June 19, 1998 Vol. 37, No. 12

Spaceport News

America's gateway to the universe. Leading the world in preparing and launching missions to Earth and beyond.

John F. Kennedy Space Center

A Future Venture with Star Appeal

Artist's concept of VentureStar

by George Diller

NASA, the U.S. Air Force and Spaceport Florida partnered for a launch site selection visit to Kennedy Space Center by VentureStar team members on June 17.

KSC payload representatives and Lockheed Martin VentureStar staff had already begun a dialogue to examine how KSC's payload infrastructure could be advantageous for the launch of this single-stage-to-orbit vehicle.

At a technical interchange meeting and associated facilities tour May 12 through 14, KSC payload staff sought to understand how the VentureStar team plans to integrate payloads with the vehicle, while VentureStar personnel learned more about how payloads are currently processed, facilities available here and the expertise that KSC has to offer.

During the three-day visit, the group also toured two commercial payload processing facilities outside KSC — Astrotech in Titusville and Spacehab at Port Canaveral — to learn more about their particular capabilities.

(See Venture, Page 8)

From Mir to the International Space Station:

Lessons learned link long-duration spaceflight legacy

This year, the United States and its International Space Station (ISS) partners will embark upon a journey of historic proportions: the assembly and operation of the largest, most complex structure ever placed in orbit.

Constructing the station will involve contributions from 16 countries, include four research laboratories of unprecedented capability, require 43 flights to fully assemble, and operate on orbit for more than a decade.

How does such an adventure begin?

Years before the United States and its international partners agreed to construct an International Space Station, the Soviet Union launched the core module of Russia's space station Mir (which means "peace" in Russian) on Feb. 20, 1986. The Soviet Union and later the Russian Federation continued to add capabilities and laboratory modules to Mir.

In 1992, then U.S. President George Bush and Russian President Boris Yeltsin signed an agreement for peaceful cooperation in space. This historic agreement resulted in initial plans to fly an American astronaut on Mir and two Russian cosmonauts on the Space Shuttle.

One year later, Vice President Al Gore and Russian Prime Minister Victor Chernomyrdin announced the

(See ISS, Page 6)

STS-91 — a flight of firsts and farewells

Discovery lifts off from Launch Pad 39A with the first new super lightweight external tank at 6:06 p.m. EDT June 2. Discovery spent four days docked to the Russian Space Station Mir for the final Mir docking mission. Discovery's crew included Commander Charles Precourt; Pilot Dominic Gorie; and Mission Specialists Wendy Lawrence, Franklin Chang-Diaz, Janet Kavandi and Valery Ryumin.

Three years after the orbiter Atlantis accomplished the first docking to the Russian Space Station Mir, the STS-91 crew aboard Discovery concluded the ninth and final Shuttle-Mir mission. Joining the STS-91 crew for the trip home was NASA astronaut Andy Thomas, the seventh and final U.S. astronaut to serve as a Mir crew member, returning after four and a half months in space. Thomas' return marks the end of 977 total days in space for all U.S. astronauts who were Mir crew members (exceeding the time spent in space by our Space Shuttle fleet in its 17 years of experience) and 812 consecutive days in space. The orbiter Discovery is seen here making a perfect landing on June 12 on Runway 15 at KSC's Shuttle Landing Facility, bringing Thomas home after 141 days in space. The 91st Shuttle mission was the 44th KSC landing in the history of the Space Shuttle program and the 15th consecutive landing at KSC. Main gear touchdown was at 2:00:18 p.m. EDT.

Safety Day Draws Near

Now less than a month away, KSC's July 16 Super Safety Day has an agenda highlighting a variety of activities throughout the day, including live panel discussions, question-and-answer periods, and displays ranging from the importance of personal protective equipment to stress management and school violence.

Due to the importance of the event, Cape Canaveral Air Station will be participating in the Super Safety Day activities as well. Since the safety philosophy at KSC embraces the need for safe practices both on and off the job, a variety of topics are under consideration for discussions throughout the day. Opening the event at 8 a.m. will be Center Director Roy Bridges, followed by keynote speaker Gordon Fullerton, who piloted STS-3 (performing the only orbiter landing at White Sands, NM) and commanded the 19th mission — STS-51F.

