accountable National Aeronautics Research and Technology Strategy
  - Address the Challenges of Military Space Acquisition
  - Integrate Aerospace Workforce Development
  - Increase Emphasis and Funding for Technology and Engineering in STEM Education
  - Lessen the Impact of Export Controls on the Domestic Aerospace Industry
  - Improve Air Cargo Security and Scanning
  - Promote Homeland Security by Facilitating the Use of UAVs in the National Airspace
  - Promote Robust and Affordable Space Transportation
  - Sustain U.S. Human Spaceflight Leadership
  - Recapture American Leadership in Space-Related Life and Physical Sciences

Overall, the presentation was well-received by the Texas Senate & House Members/Staffers.



## Staying Informed

COMPILED BY THE EDITORS

### NASA Global Climate Change web site at JPL

<http://climate.jpl.nasa.gov>

### Comments by John Marburger, Director, OSTP, at the Robert Goddard Memorial Symposium

<http://www.ostp.gov/galleries/speeches/jhm%20Goddard%20Symposium%20030608.pdf>

### 2008 FAA Commercial Space Transportation Forecasts

[http://www.faa.gov/about/office\\_org/headquarters\\_offices/ast/media/2008%20Forecasts%20NGSO%20GSO%20Commercial%20Space%20Transportation%20May%202008%20website.pdf](http://www.faa.gov/about/office_org/headquarters_offices/ast/media/2008%20Forecasts%20NGSO%20GSO%20Commercial%20Space%20Transportation%20May%202008%20website.pdf)

### Changing the Conversation: Messages for Improving Public Understanding of Engineering

[http://books.nap.edu/catalog.php?record\\_id=12187#toc](http://books.nap.edu/catalog.php?record_id=12187#toc)

### Frontiers of Engineering: Reports on Leading-Edge Engineering from the 2007 Symposium

[http://books.nap.edu/catalog.php?record\\_id=12027#toc](http://books.nap.edu/catalog.php?record_id=12027#toc)

### Rehearsal for the Moon

<http://www.memagazine.org/dec07/features/rehearsal/rehearsal.html>

### How Things Work: Thrust Vectoring

[http://www.airspacemag.com/flight-today/Thrust\\_Vectoring.html](http://www.airspacemag.com/flight-today/Thrust_Vectoring.html)

### The Million Mile Mission

[http://www.airspacemag.com/space-exploration/Million\\_Mile\\_Mission.html](http://www.airspacemag.com/space-exploration/Million_Mile_Mission.html)

### Orion's Brain

<http://www.airspacemag.com/space-exploration/16047062.html>

### Driving to Work on the Moon

[http://www.aiaa.org/aerospace/images/articleimages/pdf/Engineering%20Notebook\\_Aerospace\\_JUN2008.pdf](http://www.aiaa.org/aerospace/images/articleimages/pdf/Engineering%20Notebook_Aerospace_JUN2008.pdf)

### OpenNASA

<http://www.opennasa.com>

### NASA Ames Research Center CoLab (NASA/Public collaboration)

<http://colab.arc.nasa.gov/>

### Phoenix Mars Mission Home Page

<http://phoenix.lpl.arizona.edu/>

### NASA Administrator Griffin's comments to the Parliamentary Group on Space, French National Assembly, 5 June 2008

[http://www.nasa.gov/pdf/239405main\\_french\\_national\\_assembly.pdf](http://www.nasa.gov/pdf/239405main_french_national_assembly.pdf)

### NASA's Gen Y Speaks Out

<http://blog.wired.com/wiredscience/2008/02/nasas-gen-y-ste.html>

### SpaceX Conducts First Five-Engine Firing of Falcon 9's Engines

<http://www.spacex.com/press.php?page=42>

*“If we are serious about this, then our objective must be more than a disconnected series of missions, each conducted at huge expense and risk, and none building a lasting infrastructure to reduce the expense and risk of future operations. If we are serious, we will build capability, not just on the ground but in space. ... If the architecture of the exploration phase is not crafted with sustainability in mind, we will look back on a century or more of huge expenditures with nothing more to show for them than a litter of ritual monuments scattered across the planets and their moons.”*

*John Marburger  
Director*

**Office of Science and  
Technology Policy**  
At the Robert H. Goddard  
Memorial Symposium

## Annual Technical Symposium

## Annual Technical Symposium (ATS 2008)

STEVE EVERETT, AIAA MEMBER, INCOMING EDITOR



Photos:  
Douglas Yazell



Opening remarks: Sean Carter, ATS General Chair



identified the technical aspects of the mission ahead, Constellation.

After a continental breakfast provided by AIAA and

a brief welcome by the local chairman Douglas Yazell and the conference general chair Sean Carter, the morning meeting opened with the "Shuttle/Station Schedule: Transition Plan to Constellation" presented by Mr. Wayne Hale, former NASA Shuttle Program Manager and current Deputy Associate Administrator of Strategic Partnerships, Space Operations Mission Directorate. He spoke without slides about the strategic plans for terminating the shuttle program and the ongoing development of the Constellation vehicles. His characteristic passion for space travel was evident as he spoke of his interest in the space program as he grew up, and he expressed his belief that good things are around the corner for NASA and space exploration. As "chief shuttle-hugger", a term sometimes derisively applied to Mr. Hale, he enumerated the unique advantages of the Space Shuttle, but was also compelled to list the drawbacks of the current system necessitating the transition to the Constellation architecture. He pointed out that the end of the Shuttle program has been made inevitable by

the termination of the supply chain for the external tank and other retooling activities, not to mention the Presidential mandate. Its continued operation would also siphon a considerable \$4 billion from the \$17 billion yearly NASA budget,

as well as the required workforce, which could be used to support the Constellation effort. Meanwhile, the International Space Station is expected to house an expanded crew of six next year with research by National Institute of Health (NIH) and other organizations planned. Among the upcoming hardware demonstrations for the Ares and Orion vehicles are an abort demonstration this summer and launch demonstration next year. Regarding the effect of the transition on the workforce, Mr. Hale regretted that many blue collar jobs would be lost in Florida, but overall the number of NASA jobs and its budget are increasing. However, the agency is undergoing a transformation, and each employee was encouraged to be flexible and take the initiative in becoming retrained for newly created positions. Because of the enormous volume of work to be done, Johnson Space Center (JSC) will no longer be the center for operations in the sense of program management and procurement, but will become a design, test and development organization. Mr. Hale also remarked on the disposal of equipment currently in use, not the least of which is the fleet of orbiters themselves, as well as the facilities to be retired and obligations for environmental remediation. He also expressed a lack of concern over the "Gap", the period of time between the retirement

(Continued on page 33)

Above: Mr. Wayne Hale/NASA-JSC delivering the opening keynote presentation, "Shuttle/Station Schedule: Transition Plan to Constellation".

Left: our audience of about 100 people



of the Shuttle and first manned flight of the Crew Exploration Vehicle (CEV). There was a corresponding six year gap in a US presence in space after the end of the Apollo program, and at any rate access to space will be available through our international partners. His prepared remarks ended with the reminder that our primary goal is to create a sustainable program and that NASA's mission continues to have popular support. In response to a question about the possibility of flying the same number of missions but over a longer time period, he reiterated that the cost of operations during that time would introduce a commensurate delay in the development of the Constellation flights. When asked about modifying the Constellation goal to visit an asteroid rather than the moon, he had no objection to the concept but believed that progress would only be made by being dedicated to a consistent plan and set of requirements. When questioned about the relocation of operations work from JSC, he provided a reassurance that the aspects of operations including the missions operations directorate, mission control, and the crew office would not be relocated. In response to a final question, he had no opinion on whether increased latitude to the contractors in meeting tolerance-based requirements would have been of benefit during the Shuttle program.

The late morning period of the conference consisted of a series of presentations given in three simultaneous tracks on topics such as ISS lessons learned, new software archi-

tectures, and proposed methods of attitude determination and autonomous robotic habitat construction. These sessions concluded with a lunch provided as part of the conference registration fee. After lunch an exquisite wooden model of the Shuttle donated by ATEC as one of the corporate sponsors was awarded as a doorprize in a drawing of tickets issued to each attendee.

