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Spaceport News

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John F. Kennedy Space Center

Mission Update

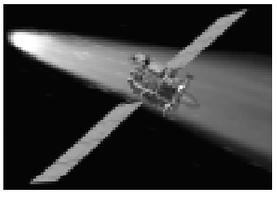
April

STS-90
Columbia
90th Shuttle, 25th OV-102
April 16, 2:19 p.m. EDT (recently changed from April 2)
Pad 39B, KSC
Neurolab (see photo at right)
Crew: Richard Searfoss; Scott Altman; Richard Linnehan; Dave Williams; Kay Hire; Jay Buckey; James Pawelczyk

May

STS-91
Discovery
91st Shuttle, 24th OV-103
May 28, 8:05 p.m. EDT
Pad 39A, KSC
Final Shuttle-Mir docking
Crew: Charles Precourt; Dominic Gorie; Wendy Lawrence; Franklin Chang-Diaz; Janet Kavandi; Valery Ryumin; Andy Thomas (returning from Mir)

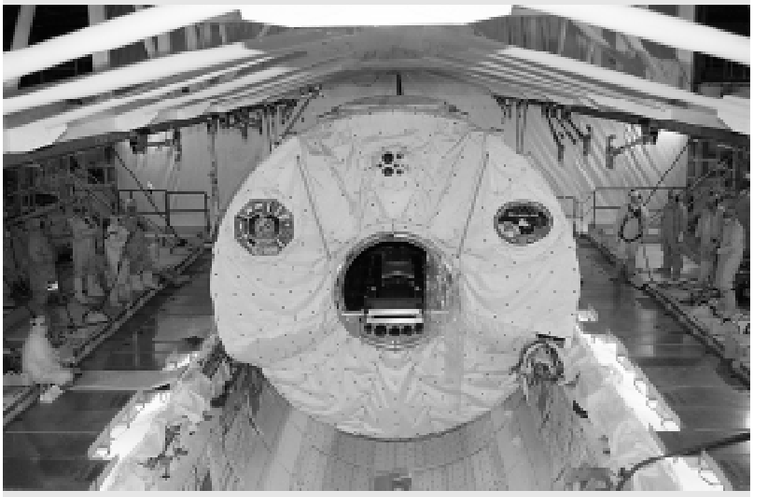
July



Deep Space-1
Delta II launch vehicle
July 1
Launch Complex 17A, CCAS
First mission in NASA's New Millennium program to fly. It will pass by an asteroid, Mars and a comet.

STS-88
Endeavour
92nd Shuttle, 13th OV-105
July 9, 12:44 p.m. EDT (under review)
Pad 39B, KSC
First U.S. International Space Station assembly flight, carrying Node-1 and PMA-1 and -2.
Crew: Robert Cabana; Rick Sturckow; Nancy Currie; Jerry Ross; Jim Newman

Neurolab moved to OPF 3



WORKERS in Orbiter Processing Facility Bay 3 transfer the Neurolab Spacelab module into the payload bay of the orbiter Columbia Feb. 12. The targeted launch date for STS-90 has been changed from April 2 to April 16 at 2:19 p.m. This second Shuttle flight of the year will include the first astronaut selected from the ranks of KSC employees, Kay Hire, who is assigned as a mission specialist on the final Spacelab flight.

KSC gets new chief counsel

Bruce H. S. Anderson became the Chief Counsel of Kennedy Space Center effective Feb. 17.

"I'm pleased to have this important post filled by someone with such impressive credentials," said KSC Director Roy Bridges Jr. "Bruce's extensive experience as a lawyer, including several years as the Deputy Chief Counsel at

Anderson

(See COUNSEL, Page 8)

KSC ingenuity, experience are tackling ISS ground support equipment needs

Ground support equipment critical to getting International Space Station (ISS) hardware from Earth into orbit is taking shape around the space center.

One of the first to be designed was the Rack Insertion Device (RID), for inserting experiment racks into research modules. Now, a new array of equipment that will expedite Earth-based processing of the station cargo tug, called the Mini-Pressurized Logistics Module (MPLM), is undergoing checkout and testing in the Advanced Systems Development Lab. Managed by Engineering Support Contractor Dynacs and overseen by the Design Engineering Directorate at NASA KSC, the lab is part of

(See GSE, Page 2)

DYNACS employee Scott Minter rotates a full-scale mockup of the Mini-Pressurized Logistics Module (MPLM) in the MPLM Access Certification Equipment (MACE) test stand. The MPLM will serve as a cargo tug between Earth and the International Space Station (ISS), shuttling materials to and from the station during the assembly phase. The MPLM is about 15 feet in diameter and 24 feet long.

GSE ...

(Continued from Page 1)

the Launch Equipment Test Facility, a long-standing testing ground for Ground Support Equipment (GSE) before it sees operational use.