A panel that includes NASA and contractor senior management will lead into an open, live 45-minute question-and-answer period.

Also participating in the panel will be Brigadier General Randy Starbuck from Patrick Air Force Base.

Questions will be solicited from all KSC employees starting on July 1. Members of the live audience in the Training Auditorium also can submit questions via microphone. An e-mail system also will accept questions from across the center via computer link-up. After the morning activities, various events will be scheduled centerwide at each company's or directorate's discretion.

Senior management will visit safety-related meetings throughout the afternoon, astronauts will visit employees, and vendors will have booths set up around KSC for informational purposes. Second-shift employees will have an opportunity to visit the vendor sites before receiving visits by astronauts and senior management. Then they will watch a rebroadcast of the first two hours of the safety program that morning.

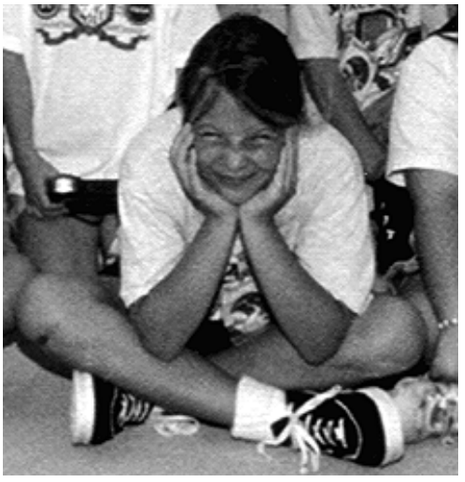
Third shift also will watch a rebroadcast. To receive more information on Super Safety Day activities and events, check out the Web site at http://ww.ksc.nasa.gov/nasa-only/events/1998/Jul/safety.html

Give your kids some space this summer!

A new day camp program at KSC's Visitor Complex offers parents an opportunity to give their kids a little space this summer.

It's the KSC Space Scholars program — a week-long drop-off program for children eight to 12 years of age.

"Space scholars play and basically have a blast with kids their own age as they explore scientific principles, try on authentic Apollo spacesuits, visit KSC historical destinations and engage in a number of creative, interactive activities and art projects," said Billy Specht, manager of education at KSC's Visitor Complex.



Each kid deserves a little space of her own and the inspiration to get there at Kennedy Space Center.

The Delaware North Park Services education department piloted the program in April and, due to its success, is offering it again in weekly sessions from June 8 through July 31.

Each camp, led by a team of trained teachers and educators, includes five days of learning activities at KSC's Visitor Complex, hot lunches, afternoon snacks, building a rocket model, IMAX films, transportation to destinations around KSC, a personalized KSC Space Scholars certificate, an official KSC Space Scholars tee-shirt and a mission patch.

KSC Space Scholars pose between activities for a group photo in the Shuttle Plaza at KSC's Visitor Complex.

In addition, kids touch real spacecraft artifacts and hardware, play interactive games under the giant Saturn V full-size moon rocket, explore space careers while sitting in the shadow of Space Shuttle "Explorer," investigate modules of the International Space Station, perform hands-on experiments showcasing the science of spaceflight, attend daily mission briefings, and meet and learn from KSC space travel experts.

The camp runs from 9 a.m. to 5 p.m. and early drop-off is available for an additional fee of $25 a week. The cost of the camp is $230 per week, with a 10 percent discount for sibling enrollment as well as for KSC and Cape Canaveral Air Station employees (only one discount per camper). The camper to instructor ratio is 10-to-one or better, allowing campers to receive a lot of individual attention.

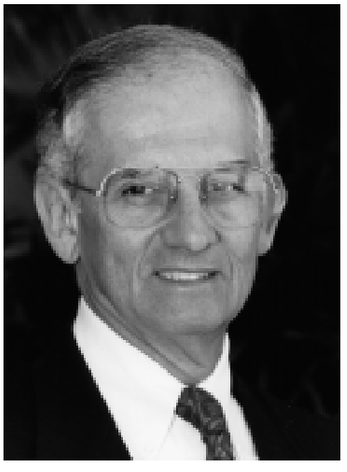
For more information or if you have any questions about the Space Scholar program, contact Billy Specht or Katha Endress at 449-4360. You can also e-mail Billy Specht at bspecht@dncinc.com.