The afternoon continued with an introduction of the upcoming talks by the conference chair. The afternoon's keynote speaker Mr. Clint Dorris, Deputy Manager for the ALTAIR Project, began his presentation, entitled "Constellation's ALTAIR Lunar Lander", by illustrating the exploration roadmap, which included a lunar return in 2019. The two manifestations of the Constellation launch vehicles are to be a heavy lift vehicle, containing the earth departure stage and lunar lander, and the crew launch vehicle, which would loft the CEV. While the mission design shares many similarities with that from the Apollo program, the lunar orbiter will remain unmanned in the current architecture, and the lunar lander will also provide the thrust to transfer the vehicle from lunar to Earth orbit. Two missions are envisioned for a four-person manned lunar lander: a seven-day sortie version, which would include an airlock module, and an outpost version to be established for up to 100-day stays; an unmanned version could also provide cargo capability. Given the currently minimal budget for the lander design,

a small team of government employees was organized to develop a preliminary design which is being evaluated by several contractors. A "minimum functionality" design philosophy is being used in which a basic foundation for the design, not meant to be flyable, was developed, to which other capabilities would be added after "buying their way in", i.e., their priority for consuming limited resources during the design is established. After a summary of the lunar lander configurations presented, Mr. Dorris responded to a question about the reasoning for using

*(Continued on page 34)*

## Annual Technical Symposium



*Above: Steve Rader, "Constellation's Command, Control, Communication & Information Architecture Overview"*

*Below: Chris Ramsay, "Software Safety"*



## Annual Technical Symposium



Photos:  
Douglas Yazell



Luncheon keynote presentations  
Above: Clint Dorris, NASA-JSC, "Constellation's ALTAIR Lunar Lander"  
Below: Chris Culbert, NASA-JSC, "Concepts for Building a Base on the Moon"



(Continued from page 33)

the lander to do the Earth-return burn by citing cost and mass trade studies. He also elaborated on the different approach to safety by noting that rather than taking the blind approach to redundancy of duplicating entire systems, the group was considering alternate approaches to backing up critical functionality.

Mr. Chris Culbert, Manager for the Lunar Surface Systems Project, continued the discussion with his presentation "Concepts for Building a Base on the Moon" by describing his group's approach to designing the infrastructure needed to reside on the moon. While the US will own and control the Constellation launch vehicles, an international approach is being taken to designing and building a lunar base. Using the "minimum functionality" approach applied to the lunar lander design, capability to vary the rate of construction, mobility, and applicability to a Mars mission are being incorporated into the design. A

conceptual illustration of the base was displayed, and components including the habitation layout, mobility, power generation, use of resources, and capability for science were described in more detail. Among the more interesting concepts discussed was the approach for minimizing dust incursion into the habitation area. A "suit-port" was described in which EVA suits would reside external to the module, and astronauts would enter the suit directly and detach from the module. Alternately, a "suit-lock" would consist of an external suit which would be provided some protection from the lunar environment. The All-Terrain Hex-Limbed Extra-Terrestrial Explorer, or ATHLETE, mobility system, a six-legged, wheeled vehicle for transporting substantial cargo over rough and steep terrain, was also illustrated. The first of several questions was a request to elaborate on the strategy for involving international partners. Mr. Culbert described the Global Exploration Strategy group, which has been formed and signed on several partners to

talk about potential outpost architectures. It was noted by one listener that the notional illustration of the lunar base was elevated, but the audience was informed that burial in the lunar regolith was being considered as well. As pointed out in a subsequent question about the danger of radiation on the lunar surface, this arrangement would provide some protection. Astronauts would

be sheltered from radiation from solar flares, which come with limited warning and are of short duration, using a safe haven provided in both stationary and mobile habitats. However, exposure to lower level but constant cosmic radiation would have to be minimized merely by limiting sortie durations. Questions about the dust on the lunar surface resulted in more description of the "suit-port" and "suit-lock" concepts and brought up the potential for discovery of differing properties of dust at the polar and lower latitude regions of the moon.

The next presentation was given by Steve King and entitled "Overview of Orion CEV Mechanisms". After defining a mechanism as a movable component, the four components of the Orion vehicle, the launch abort rocket, crew module, service module, and spacecraft adapter, were illustrated. Over a dozen different mechanisms were described, including hatches, abort systems, docking devices, and others. Mr. King addressed questions about the impact attenuation system and mission design.

The final presentations of the day were on the design and potential use for lunar transfer orbits of the Variable Specific Impulse Magnetoplasma Rocket (VASIMR) under development by the Ad Astra Rocket Company. These presentations, "VASIMR: Future Propulsion Technology" and "Lunar Access with VASIMR", were given by Dr.

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## Annual Technical Symposium



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Jared Squire and Mr. Tim Glover, respectively. A simple schematic illustrated this rocket design, in which RF amplifiers would be used to generate plasma, which would then be contained, directed and propelled by magnetic fields, to produce thrust. Efficiencies resulting from the various experiments using deuterium and argon as propellants were reported, and the recent upgrade to a 120 cubic meter vacuum chamber for testing at the Ad Astra facility on Highway 3 was described. When the question was raised as to the consequences of losing the electric field and thus containment of the plasma, it was noted that the energy actually stored in the plasma was relatively low due to its low density, and little damage would be expected. An explanation of the behavior of the plasma to maintain neutrality of the spacecraft

was also provided. In the second half of this pair of talks, the potential market for delivering payload to the moon using VASIMR was described. Efficiencies attained by this form of propulsion could potentially deliver 38% of the mass in low Earth orbit to the lunar surface, as compared to 18% provided by the Surveyor mission. The solar arrays were cited as incurring the largest cost in a system for transfers to lunar orbit using the VASIMR, but the cost would be amortized over the ten round trips possible. When asked to elaborate on a comment about an upcoming flight test, Mr. Glover expressed the desire to install a VASIMR engine on the International Space Station. While it would likely not be transported using a Space Shuttle, the proximity of the crew for servicing and the absence of additional guidance and navigation requirements would make this

an ideal application for testing the capability of the engine.

Aside from the technical information presented, one of the primary benefits to the attendees of this conference was the opportunity to meet other engineers, researchers and scientists in the local aerospace community. Although tight budgets in the current industry climate do not always allow companies to provide funding to pay for an employee's time and registration fee, involvement in local events such as this is well worth the personal expense of one day and \$10, both for the individual's company and for his career. For those who were not able to attend, electronic copies of the charts presented are located at the local AIAA chapter website (<http://www.aiaa-houston.org/cy0708/event-09may08/program.php>).

Photos:  
Douglas Yazell



Ruby Viveros of Atec congratulates Shawn Tinoco of Geo Controls who won the model Space Shuttle door prize. Atec ([www.atec.com](http://www.atec.com)) is a small, local AS9100 certified company that manufactures flight critical components.



Steve King, "Overview of CEV Orion Mechanisms". Mr. King works for Lockheed Martin and is a past chair of AIAA Houston Section.

## International Space Activities Committee (ISAC)

[www.aiaa-houston.org/tc/isac](http://www.aiaa-houston.org/tc/isac)

## Soyuz Launch of October 10, 2007

DOUGLAS YAZELL, ACTING EDITOR

Ludmila Dmitriev-Odier volunteered at a good time to be the Chair of our section's International Space Activities Committee (ISAC), since we were initiating some activities with French and Russian aeronautics and astronautics programs this year. Mila has experience with both cultures and with American and Russian space programs.