Inside the lab, a KSC-built full-scale mockup of the MPLM has been incorporated into the MPLM Access Certification Equipment (MACE). Designed by Boeing and NASA and built by Dynacs and NASA, the MACE can easily move on the air-bearing pallets in the Space Station Processing Facility (SSPF), where the stand will find operational use.

"Including the MACE, there are about 15 items of GSE total that eventually will be located in the SSPF," said Scott Colloredo, lead design engineer.

MACE allows access to the MPLM in two different configurations. Horizontal access would be required when the MPLM is in the SSPF, Orbiter Processing Facility or at Dryden because of a West Coast landing, while vertical access will be needed when the module is at the pad prior to flight and late stowage of re-supply items is performed.

For this latter task, an ingenious piece of telescoping hardware was developed by the Boeing/NASA design team. Scott

THE (Mini) PLM (MPLM) Late Access Kit (PLAK) will make late stowage in the module easier and safer. It features a retractable ladder and attached work platforms. The PLAK was built by Engravers Metal Fabricators, Merritt Island.

Strickland of Boeing came up with an efficient, tightly designed piece of GSE called the (Mini) PLM Late Access Kit (PLAK). It features a retracting ladder and fold-up platforms that are telescoped down into the MPLM. A worker climbs down the ladder and unfolds platforms to create a mini-work area.

"This is a better way to do MVAK," Colloredo noted, referring to Module Vertical Access Kit, the current process for performing late stowage. No load is placed upon the MPLM by the GSE structures, and it's easier for the worker accessing the MPLM to climb down a ladder than be lowered on a hoist.

"Getting the person in there is half the battle," Colloredo said. "The other half is the equipment." Cargo is lowered from a hoist system on the PLAK. The same MVAK hoists can be used on the PLAK.

The first of three MPLMs are due on deck at KSC this year. First flight will occur in June 1999, when an MPLM will ferry up hardware for the U.S. laboratory, kicking off an ongoing series of supply missions to outfit the station that will extend into the next century.

Other GSE being developed at KSC to support ISS includes:

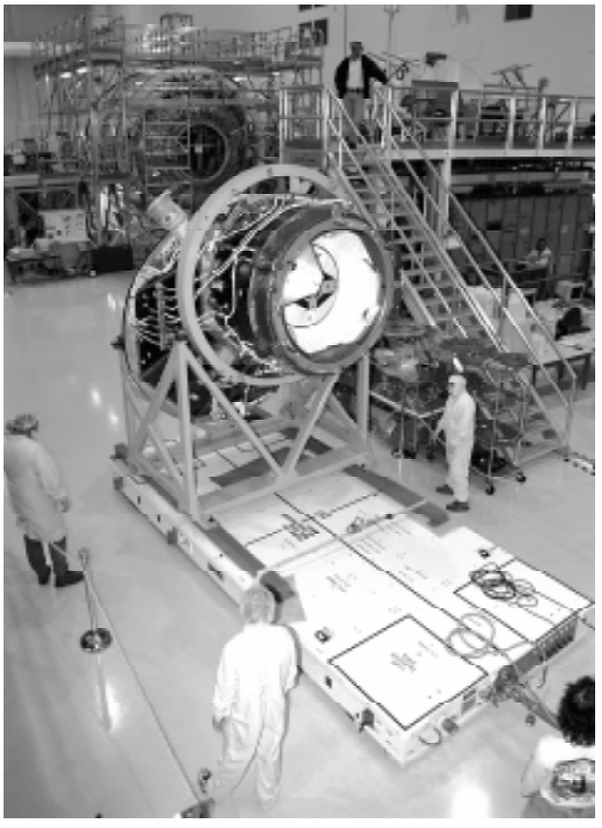
• Removable End Access Platform (REAP), for quick access to the MPLM after it returns from space;

• Hatch Access Structure (HAS), for accessing the MPLM if the orbiter lands in California instead of KSC;

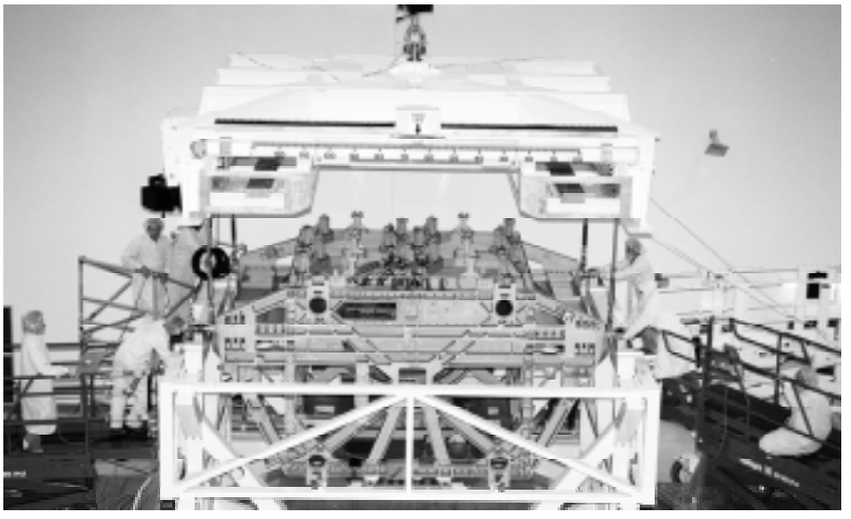
• Hatch Operations Kit (HOK), which will be used to open and close the forward MPLM (and other module) hatches when in the horizontal mode.