1997 Kennedy Space Center Honor Awards

In December 1997, the Space Shuttle Endeavour rolled out to Launch Pad 39A in final preparation for liftoff of the STS-89 mission in January 1998. On this flight, Mission Specialist Andy Thomas succeeded David Wolf as the last NASA astronaut to stay aboard the Russian Space Station Mir.

The Kennedy Space Center Honor Awards Ceremony was held June 17 in the Visitor Complex Imax II Theater. More than 200 employees were recognized for their efforts in 1997 that contributed significantly to helping achieve the Center's mission. Among the honors presented were the KSC Director's Award, the Equal Opportunity Award and Medal, two Presidential Rank Awards, the Secretary of the Year Award, Outstanding Leadership Medals, and four Service Awards. Individual and group awards also recognized contributions centerwide.

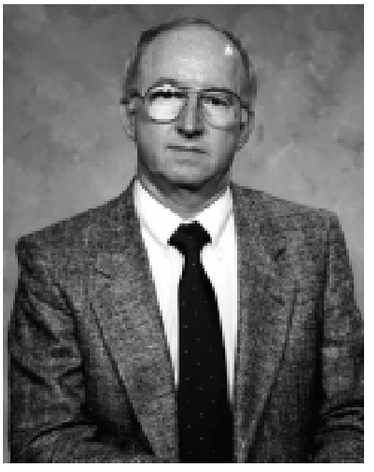
KSC Director's Award



Saul Barton

The Director's Award is the highest award that the Center confers upon an employee. The award honors the accomplishment of a job-related task of such magnitude and merit that it deserves special recognition. Saul Barton was recognized for his outstanding leadership and contribution during the formative and implementation stages of KSC's Implementation Plan and Roadmap. Barton's expertise, patience, persistence and collaborative skills contributed immeasurably to the success of KSC's strategic planning efforts.

KSC Distinguished Service Medal



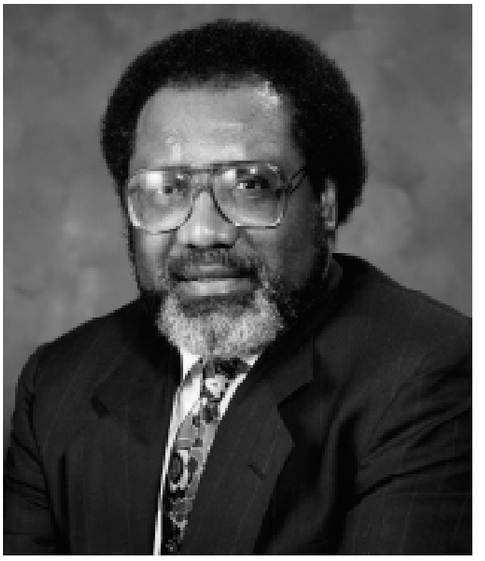
James Harrington III

The Distinguished Service Medal is awarded to any person in the federal service who, by distinguished service, ability or courage, has personally made a contribution representing substantial progress to the NASA mission. The contribution must be so extraordinary that other forms of recognition by NASA would be inadequate. This is the highest honor that NASA confers. James Harrington III was honored for outstanding leadership in Shuttle processing and dedication to the Space Shuttle program.

(Continued on next page)

Presidential Executive Rank Award

Loren Shriver



James Jennings

Presidential Rank awards recognize federal senior executives who have demonstrated exceptional performance over an extended period of time. The Meritorious Executive Rank award received by KSC Deputy Director for Launch and Payload Processing Loren Shriver and Deputy Director for Business Operations James Jennings is awarded to the top five percent of "sustained accomplishment" performers. Criteria include career achievements that are acknowledged on a national or international level; achieve significant cost reduction; and demonstrate personal initiative and innovation in meeting goals and policies.