Thanks to her family connections with Yuri Malenchenko,

Mila had a VIP invitation to see the Soyuz launch of October 10, 2007, commanded by Yuri. Our section and the national AIAA organization helped with her travel to Moscow and Baikonur. While traveling there, Mila went to work to make new connections and renew old connections to be of service to our profession in Houston with something similar to sister section activities. In this case, this work might

lead to dinner meeting speakers and other speakers at AIAA events in Houston. As with all such speakers, when these activities involve the exchange of technical information, the speakers obtain authorization from their employers and their national governments. And this kind of work is concerned with other things of service to our profession, such as professional con-

*(Continued on page 37)*



*Right: Yuri, Peggy, and the Malaysian astronaut near departure*

*Left: Getting ready for launch of October 10, 2007*



*All photos except the two at right are courtesy of NASA*



*Above: Mila in the center, and Mr. George Abbey, 2nd from right*



*Above: Mila in the Mission Control Center in Moscow*

(Continued from page 36)

tacts, cultural activity and education, and citizen-to-citizen diplomacy. Mila volunteered to continue in this role as ISAC chair for the coming year, the 12 months starting July 1, 2008. And as reported elsewhere in this issue, she invited the speaker and several guests of honor for our dinner meeting of May 2, 2008. Congressman Nick Lampson, whose district includes NASA Johnson Space Center, was our dinner speaker for that meeting.

International Space Station (ISS) commander Peggy Whitson was onboard this Soyuz vehicle for this launch, along with an astronaut from Malaysia. Peggy commanded

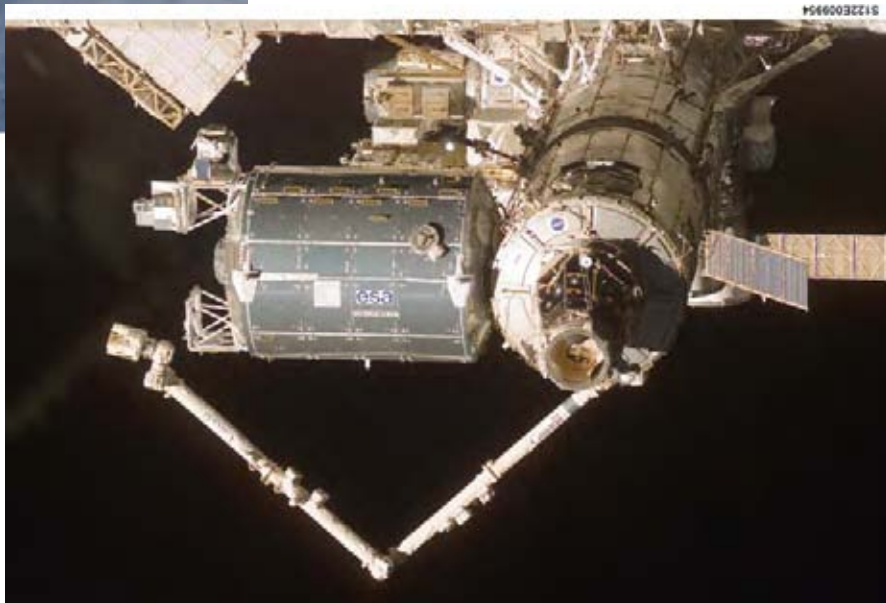
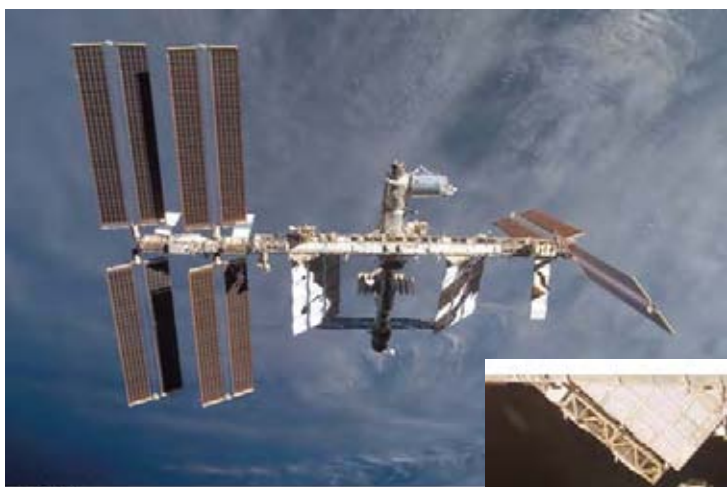
ISS Expedition 16, a long stay onboard the ISS with Yuri and the other Expedition members, some of whom came and went with stays of shorter duration. One of those who stayed about seven weeks was a French astronaut, Leopold Eyharts, of interest to our section even more than usual since the recent creation of our sister section relationship with a French sister section, l'Association Aeronautique et Astronautique de France, Toulouse - Midi-Pyrenees branch (AAAF TMP). Leopold brought the Columbus laboratory up to speed with numerous IVA's, Intra-Vehicular Activities. Since his December 2007 launch on Space Shuttle Atlantis was delayed until February

of 2008, he had less time than planned to complete his work on the Columbus laboratory, but he completed all planned tasks despite the shorter schedule. Nicely done!

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## International Space Activities Committee (ISAC)

[www.aiaa-houston.org/tc/isac](http://www.aiaa-houston.org/tc/isac)



## International Space Activities Committee (ISAC)

[www.aiaa-houston.org/tc/isac](http://www.aiaa-houston.org/tc/isac)

*(Continued from page 37)*

We expected our story for this article to end there, but the return of Yuri and Peggy with a Korean astronaut in a Soyuz capsule is a memorable drama told well by these NASA photographs. The capsule followed a steeper than usual trajectory (a steep trajectory called a ballistic return) in response to problems with the return mission, and it was a hotter than usual experience for the capsule. The crew ex-

perienced about 8 g's instead of a much lower g-load, perhaps 3 g's. Gravity is not a friend after six months in orbit, but especially not when the g-loads are so high.

The NASA photographs show the grass near the capsule burned for a long distance, perhaps a square kilometer on one side of the capsule. One photograph shows the capsule hit the ground hard enough to bounce, which might be nominal, but that's something

which cannot be pleasant.

The first people to find the capsule and crew were not the space support team, but people passing by. Reports I skimmed over in the press said Yuri had a satellite phone (used with success after this landing and was first to exit the capsule. A few Soyuz return missions in recent years followed a ballistic trajectory, so the crew was

*(Continued on page 39)*



*Above: ISS Expedition 16 members Dan Tani, Peggy Whitson, Yuri Malenchenko, and Leopold Eyharts*

*Above at right: our cover image*

*Below: DEXTRE, the Special Purpose Dexterous Manipulator (SPDM), from Canada*

*Below at right: Jules Verne approaches ISS. It is the first of ESA's Automated Transfer Vehicles*



(Continued from page 38)

prepared in some ways.

NASA has been generous in sharing the photographs from this dramatic mission, and it was full of historic successes: DEXTRE, a Canadian robot, Jules Verne, the first of the Automated Transfer Vehicles from the European Space Agency (ESA), the Columbus Laboratory from ESA, and more. Congratulations to the many members of Expedition 16.

## International Space Activities Committee (ISAC)

[www.aiaa-houston.org/tc/isac](http://www.aiaa-houston.org/tc/isac)



## From our French Sister Section

*Photo 7: London by night from the International Space Station (courtesy of NASA). Map courtesy of Google Maps.*



*Continued from last issue*

*Skipping to the part about ISS:*

### International Space Station

From the orbiting International Space Station (ISS) at an altitude of about 400 kilometers, it is possible to obtain images of Earth at night. Tests were conducted from a relatively simple and easy-to-use photo-

graphic platform installed near one of the ISS windows.

NASA created a bank of results of this image-taking and some of these are available from the internet (Reference 14).

Photo 7 shows London and its suburbs, the mouth of the Thames River and the south coast of England to Hasting. This photo was taken on Feb-

some major, well-lighted thoroughfares, some major ports, and the saturation of the image in the downtown area. We also see, in the mouth of the Thames River, clouds or fog lit by city lights.

These results are very encouraging for potential improvements which the system currently in work can bring.

### Earth Observation from the Moon

Seen from the Moon, the disk of the Earth is about four times bigger than the full Moon, or about 4 degrees wide. During one of the Apollo missions, a small telescope was placed on the lunar soil and allowed the taking of ultraviolet (UV) images.