MATT McCartney of Dynacs has climbed down to the bottom of the (Mini) PLM Late Access Kit (PLAK) and is unfolding work platforms at the base. The PLAK will extend about 12 feet into the module, enough to access the two highest racks.

ISS preparations ramping up



TAKING SHAPE — The Pressurized Mating Adapter-2 (PMA-2) (photo at left) in the foreground is being mated to Node 1 in the Space Station Processing Facility (SSPF) Feb. 17. The two PMAs will have critical roles in the on-orbit assembly of the International Space Station: One PMA will be connected to the Russian-built Control Module while the other will serve as a docking port for future Shuttle missions. The Node will become a passageway between the different elements. During STS-88 this summer, the PMA/Node assembly will be attached to the Control Module. Several space walks by the STS-88 crew will be required to connect power and data transmission cables on the mated hardware. A third PMA arrived at KSC the same week. It will be attached to the Node during STS-92 and will have the same purpose as PMA-2. Below, the Z1 Integrated Truss Segment is moved into a work stand in the SSPF Feb.18. The Z1 truss also will be launched on STS-92. It will allow temporary installation of the U.S. power module to Node 1. Attached gyroscopes on the truss will provide attitude control. Extravehicular activity equipment also can be secured to the truss.



THE 5,500-pound X-33 aluminum liquid oxygen tank arrives at the Lockheed Skunk Works in Palmdale Feb. 10. This is the first major flight component delivered to the vehicle assembly facility.

First major flight component for X-33 arrives at Palmdale

NASA and Lockheed Martin today saw their X-33 technology demonstrator move from drawing board to plant floor as the first major flight component arrived at the Lockheed Martin Skunk Works vehicle assembly facility in Palmdale, Calif.

The 26-foot-long, 5,500-pound aluminum liquid oxygen tank that will form much of the nose and forward third of the X-33 vehicle arrived Feb. 10 by air from the Lockheed Martin Michoud Space Systems facility in New Orleans.

"The arrival of the liquid oxygen tank marks the start of an ambitious assembly schedule that will see the X-33 vehicle roll out and begin flight tests within 18 months," said Jerry Rising, Lockheed Martin Skunk Works vice president for X-33/ VentureStar.

"This is a significant achievement in making the X-33 vehicle ready for flight, as the liquid oxygen tank is the first major element to be placed into the assembly fixture," added Gene Austin, NASA X-33 program manager.

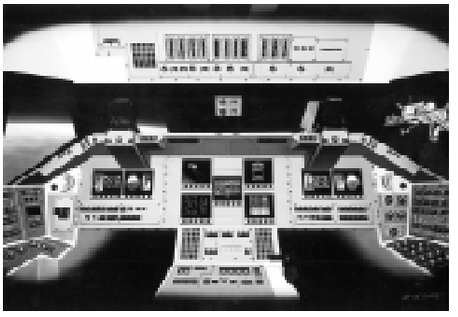
The tank, designed to hold more than 181,000 pounds of liquid oxygen, will supply the oxidizer needed to burn the vehicle's fuel, liquid hydrogen.

The liquid oxygen tank also plays a key structural role in the X-33. It has a complex, two-lobed structure allowing for a close fit within the vehicle's outer shell.

When filled, the tank will account for about 65 percent of total vehicle weight at liftoff.

The liquid oxygen tank design is one of a number of challenging technology areas that are key to the X-33, including the vehicle's two cutting-edge composite liquid hydrogen tanks, two linear aerospike engines, the vehicle's rugged metallic thermal protection system and advanced avionics systems all of which will be arriving at the Palmdale facility during the coming year.

Vehicle assembly of the subscale prototype technology demonstrator is scheduled to be completed in late spring 1999, with the first flight, to be launched from Edwards Air Force Base, Calif., scheduled for July 1999.



ARTIST'S concept of the Honeywell Multifunction Electronic Display Subsystem (MEDS). All four orbiters will be outfitted with the display system and Honeywell also has been contracted to provide a unit for the International Space Station that will allow astronauts to interface with the station's robotic arm.