40-Year Service Awards

James Deshotel

Jimmie Dyer

This award is given in grateful recognition of 40 years of faithful service to NASA and the U.S. government. Photos were not available for James Belote and W. Paula Williams.

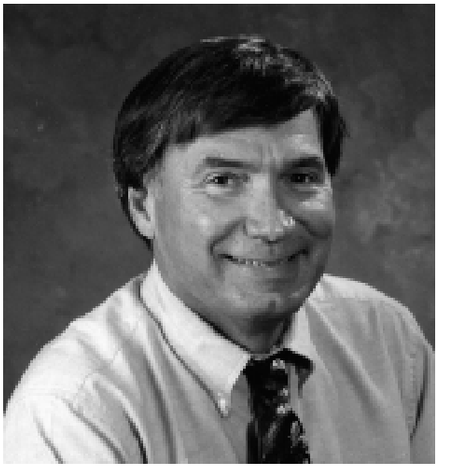
Secretary of the Year

Mary Joy Colston

This award is granted to a KSC secretary who has demonstrated exemplary performance over time, characterized by a high degree of personal integrity, judgment and responsibility. Colston demonstrated outstanding professionalism, dedication and exceptional contributions to the successful operations of the Procurement Office.

Equal Opportunity Award

This award is granted to a KSC employee or supervisor for outstanding contributions to equal opportunity. Examples of the types of contributions for which the award might be granted include encouraging self-development and training among minorities and women and assigning these employees to organizational tasks that broaden their experience. Talone was recognized for advancing cultural diversity in the Space Station Hardware Integration Office.



John "Tip" Talone

Equal Opportunity Medal

This award is for outstanding achievement and material contribution to the goals of NASA's Equal Employment Opportunity programs either within government or within community organizations or groups.

J. Albert "Jay" Diggs Jr.

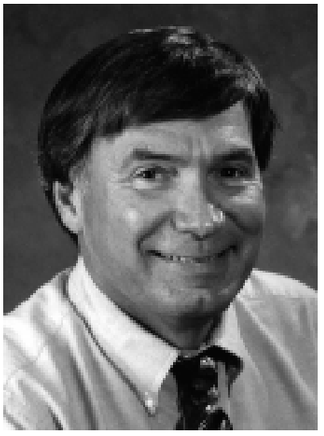
Outstanding Leadership Medal

The NASA Outstanding Leadership Medal is awarded for notably outstanding leadership that has had a pronounced effect upon the technical or administrative programs of NASA. The award may be given for an act of leadership or for sustained contributions based on an individual's effectiveness as a leader, the productivity of an individual's program or demonstrated ability to develop the administrative or technical talents of other employees.

Retha Hart

Joel Reynolds

Ralph Roe Jr.



John "Tip" Talone

Exceptional Service Medal

The Exceptional Service Medal is awarded for significant performance characterized by unusual initiative or creative ability that clearly demonstrates substantial improvements or contributions in engineering, aeronautics, space flight, administration, support or space-related endeavors that contribute to the mission of NASA.

Louise Boyd
W. Wesley Branning
Thomas Clarke Jr.
David Dibler
Bobby Goforth
John Guidi
Robert Johnson
Julian King
Daniel Lewis
Feng-Nan "Gary" Lin
Maria Littlefield
Michael O'Neal
Burt Summerfield
Beth Vrioni
Timmy Wilson

Group Achievement Award

The Group Achievement Award is given in recognition of an outstanding accomplishment made through the coordination of many individual efforts that has contributed substantially to NASA's mission. This award recognizes the accomplishments of either a group comprised of all government employees or a group of both government and non-government personnel.