In the case of a permanent lunar base, the creation of an automatic telescope observing the terrestrial night would be of the greatest interest. In fact, astronomers who observe the Moon from the Earth know well that during certain conditions of stability and atmospheric turbulence, and with adequate instrumentation, one can achieve a resolution of less than one kilometer on the lunar surface.

Current and future technical progress allows significant improvement in resolution and the thresholds of detection of flux in different wavelengths.

An automatic telescope in the class of 1 to 1.5 meters in diameter (or more) pointed to

*(Continued on page 41)*

## Constellation Earth

MICHEL BONAVIDACOLA, AAF TOULOUSE - MIDI-PYRENEES  
TOULOUSE, FRANCE

(Continued from page 40)

the Earth from the visible side of the Moon could contribute effectively to the preservation of the terrestrial nocturnal environment.

## VII Conclusions

The rapid proliferation and

uncontrolled power of exterior lighting has multiple and quantifiable impacts on the nocturnal environment. Simple and practical technical solutions allow significant reduction in the nuisance of artificial lighting while respecting the comfort of the users.

More and more precise observation of Earth's night by terrestrial, airborne, a satellite means permit, with study of its impact, the more and more exact establishment of the extent of the damage.

The detailed processes in this article are an invaluable help for the preservation of nocturnal flora and fauna. There will be more and more a part of defining the politics of land settlement which is more respectful of the environment. They lead to very important energy savings and are becoming part of a new start of durable development.

## From our French Sister Section

*Editor's note: The El Paso photo and map and the box below are not part of the article from our French sister section, but they fit well with this article.*



Photo of El Paso, Texas : NASA astronaut Don Pettit  
Map of Houston: maps.google.com



As a member of ISS Expedition 6, American astronaut Don Pettit made an outstanding movie about his photography of cities of the world at night seen from ISS. By rigging up some machinery onboard ISS to counteract the motion of ISS, he was able to obtain photos with higher resolution (about 60 meters) than available elsewhere (about 2 miles). Here is a link to a low-resolution version of his 10-minute movie:

<http://www.youtube.com/watch?v=eEiy4zepuVE>, and recently NASA made the high-definition movie available at: <http://eol.jsc.nasa.gov>

*Editor's note: Contact us at [editor@aiaa-houston.org](mailto:editor@aiaa-houston.org) if you would like a complete copy of the 6,000-word article in French and some help with the translation. This includes a list of 14 references. The author, Michel Bonavitacola, is part of a team working to establish sensible levels of light pollution for an astronomical observatory in the Pic du Midi near Toulouse, France. Coincidentally, the Houston Chronicle of Sunday, May 4, 2008, has a similar story (<http://www.chron.com/disp/story.mpl/nb/fortbend/news/5751993.html>) about light pollution at the George Observatory.*

**Calendar subject to change. See [www.aiaa-houston.org](http://www.aiaa-houston.org) for updates**  
 Contact [chair@aiaa-houston.org](mailto:chair@aiaa-houston.org) or [events@aiaa-houston.org](mailto:events@aiaa-houston.org) for further details.

**June (note: this issue of Horizons is going online June 25, 2008)**

- 2 Council meeting: see our org chart for contact information at [www.aiaa-houston.org](http://www.aiaa-houston.org)
- 10 Dinner meeting for our section's honors & awards: speaker: Mr. Launius from the Smithsonian Institute (We will put contact information here for future dinners)
- 25 Horizons online June 25, 2008. Then quarterly again (online only).
- 30 End of this AIAA year

**July (no council meeting this month)**

- 24 Regional Leadership Conference, Thursday & Friday, 24-25th (Hartford, CT): attendees from Houston Section: Nick Pantazis, Natasha Rowell

**August (no council meeting this month?: a section leadership retreat probably...)**

*Yuri's Night Houston Update (see the report in our last issue):*

*American Astronautical Society (AAS) volunteers led the Houston portion of this worldwide annual event. On Friday, May 9, 2008, at the wrap party at BJ's Brewery (nice pizza!) on Bay Area Boulevard, we heard the attendance: "about 7,000"! This includes all who were present at Space Center Houston that day and night, as well as those who enjoyed the morning 5 km fun run. Each year AAS works to place this April 12 event in a downtown location in order to do public outreach for the space program, but this year the downtown locations did not work out. Yuri's Night celebrates Yuri Gagarin's becoming the first person in space on April 12, 1961 flight and the April 12, 1981 STS-1 space shuttle launch. (Note: The International Space University chose April 12, 1987, as the date for its opening ceremony.) The first Yuri's Night celebration was in 2001, but it is related to Cosmonauts Day, which has been celebrated on April 12 each year since 1962.*



## Cranium Cruncher

BILL MILLER, SENIOR MEMBER

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

Joe Frisbee  
Gary Turner  
Murugan Subramanian  
Carl Lawrence  
Bob Maraia  
Gregory Pierce

They all figured out that the average speed of the rover was 4 km/hr regardless of terrain so that in the six hours a total distance of 24 km was covered. We do not know how much of the terrain was sloped or flat, but if it were all slope, the turnaround point would have been at 4 pm. If it were all flat, the turnaround point would have been at 3 pm. So we can conclude that it was within 30 minutes of 3:30.

Thanks to all who participated.

This issue's problem:

An analyst was working on plans to launch five spacecraft on expendable boosters. He was looking at options to launch multiple payloads on single boosters as follows:

Satellites Alpha and Bravo together - total payload weight 12 metric tonnes  
Satellites Bravo and Charlie together - total payload weight 13.5 metric tonnes  
Satellites Charlie and Delta together - total payload weight 11.5 metric tonnes  
Satellites Delta and Echo together - total payload weight 8 metric tonnes  
Satellites Alpha, Charlie, and Echo together - total payload weight 16 metric tonnes.

However, the analyst was just redirected to plan for launching each spacecraft on its own individual booster. He discovers that he has misplaced the information about the weight of each payload. From the weight sums given above, can you determine the individual weight of each satellite?

Send solutions to Bill Miller at [wbmilleriii@comcast.net](mailto:wbmilleriii@comcast.net). Names of the solvers, references, and the answer will be given in the next issue.

## Cranium Cruncher & EAA Corner



*Above: John Kuykendall's one-of-a-kind, highly modified LongEZ type aircraft CM-144 (for sale)*

The EAA photo from last issue did not have a caption, but here it is now:

***"1999 Seawind amphibian built by an EAA member in Deer Valley Airport near Phoenix AZ."***

Thanks to the Experimental Aircraft Association (EAA) in Houston, [www.eaa12.org](http://www.eaa12.org):

### Upcoming EAA Events: Experimental Aircraft Association

June 21<sup>st</sup>, Saturday - Wings & Wheels program (around the lunch hour) on the 3rd Saturday of each month: new aircraft expo, 1940 Air Terminal Museum, Hobby Airport, Houston TX, 10AM-5PM, 8325 Travelair Road, Houston TX 77061, 713-454-1940.