Collaborative Ukrainian Experiment Mission Mgt. Team
Dual Source Liquid Hydrogen Procurement Team
Flight 2A NASA Team
Front End Processor Development and Production Team
Orbiter Fuel Cell Monitoring System Implementation Team
Personal Computer/Ground Operations Aeronautical Language/Checkout and Launch Control Systems External Tank Surface Ice Prediction Program Team
Public Communications Cassini Team
Space Shuttle Main Engine Integrated Quality System Development and Implementation Team

Group Achievement Award Special Mention — Mars Pathfinder

Payload and Expendable Launch Vehicle Team, NASA KSC
Mars Pathfinder Support Team — KSC

Public Service Group Achievement Award

Automated Checkout Systems Software Configuration Management Team
Cassini Radioisotope Thermoelectric Generators/Radioisotope Heater Units Processing Health Physics Support Team
Change Paper Tracking Development Team
I-Net, Inc., Safety, Reliability, Maintainability and Quality Assurance Team
Launch Complex 39 Fiber Optic Cable Replacement Team
Microgravity Science Laboratory Payload Mission Processing Team
NASA Payload Logistics Depot Certification Team
Orbiter Vehicle-105 Liquid Oxygen Disconnect Changeout Team
Russian Electrical, Electro-Mechanical and Electronic Parts Buy Team
Wang Government Service Customer Services Operations

Exceptional Achievement Medal

The Exceptional Achievement Medal is awarded for a specific accomplishment or contribution clearly characterized by a substantial and significant improvement in operations, efficiency, service, financial savings, science or technology that contributes to NASA's mission.

Deborah Bayline
Lori Cernell
James Dumoulin
Constance Gary
Ronald Gillett
George Marmaro
James Meyer
Shawn Quinn
Francis Villalpando

(Continued on next page)

KSC Award Special Mention

Delaware North Park Services of Spaceport, Inc. — Marketing Dept.

For seeking out opportunities to create awareness of the KSC Visitor Complex and telling the NASA story — past, present and future.

Public Service Medal

This award is granted for exceptional contributions to the mission of NASA. The award may be given to any individual who was not a government employee during the period in which the service was performed.

John Elbon
Benjamin Glenn
Richard Harvey
Jerry Moyer
Jack Nichols
J. Michael Orr
Ronald Wetmore
James Wilder Jr.

Certificate of Commendation

This award recognizes exceptional individual accomplishments or outstanding management of a program that affects the entire center or contributes signficantly to the center's mission.

Linda Ackroyd
Clifton Arnold Jr.
Angela Balles
Joseph Beardall
Robert Beil
Michael Bolger
Josephine Burnett
Henry Bursian
Ernesto Camacho
Kimberly Cochrane
Scott Colloredo
Alvardo Diaz
Charles Dovale
Sandra Eastman
Chris Forney
Darrell Foster
William Franklin
Sheree Gillard
William Glover
Charles Grove
Cristina Guidi
Billy Haynes
Barbara Jean Henderson
Darleen Hunt
Karen Iftikhar
Charles Jenkins
Wendy Johnson
James Jones
John Kehoe
Hae Soo Kim
Jodi Levesque
John Manning
George Martin, M.D.
Cheryl McPhillips
Jim Medina
Paul Mogan
Ross Nordeen
Gary Olson
Catherine Parker
R. Albert Parrish
G. Thomas Pentrack
Jimmie Rogers
William Roy
Roger Rudig
Eric Schafer
Dawn Schaible
Julie Schneringer
Daniel Shafer
Glenn Snyder
David Spacek
Connie Stallings
Geoffrey Swanson
Rayelle Thomas
Randall Tilley
Manuel Virata
Laurie Walls
Mark Woloshin
Tracy Young
Ping Yu
Edgar Zapata

ISS ...

(Continued from Page 1)

expansion of joint activities in human space flight.

Taking advantage of Russia's unique set of experiences and capabilities in long-duration human space flight, NASA then initiated a three-phase ISS development process with Russia as an integral partner.

Phase 1 was designed to decrease the risks associated with assembling, operating and conducting research on the ISS. It consisted of a series of Space Shuttle-Mir rendezvous flights and long-duration stays of seven NASA astronauts on Mir.

The program also provided for nine Russian cosmonauts to fly on the Space Shuttle.

Now drawing to a close after four-and-a-half years, Phase 1 has proven to be an unprecedented learning opportunity for living, working and conducting research together in space.

When Mission Specialist Andy Thomas returned to Earth on June 12 as a member of the STS-91 crew, Americans who flew on Mir logged:

▲ 977 total days in space (exceeding the time spent in space by our Space Shuttle fleet in its 17 years of experience), of which 907 were as Mir crew members; and

▲ 812 consecutive days in space from Shannon Lucid to Andrew Thomas, of which 802 were as Mir crew members.

As part of the Phase 1 program, the United States helped equip the last two Mir modules, Spektr and Priroda, with scientific instruments.

Spektr was outfitted to support a variety of life sciences experiments and Priroda with microgravity research facilities. The U.S. also funded the construction and delivery of additional solar arrays to supply more power for experiments.

In many ways, it was a dress rehearsal for the more complex tasks of ISS assembly, logistics, maintenance and research.

The Goals

Phase 1 facilitated ISS development through fulfillment of four primary

(See ISS, Page 7)

ISS ...

(Continued from Page 6)

goals:

▼ Reduce the risks associated with developing and deploying the ISS;

▼ Garner operational experience for NASA on long-duration orbital missions;

▼ Conduct peer-reviewed, precursor scientific research in preparation for the ISS; and

▼ Learn how to work with our international partners.

According to Frank Culbertson, Phase 1 Shuttle-Mir program director, NASA has accomplished all of these goals.

"Every single one of these [goals] will carry over into the next phase," noted Culbertson during a press conference June 1 at KSC, "because everything we've learned working with each other about how to conduct science will need to be continuously perfected in order to operate for long periods of time in space."

The Results

Reduce the Risks

NASA has garnered practical experience on Mir to resolve a variety of space station problems, such as dealing with loss of electrical power, a fire resulting in temporary atmospheric contamination, and a cabin pressure leak. In all instances, the problems were resolved to permit the continuation of the mission.

"Phase 1 was a very worthwhile investment," said ISS Program Manager Randy Brinkley. "It's clearly allowed us to reduce our technical risk during the development phase for the last five years, and I believe it will ensure safe operations on the ISS."

Problems on Mir have led to a number of hardware, software and procedural changes for the ISS.

A February 1997 fire aboard Mir caused NASA to re-evaluate ISS fire control options.

Monitors on the outside of the Russian station found the Mir's surface was being contaminated by its own attitude control propellant. To avoid the same pitfall, ISS propellant venting procedures have been changed.

The depressurization of the Spektr module after a collision with a Russian Progress vehicle in June 1997 validated the U.S. design (no cables running through open hatches) and demonstrated the importance of maintaining clear station passageways.

"We've benefitted from problems probably more than we have from our successes," Brinkley noted, "so those lessons learned will change our procedures so that we have less chance of having those same kinds of problems."

One of the most valuable lessons learned, according to Culbertson, is that "you have to expect the unexpected."

He noted that "even though we didn't plan some of the more difficult problems we had, we dealt with them successfully with our Russian partners."

Garner Operational Experience

All Earth-bound creatures, especially humans, are accustomed to a 24-hour day-night cycle.

Although most people can adjust to 'jet lag,' the experience was intensified for Mir crew members, who had to interact with two ground control centers with a nine-hour time difference.

Culbertson pointed out that in reflecting on the lessons of our experience on Mir, we need to remember our goals of sending manned missions back to the Moon and possibly to Mars.

"When you think about a four- to six-month flight on board Mir, that's not unlike a four- to six- month flight to Mars," he noted. "You're going to be just as isolated and reliant on communication and on what you brought along, both in your brain and in the closet. So these are all valuable lessons learned for generations to come."

Precursor Scientific Research

Researchers used the Mir opportunity to familiarize themselves with operational protocols and techniques, to test equipment, and to conduct experiments as precursors to ISS research.

Experiments on Mir successfully verified that a wireless computer network can be used on the ISS to enhance communication among investigators on the ground, crew members, and station research payloads. Wireless communications will eliminate the restrictions on movement associated with cable connections.

Working with the Russians

Coordinating and integrating two robust space programs and their supporting infrastructures that have operated independently for decades was a formidable task.