Raffle for a beautifully restored Cessna 140 in July, great odds! - [www.1940airterminal.org](http://www.1940airterminal.org)

4th Saturday of each Month - Monthly Tex-Mex Fly-In, Denton TX

June 20 - 22 - Lake Whitney Fly-in Campout - NW of Waco TX

2 Jul 2008 - Oshkosh Arrival Procedures, David Staten, Southwest Services Ellington Field, [Houston TX](http://HoustonTX)

28 July - 3 August 2008 - EAA AirVenture, Whitman Field, WI

6 August 2008 - Monthly Meeting - Engine Ignition Systems - "In the Beginning There Were Mags!", Presenter TBD, Ellington

Contact: David Staten, [info@eaa12.org](mailto:info@eaa12.org)

## Odds and Ends

*Below: Astronaut Mario Runco is in the back row, just left of center. Teachers in this photo with their students are:*

*Abhishek Agarwal (not pictured), Neeti Parti (at left), and Sanjeev Kumar Gandhi (at right).*



*Above: 4Frontiers ([www.4FrontiersCorp.com](http://www.4FrontiersCorp.com)) assembled a tour for 30 high school students from India, the US Space & Culture tour, including visits to New York City, Orlando, and Kennedy Space Center. Here they are in Space Center Houston for a presentation by American astronaut Mario Runco.*

*Thanks to our section's pre-college chair, Svetlana Hanson for finding this speaker at the last minute, and to our section's space operations technical committee chair BeBe Kelly-Serrato for relaying the request to our section.*

*Right: Teacher Nina Corley & students from Satori School in Galveston with certificates from the Civil Air Patrol*

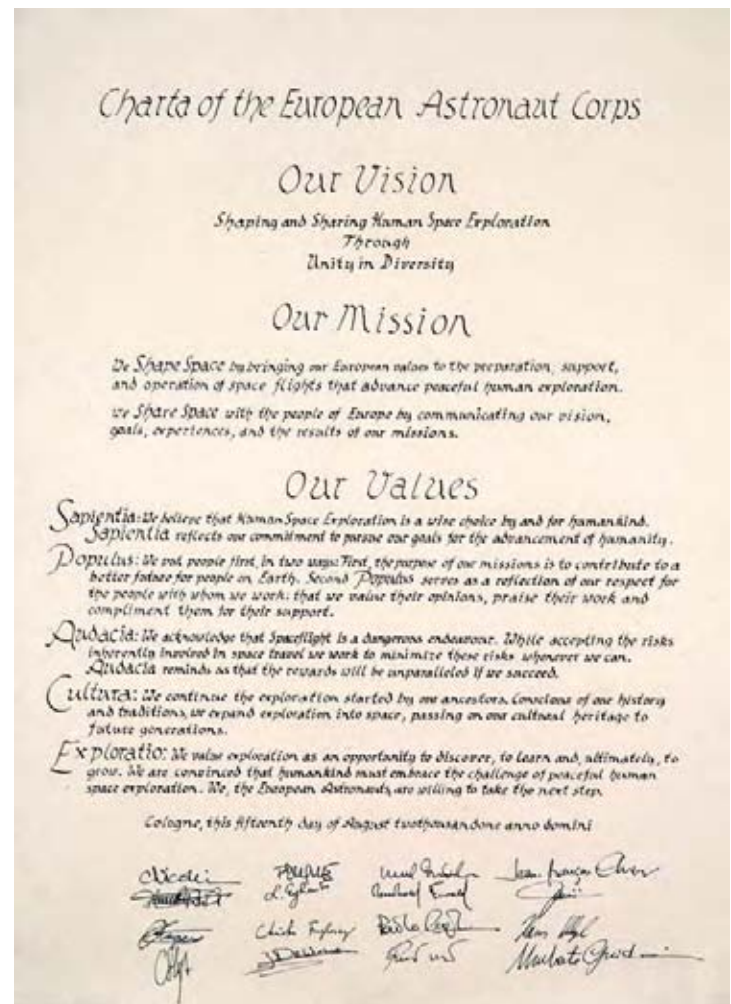


## Odds and Ends

<http://esamultimedia.esa.int/images/astronauts/charta.jpg>

"Everything should be made as simple as possible, but not simpler. It is not enough that you should understand about applied science in order that your work may increase man's blessings. Concern for the man himself and his fate must always form the chief interest of all technical endeavours; concern for the great unsolved problems of the organization of labour and the distribution of goods in order that the creations of our mind shall be a blessing and not a curse to Mankind. Never forget this in the midst of your diagrams and equations" (A.Einstein, address to Caltech Students in Pasadena on 16th February 1931 reproduced on page 6 of New York Times, 17th Feb. 1931 Edition)

A quote sent from Laurent Mangane, member, AAAF TMP Human and Robotic Space Exploration technical committee.



## Conference Presentations/Articles by Houston Section Members

COMPILED BY THE EDITOR FROM AIAA AGENDAS, SUBMISSIONS, ETC.

Some information here is taken from preliminary AIAA conference agendas. As such, it is subject to change.

**38th Fluid Dynamics Conference and Exhibit**  
**26th AIAA Aerodynamic Measurement Technology and Ground Testing Conference**  
**39th Plasmadynamics and Lasers Conference**  
**40th Thermophysics Conference**  
**4th Flow Control Conference**  
**5th AIAA Theoretical Fluid Mechanics Conference**

**23 - 26 Jun 2008**  
**Double Tree Hotel Seattle Airport**  
**Seattle, Washington**

Transition Mechanisms for Transport Aircraft (invited)  
*H. Reed, Texas A&M, College Station, TX*

Infrared Imaging of the Shuttle Boundary Layer Transition Flight Experiment  
*S. Berry and T. Horvath, NASA Langley Research Center, Hampton, VA; R. Schwartz, ATK, Hampton, VA; M. Ross, The Aerospace Corporation, Los Angeles, CA; and B. Anderson, NASA Johnson Space Center, Houston, TX*

Laminar Flow Control Flight Tests for Swept Wings (invited)  
*W. Saric, A. Carpenter and H. Reed, Texas A&M University, College Station, TX*

Measurements and Comparisons of ISS Plasma Interactions  
*J. Alred, NASA Johnson Space Center, Houston, TX; K. Wright, NASA Marshall Space Flight Center, Huntsville, AL; K. Smith, The Boeing Company, Houston, TX; and S. Koontz, NASA Johnson Space Center, Houston, TX*

Discrete Roughness Induced Boundary Layer Transition on Blunt Bodies (Invited)  
*T. Horvath, J. Everhart, B. Hollis, S. Berry, and P. Danehy, NASA Langley Research Center, Hampton, VA; A. Amar and B. Kirk, NASA Johnson Space Center, Houston, TX*

Experimental Evidence for Transient Growth Effects in Low-Speed Boundary Layers (Invited)  
*E. White, Texas A&M University, College Station, TX*

A Review of the Analytical Model and Experimental Investigations for the Thermophysical Properties of Metamaterials and Negative Refraction  
*A. Rivas-Cardona and E. Marotta, Texas A&M University, College Station, TX*

**44th AIAA/ASME/SAE/ASEE Joint Propulsion Conference & Exhibit**

**21 - 23 Jul 2008**  
**Connecticut Convention Center**  
**Hartford, CT**

Characterization of a Thermodynamic Vent System (TVS) for an On-Orbit Cryogenic Reaction Control Engine (RCE) Feed System  
*R. Jimenez, S. Flores, K. Romig, E. Hurlbert and V. Spencer, NASA Johnson Space Center, Houston, TX; W. Lee, Jacobs Sverdrup, Houston, TX*

Space Shuttle Transition Management Status  
*E. Henderson and G. Norbraten, NASA/Johnson Space Center, Houston, TX*

Validating A Momentum Flux Sensor Against A Traditional Inverted Pendulum Thrust Stand  
*B. Longmier, University of Houston, Pearland, TX; J. Squire, Ad Astra Rocket Company, Houston, TX; E. Bering, University of Houston, Houston, TX; F. Chang-Diaz, Ad Astra Rocket Company, Houston, TX; B. Reid, University of Michigan, Ann Arbor, MI; A. Gallimore, University of Wisconsin, Ann Arbor, MI*

Toluene Combustion in the Presence of Ceria Nanoparticles: A Shock-Tube Study  
*B. Rotavera and E. Petersen, Texas A&M University, College Station, TX*

Effects of Housing Materials on Pyrotechnic Initiator Output  
*F. Salazar, NASA/JSC, Houston, TX; R. Saulsberry, NASA/WSTF, Las Cruces, NM; S. McDougale, MEI Technologies, Las Cruces, NM; A. Dibbern, NASA Engineering and Safety Center, Kennedy Space Center, FL; M. Hagopian, NASA/GSFC, Greenbelt, MD*

Acceleration of a Plasma Flow by Oscillating Magnetic Mirrors  
*R. Deresz and J. Richard, Texas A&M University, San Antonio, TX*

Auxiliary Propulsion System Analysis Tool for Sizing On-Orbit Propulsion Systems  
*B. Lusby and K. Romig, NASA Johnson Space Center, Houston, TX; M. Smith, Jacobs Sverdrup, Houston, TX*

Liquid Oxygen (LO2) / Liquid Methane (LCH4) Testing of Lunar Ascent Main Engines at Simulated Altitude Conditions at NASA White Sands Test Facility (WSTF)  
*J. Melcher, NASA - Johnson Space Center, Houston, TX; J. Allred, NASA - Johnson Space Center White Sands Test Facility, Las Cruces, NM*

ISS Propulsion Systems, Management and Operations  
*S. Russell and V. Spencer, NASA, Houston, TX; U. Kamath, E. Duncan and R. Swanson, Boeing, Houston, TX*

Explosion Hazard Analysis of the Space Shuttle External Tank Separation Camera and Flash Housings  
*J. Melcher and J. Brewer, NASA Johnson Space Center, Houston, TX*

Rotating Stall in a Single Stage Axial Compressor  
*F. Carpenter, S. Johnson, P. Cizmas and O. Rediniotis, Texas A&M University Dept. Aerospace Engineering, College Station, TX*

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Reaction Control System Tests Using LOx/ethanol and LOx/Methane  
M. Villemarette, E. Hurlbert, K. Romig and J. Collins, NASA Johnson Space Center, Houston, TX; T. Peters, NASA Johnson Space Center - ESCG, Houston, TX

## **6th International Energy Conversion Engineering Conference (IECEC)**

**28 - 30 Jul 2008**

**Marriott Cleveland Downtown at Key Center  
Cleveland, Ohio**

An Overview of NASA's Contributions to Energy Technology

V. Lyons, NASA Glenn Research Center, Cleveland, OH; J. Scott, NASA Johnson Space Center, Houston, TX

Extreme Energy Density Flywheel Energy Storage System for Space Applications

R. Hockney, D. Ansbikian and W. Spears, Beacon Power Corporation, Tyngsboro, MA; S. Pekarek, Purdue University, West Lafayette, IN; A. Palazzolo, Texas A&M University, College Station, TX; M. Polimeno, Beacon Power Corporation, Tyngsboro, MA

Integrated Reactant Regulator, Ejector Pump, and Two- Stage Water Separator for Fuel Cells

A. Vasquez, NASA Johnson Space Center, Houston, TX

## **AIAA Guidance, Navigation and Control Conference and Exhibit 26th AIAA Applied Aerodynamics Conference**

**AIAA Atmospheric Flight Mechanics Conference and Exhibit**

**AIAA Modeling and Simulation Technologies Conference and Exhibit**

**AIAA/AAS Astrodynamics Specialist Conference and Exhibit**

**18 - 21 Aug 2008**

**Hawaii Convention Center and Hilton Hawaiian Village  
Honolulu, Hawaii**

Mars Entry Bank Profile Design for Terminal State Optimization

J. Lafleur and C. Cerimele, NASA Johnson Space Center, Houston, TX

Low- Thrust Trajectory Optimization Tool to Assess Options for Near-Earth Asteroid Deflection

B. Stahl, AIAA Member, Houston, TX; R. Braun, AIAA Fellow, Atlanta, GA

Beyond Newton's Method: Generalized Higher- Order Approximation Methods

J. Turner, Texas A&M University, College Station, TX

Ares- I Bending Filter Design Using A Constrained Optimization Approach

J. Jang, R. Hall and N. Bedrossian, The Charles Stark Draper Laboratory Inc, Houston, TX; C. Hall, NASA Marshall Space Flight Center, Huntsville, AL

Uncertainty Analysis of Hypersonic Flight Using Multi- Resolution Markov Operators

P. Sengupta and R. Bhattacharya, Texas A&M University, College Station, TX

Hybrid Hierarchical Motion Planning

S. Chakravorty and R. Saha, Texas A&M University, College Station, TX

Simulation Architecture Development of a Distributed Multi- Pilot Engineering Flight Simulation Facility

J. May, J. Doebbler and J. Valasek, Texas A&M University, College Station, TX

High- Order State and Parameter Transition Matrix Calculations

J. Turner, Texas A&M University, College Station, TX

Modelling and Suboptimal Trajectory Generation for a Symmetric Flapping Wing Vehicle

J. Jackson, R. Bhattacharya and T. Strganac, Texas A&M University, College Station, TX

Nonlinear Stochastic Control using the Fokker- Planck Equation

M. Kumar, S. Chakravorty and J. Junkins, Aerospace Engg TAMU, College Station, TX

OKID for Time Varying Eigensystem Realization Algorithm

M. Majji and J. Junkins, Texas A&M University, College Station, TX

Model Verification and Validation of a Mobile Robot System for 6-DOF Motion Emulation

X. Bai, Graduate Research Assistant, College Station, TX; J. Junkins, Distinguished Professor, College Station, TX; J. Turner, Research Professor, College Station, TX; H. Frisch, Emeritus NASA, Greenbelt, MD

Shuttle Landing and Rollout Training at the Vertical Motion Simulator

S. Beard, NASA Ames Research Center, Moffett Field, CA; E. Buchmann, SAIC, Moffett Field, CA; L. Ringo, NASA Johnson Space Center, Houston, TX; W. Dafler, Boeing Space Exploration, Houston, TX; B. Mader, United Space Alliance LLC, Houston, TX

Mobile Robotic System for Ground- Testing of Multi- Spacecraft Proximity Operations

J. Davis, J. Doebbler, J. Junkins and J. Valasek, Texas A&M University, College Station, TX

Morphing Aircraft Dynamical Model: Longitudinal Shape Changes

A. Niksch, J. Valasek, L. Carlson and T. Strganac, Texas A&M University, College Station, TX

Development and Implementation of Electromechanical Actuators for the X- 38 Atmospheric Test Vehicles

J. Albright and L. Moore, NASA/Johnson Space Center, Houston, TX

Shock/Boundary Layer Interaction Effects On Transverse Jets in Cross-flow on a Flat Plate

D. Dickmann, Lockheed Martin Missiles and Fire Control, Grand Prairie, TX; F. Lu, University of Texas at Arlington, Arlington, TX

Evaluation of Ares- I Control System Robustness to Uncertain Aerodynamics and Flex Dynamics

J. Jang, C. Van Tassell and N. Bedrossian, The Charles Stark Draper Laboratory Inc., Houston, TX; C. Hall, NASA Marshall Space Flight

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*Center, Huntsville, AL; P. Spanos, Department of Mechanical Engineering & Material Science Rice University, Houston, TX*

Uni-Directional Motion Stability of Spatial Resolution Coverage Discs  
*H. Altwaijry, Asst. Research Professor KACST, Riyadh, Saudi Arabia; D. Hyland, Professor Texas A&M University, College Station, TX*

Development and Testing of the StarCam SG100: A Stellar Gyroscope  
*A. Katake, Star Vision Technologies Inc, College Station, TX*

The Art of Simulation: Determining the Right Fidelity of a Flight Software Test Stand  
*W. Davidson, United Space Alliance, Houston, TX*

Stellar Positioning System (Part I): Applying Ancient Theory to a Modern World

*J. Parish, A. Parish, D. Mortari and J. Junkins, Texas A&M University, College Station, TX; M. Swanzy, Spacecraft Technology Center, College Station, TX; D. Woodbury, Texas A&M University, College Station, TX*

Stellar Positioning System Part II: Overcoming Error During Implementation

*D. Woodbury, Ph.D. Student Department of Aerospace Engineering, TAMU-3141, College Station, TX; M. Swanzy, Space Technology Center TAMU 3118, College Station, TX; D. Mortari, Associate Professor Department of Aerospace Engineering, TAMU-3141, College Station, TX*

Autonomous Mid- Course Navigation for Lunar Return

*R. Zanetti, The C. S. Draper Laboratory, Houston, TX*

Orbital Express Autonomous Rendezvous and Capture Flight Operations, Part 2

*T. Mulder, Boeing, Houston, TX*

Pitch Constrained Fuel Optimal Trajectories Over a Planet With Negligible Atmosphere