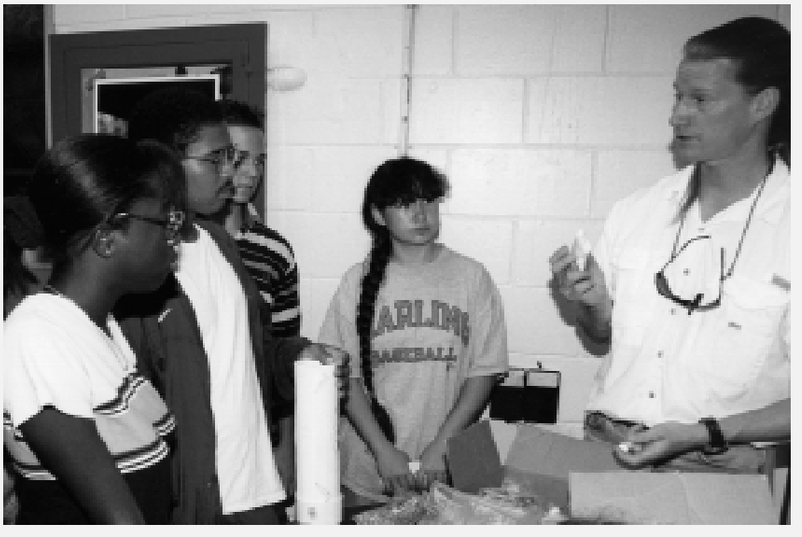
NASA concluded Phase 1 with a very thorough understanding of how the Russians plan and train for a flight after four years of working with them shoulder to shoulder.

The Americans and the Russians learned how to interpret each other's 'standard documentation' and decided how to allocate and track responsibilities between the two different space organizations.

All told, both NASA and the Russian Space Agency agree that the experience was invaluable.

"We're looking forward to working together for a long and prosperous future in space," Culbertson noted.

Florida students prepare the first 'MARS' payload



Miami/Dade County's Science Teacher of the Year Mark Tohulka, far right, discusses experiments with students from his Advanced Placement Biology class at Homestead Senior High School. The students, seen here in Hangar L at Cape Canaveral Air Station with Tohulka, designed the experiments as part of NASA's Mission to America's Remarkable Students (MARS) educational outreach program. These will be part of MARS' first experiments flown in space in an effort to teach students how to conduct scientific experiments. The experiments are scheduled to fly in a Get-Away Special (GAS) canister on STS-96.

Venture ...

(Continued from Page 1)

A launch site for VentureStar has not yet been selected and several sites are under consideration based on who the customers for the new launch vehicle will be and what payload requirements they are likely to have.

On their recent visit to KSC, Lockheed Martin representatives from Palmdale and Sunnyvale, Calif., saw first-hand our payload processing facilities.

These included the Operations & Checkout (O&C) Building, Spacecraft Assembly and Encapsulation Facility-2 (SAEF-2), the Space Station Processing Facility (SSPF), the Vertical Processing Facility, the Multi-Payload Processing Facility, Payload Changeout Room and Orbiter Processing Facility bays.

The payload-specific facilities are all Class 100,000 clean rooms, and some have unique capabilities — such as the PHSF, which is designed for hazardous spacecraft processing, SAEF-2 with its spin balance machine and the O&C and SSPF with numerous off-line laboratories and unique test equipment.

While VentureStar plans include integration of payloads with the new launch vehicle in a horizontal position, the attributes of vertical payload integration and the likely competition from the Evolved Expendable Launch Vehicle (EELV) are of significant interest to VentureStar.

Most customers identified for the next generation of launch vehicles have stated a preference to have dual vehicle compatibility for their payloads.

This dual compatibility assures the launch of a payload even if one launch vehicle system has a problem that grounds the fleet.

KSC payload managers pointed out compatibility issues to the Venture Star team in fueling spacecraft collectively within the mission module.

They also pointed out that there are challenges of multi-payload manifesting where each spacecraft has its own unique requirements.

"We want to offer to them our payload expertise as an asset for the launch of VentureStar at KSC," said Bill Fletcher, deputy director of the NASA-KSC Customer Support Directorate.

The infrastructure necessary to process payloads was of particular interest to the VentureStar team.

"A facility like the Hangar L Life Sciences Facility, for example, may be very important to them since about 30 percent of the requirements for the International Space Station will be Life Sciences payloads for NASA," said Fletcher.