*J. Rea, NASA Johnson Space Center, Houston, TX*

Analysis of Hypersonic Flight Dynamics with Probabilistic Uncertainty in System Parameters

*A. Prabhakar and R. Bhattacharya, Texas A&M University, College Station, TX*

Apollo-Derived Terminal Control for Bank- Modulated Mars Entries with Altitude Maximization

*E. Garcia-Llama, GBTech contractor to NASA/JSC, Houston, TX*

Evolution of National Airspace System Protection for Space Shuttle Launch and Landing

*D. Hensley, NASA Johnson Space Center, Houston, TX*

GLOMAP Approach for Nonlinear System Identification of Aircraft Dynamics Using Flight Data

*M. Marwaha and J. Valasek, Texas A&M University, College Station, TX; P. Singla, University at Buffalo, Buffalo, NY*

Complete CFD Analysis of a Velocity XL- 5 RG with Flight- Test Verification

*S. Schouten and W. Saric, Texas A and M University, College Station, TX*

High-Order Equality Constraint Tracking Algorithm for Nonlinear Optimization

*J. Turner, TAMU Aerospace Department, College Station, TX*

Cryogenic Feed System Modeling Using EASY5

*B. Lusby, NASA, Houston, TX*

Integrating Collaborative Distributed Simulations for Space Exploration Missions

*E. Dan Dexter, NASA Johnson Space Center, Houston, TX; V. Chung, NASA Langley Research Center, Hampton, VA; J. Busto, Kennedy Space Center, Kennedy Space Center, FL; M. Blum, Science Applications International Corp, Moffett Field, CA; E. Jennings, Jet Propulsion Laboratory, Pasadena, CA; J. Hawkins, Teledyne Brown Engineering, Huntsville, AL*

Development of Launch Area Risk Assessment Input Data for Ares I- X

*J. Gowan and R. Cross, NASA Johnson Space Center, Houston, TX; B. Starr and J. Beaty, NASA Langley Research Center, Hampton, VA; B. Thompson, Willbrook, Huntsville, AL; Y. Lo, BTI, Huntsville, AL*

Orion Entry Debris Recontact and Disposal Protection Analysis

*B. Kadwa, NASA Johnson Space Center, Houston, TX*

Aircraft Vulnerability Modeling for Range Safety

*P. Wilde and C. Draper, ACTA Inc., Houston, TX*

Service Module Abort Preliminary Design

*M. Tedesco, NASA JSC/EG4, Houston, TX*

Orion Pad Abort 1 GN&C Design and Development

*E. Medina, NASA JSC, Houston, TX*

Orion Entry Flight Control Modifications and Performance

*B. Hoelscher, A. Strahan and S. Stachowiak, NASA JSC, Houston, TX; G. Loe, Honeywell Inc., Houston, TX*

Orion Entry Flight Corridor Analysis

*J. Rea, NASA JSC, Houston, TX*

An Analytical Approach to Star Identification Reliability

*M. Kumar, D. Mortari and J. Junkins, Texas A&M University, College Station, TX*

Design of the Onboard Autonomous Targeting Algorithm for the TransEarth Phase of Orion

*M. Weeks, NASA Johnson Space Center, Houston, TX; B. Marchand, University of Texas Austin, Austin, TX*

Optimal Guidance of Hypersonic Vehicles Using B- Splines and Galerkin Projection

*B. Singh and R. Bhattacharya, Texas A&M University, College Station, TX*

Visiting Vehicle RF Ranging System Performance in International Space Station Multipath Environment

*S. Hwu, Barrios Technology, Houston, TX; K. DeSilva, Jacobs Engineering, Houston, TX; M. Upanavage, ERC Inc., Houston, TX; C. Sham, NASA Johnson Space Center, Houston, TX*

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Cooperative Control of a Two- Robot Formation Connected by a Flexible Structure

L. Weitz, J. Doebbler, K. Holmstrom and J. Hurtado, Texas A&M University, College Station, TX

Reinforcement Learning for Active Length Control of Shape Memory Alloys

K. Kirkpatrick and J. Valasek, Texas A&M University, College Station, TX

Reinforcement Learning of a Morphing Airfoil- Policy and Discrete Learning Analysis

A. Lampton, A. Niksch and J. Valasek, Texas A&M University, College Station, TX

Morphing Airfoil with Reinforcement Learning of Four Shape Changing Parameters

A. Lampton, A. Niksch and J. Valasek, Texas A&M University, College Station, TX

Orion Guidance, Navigation, and Control Architecture for Increased Spacecraft Automation and Autonomy Capabilities

J. Hart, NASA JSC, Houston, TX

Concept of Operations for Orion Automated Rendezvous, Proximity Operations, and Docking

S. Walker, NASA JSC, Houston, TX

Estimate of Burn Error for Open-Loop Guidance Maneuvers During Proximity Operations

Z. Milenkovic, C. S. Draper Laboratory, Houston, TX

Orion Preliminary Navigation System Design

C. D'Souza, NASA JSC, Houston, TX

Assessment of Orion Mission Capability as a Function of Driving Time and Geometry- Related Factors

G. Condon, NASA JSC, Houston, TX

Flight Control System Design of the Orion Vehicle for Ascent and On-Orbit Ops

R. Gonzalez, NASA JSC, Houston, TX

Attitude Maneuver Implementation Based on an Inertial Intercept Algorithm

Z. Milenkovic and M. Martin, C. S. Draper Laboratory, Houston, TX

Characterization and Implementation of a Vision- Based 6- DOF Localization System

J. Doebbler, J. Davis, J. Valasek and J. Junkins, Texas A&M University, College Station, TX

Laminar Flow Control on a Swept Wing with Distributed Roughness

A. Carpenter, W. Saric and H. Reed, Texas A and M University, College Station, TX

CFD Analysis of Flight Test Configuration Flowfield and Laminarization of Swept Wing Boundary Layer with Flight Test Verification

R. Rhodes, A. Carpenter, W. Saric and H. Reed, Texas A and M University, College Station, TX

Fault Tolerant Control Allocation for Mars Entry Vehicle using Adaptive Control

M. Marwaha and J. Valasek, Texas A&M University, College Station, TX

Formation Maintenance and Reconfiguration Using Impulsive Control

H. Yan, S. Vadali and K. Alfriend, Texas A&M University, College Station, TX

Triangle Formation Design in Eccentric Orbits Using Pseudospectral Optimal Control

Q. Gong, University of Texas at San Antonio, San Antonio, TX; I. Ross, Naval Postgraduate School, Monterey, CA; T. Alfriend, Texas A&M University, College Station, TX

Updated Jth Moment Extended Kalman Filtering for Estimation of Nonlinear Dynamic Systems

M. Majji, J. Junkins and J. Turner, Texas A&M University, College Station, TX

Observer- Type H<sub>inf</sub> Filter Design for Structural Systems

M. Meisami-Azad, J. Mohammadpour and K. Grigoriadis, Univ. of Houston, Houston, TX

Trajectory Design, Guidance and Control for Autonomous Parafoils

B. Rademacher and P. Lu, Iowa State University, Ames, IA; A. Strahan and C. Cerimele, NASA Johnson Space Center, Houston, TX

Robust Fault Tolerant LPV Control Design for Systems Under Actuator Failures

J. Mohammadpour and K. Grigoriadis, University of Houston, Houston, TX

On Robust and Adaptive Inner Loop Control of ARES

R. Bhattacharya, Texas A&M University Dept. of Aerospace Engineering, College Station, TX; J. Jackson, X. Bai, M. Marwaha, B. Singh and S. Johnson, Texas A&M University, College Station, TX

Cockpit Avionics Upgrades Required Attitude Symbol for the Space Shuttle Cockpit

L. Roberts, United Space Alliance LLC, Houston, TX

**AIAA SPACE 2008 Conference & Exposition**

**9 - 11 Sep 2008**

**San Diego Convention Center  
San Diego, California**

**NASA Constellation Program**

Speaker: **Jeffrey Hanley**, Manager, NASA Constellation Program, NASA Johnson Space Center, Houston, TX (invited)