Hangar L has animal labs, aquatic labs, and specialized science labs and data collection facilities.

To date, more than 300 science experiments have been processed for flight at KSC, including life sciences, microgravity science, space science and commercial experiments.

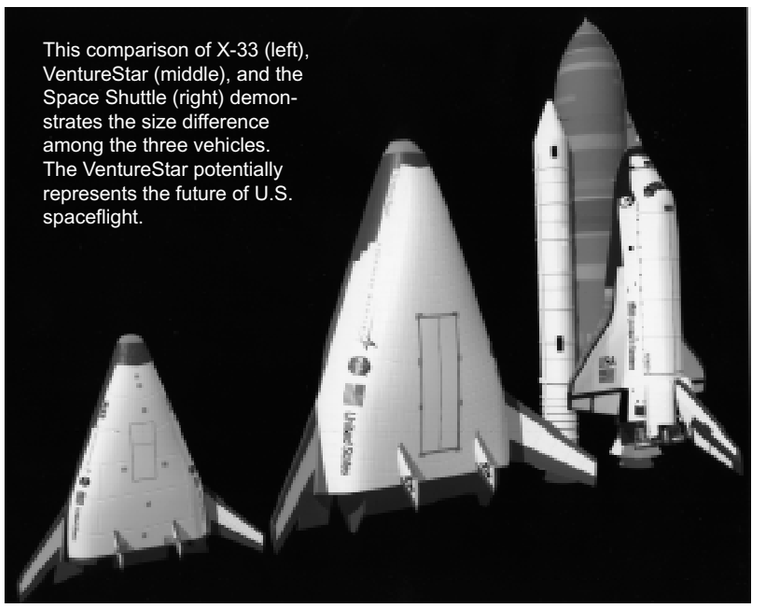
"Most flights with NASA payloads are likely to be dedicated missions, particularly to the International Space Station," said Fletcher, "for a combination of practical as well as scientific reasons."

During the dialogue between the two organizations, NASA demonstrated to the VentureStar team what it might mean in terms of requirements to have NASA onboard as a partner.

KSC showed what its payload infrastructure will contribute to the site selection process noting that KSC already has much of that infrastructure in place.

It was also pointed out that payload carriers from existing hardware, such as Spacelab and International Space Station pallets, could be customized for use on the VentureStar.

Throughout the visit, KSC demonstrated its value as the logical partner and launch site location for this fully reuseable launch vehicle of the future.



This comparison of X-33 (left), VentureStar (middle), and the Space Shuttle (right) demonstrates the size difference among the three vehicles. The VentureStar potentially represents the future of U.S. spaceflight.

A Hire Form of Expression

Mission Specialist Kay Hire, signing autographs at left, recently returned to KSC with the crew of the STS-90 mission to personally thank KSC workers. Also signing autographs are Mission Specialist Daffyd "Dave" Williams, far right, and Pilot Scott Altman. Hire is the first KSC employee to join the astronaut corps. She began working here in 1989 and was later certified as a Space Shuttle test project engineer (TPE). From the TPE computer console position in the Launch Control Center, she integrated all technical aspects of Shuttle turnaround maintenance from landing to launch. During STS-90, the seven-person crew served as both experiment subjects and operators for 26 individual life science experiments focusing on the effects of microgravity on the brain and nervous system. Hire has now logged more than 381 hours in space.

John F. Kennedy Space Center

Spaceport News

Spaceport News is an official publication of the Kennedy Space Center and is published on alternate Fridays by the Public Affairs Office in the interest of KSC civil service and contractor employees.

Contributions are welcome and should be submitted two weeks before publication to the Media Services Branch, AB-F1. E-mail submissions can be sent to Susan.Maurer-1@ksc.nasa.gov

Managing editor. . . . . Bruce Buckingham
Editor. . . . . Susan Maurer
Editorial support provided by Sherikon Space Systems Inc. Writers Group.
Photographic support primarily provided by The Bionetics Corp.
NASA at KSC is on the Internet at http://www.ksc.nasa.gov

USGPO: 633-112/80008