**Matrix Methods Analysis of International Space Station Logistics**

A. Siddiqi, Massachusetts Institute of Technology, Cambridge, MA; S. Shull, NASA Johnson Space Center, Houston, TX; and O. de Weck, Massachusetts Institute of Technology, Cambridge, MA

**Simulating International Space Station Issue Resolution**

H. Johnson, The Boeing Company, Houston, TX

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Autonomous, Real- Time Asset Management System for ISS: Technical and Financial Evaluation

A. Grindle and O. de Weck, Massachusetts Institute of Technology, Cambridge, MA; S. Shull, NASA Johnson Space Center, Houston, TX

Space Flight Resource Management Training for International Space Station Flight Controllers

W. O'Keefe, United Space Alliance, Houston, TX

VASIMR Vx- 100: High Power Electric Propulsion for Space Transportation Beyond LEO

E. Bering and B. Longmier, University of Houston, Houston, TX; F. Chang Díaz, J. Squire, and T. Glover, Ad Astra Rocket Company, Webster, TX; and M. Brukardt, University of Houston, Houston, TX

High Reliability Software and Systems for Autonomous Operations

R. Ferguson and G. O'Neil, United Space Alliance LLC, Houston, TX

Constellation Architecture Team- Lunar, Lunar Habitat Concepts

K. Kennedy and L. Touns, NASA Johnson Space Center, Houston, TX

Design Development and Testing for an Expandable Lunar Habitat

J. Hinkle, A. Dixit, and J. Lin, ILC Dover, Frederica, DE; K. Whitley and J. Watson, NASA Langley Research Center, Hampton, VA; and G. Valle, NASA Johnson Space Center, Houston, TX

Life Support Systems for Human Lunar Missions

D. Barta and M. Ewert, NASA Johnson Space Center, Houston, TX

An Historical Parallel for NASA's Exploration Program

J. Scott, NASA Johnson Space Center, Houston, TX

A Brief History of Meteoroid and Orbital Debris Shielding Technology

M. Bjorkman, J. Hyde, T. Prior, E. Christiansen, and D. Lear, NASA Johnson Space Center, Houston, TX

Optimal Cost and Reliability Design for Exploration Life Support Systems

L. Rodriguez and H. Jiang, University of Illinois at Urbana-Champaign, Urbana, IL; D. Kortenkamp and S. Bell, NASA-Johnson Space Center, Houston, TX

How Organizational Culture Influences Space Operations

David Fuller, Chair, AIAA Space Operations and Support Technical Committee, Seabrook, TX

Radiation Exposure Assessments for Solar Proton Ground Level Enhancements

W. Atwell, The Boeing Company, Houston, TX

CCSDS Spacecraft Monitor and Control for Ground Segments

M. Merri, European Space Agency, Darmstadt, Germany; and L. Martinez, NASA Johnson Space Center, Houston, TX

Comparison of Radiation Transport Codes for Solar Particle Events Space Environment

R. Tripathi, NASA Langley Research Center, Hampton, VA; . Townsend, University of Tennessee, Knoxville, TN; T. Gabriel, SID, Knoxville, TN; L. Pinsky, University of Houston, Houston, TX; T. Slaba, Old Dominion University, Norfolk, VA

A Philosophy of EVA Flight Control and Training for Lunar and Martian Expeditions

E. Bell, United Space Alliance, Houston, TX; D. Coan, Barrios Technology, Houston, TX

A Comparison of Experience Level and Workload Factor to Metabolic Rate During International Space Station Extravehicular Activities

A. Luta, Barrios Technology, Houston, TX; E. Bell, United Space Alliance, Houston, TX

Space Shuttle Bearing Displays: From Concept to Spaceflight

L. Roberts, United Space Alliance, Houston, TX

Orion Project System Optimization Methodology Overview

H. Hu and W. Jermstad, NASA Johnson Space Center, Houston, TX; T. Sullivan and T. Henning, Lockheed Martin Space Systems Company, Denver, CO

Orion Command Processing and Data Architecture

D. Buscher, NASA Johnson Space Center, Houston, TX; R. Kasuda, Lockheed Martin Space Systems Company, Denver, CO

Seven Vehicles in One: Orion GN&C

T. Straube, NASA Johnson Space Center, Houston, TX

Orion Crew Exploration Vehicle Descent, Landing and Recovery

C. Johnson, NASA Johnson Space Center, Houston, TX; R. Hixson, Lockheed Martin Space Systems Company, Denver, CO

Astronaut Interface Device (AID)

R. Hirsh and C. Simon, NASA Johnson Space Center, Houston, TX; D. Mittman, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA; R. Burridge, TRAClubs, Inc, Houston, TX; M. Allan, Perot Systems Government Services, Moffett Field, CA; H. Utz, NASA, Mountain View, CA; K. Tyree and T. Ngo, NASA Johnson Space Center, Houston, TX

The Altair Lunar Lander

B. Jones, NASA Johnson Space Center, Houston, TX

Supportability and Operability Planning for Lunar Missions

J. Green, Casitair Consulting, Safety Harbor, FL; K. Watson, NASA Johnson Space Center, Houston, TX

Operational Lessons Learned Supporting NASA's Desert Research and Technology Studies (D- RATS)

S. Shull, NASA Johnson Space Center, Houston, TX

NASA and Public Perception: Are We Asking the Right Questions?

M. Dittmar, Dittmar Associates Inc., Houston, TX

Constraint Driven Design for Surface Inflatable Modules

G. Petrov, K. Steinfeld and C. Adams, Synthesis International, Houston, TX

Exploration Technology Development Program (ETDP) Multi- Center Cockpit (MCC)

D. Mittman, J. Norris, and R. Torres, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA; K. Hambuchen and R. Hirsh, NASA Johnson Space Center, Houston, TX; M. Allan and H. Utz, NASA Ames Research Center, Moffett Field, CA

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Lessons Learned from RCC Crack Repair Efforts on STS- 114 and STS-121 Flights

*R. Morgan and M. Rudolphi, ATK, Huntsville, AL; W. McMahon and M. Effinger, NASA Marshall Space Flight Center, Huntsville, AL; and C. Campbell, NASA Johnson Space Flight Center, Houston, TX*

Migration of Engineering Development Models to Safe Real Time Control Systems

*J. Battan, W. Davidson, J. Sorrell, W. Tate and G. O'Neil, United Space Alliance LLC, Houston, TX*

Optimized Cabin Architecture for Passenger Spacecraft

*C. Adams and G. Petrov, Synthesis International, Houston, TX; A. Clinton, Perkins and Will, Houston, TX*

Microgravity Testing of a Deployment and Docking System for Mini AERCam

*T. Kuck, A. Maag, N. Graman, R. Stellhorn and A. Bosse, University of Cincinnati, Cincinnati, OH; N. Howard, NASA Johnson Space Center, Houston, TX*

Monitoring of International Space Station Telemetry using Industry-standard Control Charts

*J. Gouveia, J. Fitch, S. Hernandez, A. Hillin and A. Simon, United Space Alliance, Houston, TX*

Concepts and Technology Needs for Lunar Surface Systems

*C. Culbert, NASA Johnson Space Center, Houston, TX*

Extravehicular Activity Technology Development Project

*R. Trevino and D. Westheimer, NASA Johnson Space Center, Houston, TX*

NASA In- Situ Resource Utilization (ISRU) Project: Development and Implementation

*G. Sanders, NASA-Johnson Space Center, Houston, TX; W. Larson, NASA-Kennedy Space Center, Cocoa Beach, FL; K. Sacksteder, NASA-Glenn Research Center, Cleveland, OH; C. Mclemore, NASA-Marshall Space Flight Center, Huntsville, AL; K. Johnson, Jet Propulsion Laboratory, Pasadena, CA; B. Glass, NASA-Ames Research Center, Moffit Field, CA*

Solar System Longboats: A Holistic and Robust Mars Exploration Architecture Design Study

*D. Barker, Mars Advanced Exploration and Development Inc., Houston, TX*



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[www.aiaa.org](http://www.aiaa.org)

Select the AIAA membership option.