Atlantis is first orbiter to get new advanced cockpit display

The orbiter Atlantis, undergoing its second Orbiter Maintenance Down Period (OMDP) in California, has become the first vehicle in the fleet to receive a new state-of-the art cockpit display system.

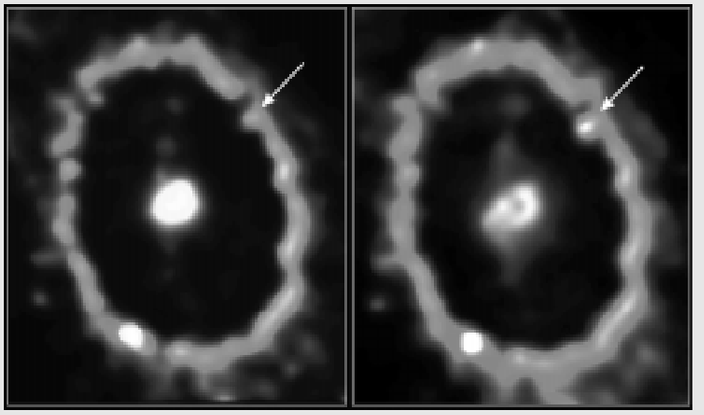
The Multifunction Electronic Display Subsystem (MEDS), built by Honeywell Space Systems/Satellite Systems Operation, is patterned after liquid-crystal display technology on the Boeing 777. It replaces the current electro-mechanical and cathode ray tube displays which were designed for the Shuttle in the 1970s.

Honeywell delivered 11 flat-panel displays for Atlantis. After installation is complete, the orbiter will have nine displays on the forward flight deck and two on the aft to support payload operations.

The displays offer state-of-the-art color and clarity. They also weigh less and use less energy than the existing displays. Each MEDS comprises three units. The display itself contains hardware and software to generate images. It is connected to a data processor, which in turn is connected to analog-to-digital converters.

Units for Columbia are scheduled to be shipped by July, with all flight units delivered by year-end.

A titanic collision



HUBBLE Space Telescope images of Supernova 1987A from 1994 (above left) and 1997 (right) show a brightening knot on the upper side of the glowing gas ring surrounding the supernova (an exploding star) at the center of the image. The knot is the site of a powerful collision between an outward-moving shock wave from the exploding star and the innermost parts of the ring surrounding the star. This is likely to be the first sign of a dramatic and violent collision that will take place over the next few years. Statistics of the phenonemon are mind-boggling: The material in the center of the ring is rushing outward at 1,864 miles per second. The blast wave is moving at 40 million miles per hour. The knot is 100 billion miles across and its temperature is surging from a few thousand degrees to a million degrees Fahrenheit. Supernova 1987 is the brightest stellar explosion seen since Johannes Kepler observed a supernova in the year 1607. It is located about 167,000 light-years from Earth in the large Magellanic Cloud.

FY '99 NASA budget request holds steady at $13.5 billion

NASA Administrator Dan Goldin presented the Fiscal 1999 budget for the agency at a briefing in Washington, D.C., earlier this month. The $13.465-billion request is only slightly lower than the prior fiscal year, $13.638 billion.

"I know that a budget is about priorities and the promise of the future," Goldin said at the Feb. 2 budget briefing. "But I also believe — deeply — that a budget isn't only about priorities and promise. It is also about performance."

Goldin presented a series of charts (see below) highlighting efficiencies achieved by NASA since FY '93, including:

• The Shuttle is delivering more for the money. Crew days in orbit have increased 133 percent and days on-orbit jumped from 62 days in FY '93 to 94 in FY '97.

• Significant Shuttle safety improvements have been achieved. In-flight anomalies have declined from an average of 14.3 anomalies per flight in FY '93 to just 5.4 anomalies per flight four fiscal years later.

• Shuttle costs are down. The total average cost per Shuttle flight has decreased 42 per cent, overtime has been reduced by 31 percent, both the civil service and contractor work force involved with Shuttle operations have been reduced by more than 20 percent, and the total Space Shuttle budget has dropped from $4.1 billion in FY '93 to about $3 billion in FY '97.

• NASA's civil service work force has fallen from 24,900 people in fiscal 1993 to 19,187 in December 1997. The Headquarters staff is about half the size it was four years previously. By Fiscal Year 2,000, about 2,000 more civil servants are projected to depart the agency.

Budget highlights include:

• **Human space flight:** Goldin said the Space Station Crew Return Vehicle, the X-38, would be a new start project in Fiscal Year 2000. The Johnson Space Center-managed initiative began captive-carry flight tests last year.

• **Earth science:** The Earth Observing System (EOS) debuts this year with the launch of EOS AM-1 and Landsat 7. The "better, cheaper, faster" QuikSCAT mission also is set for launch in 1998 as well from the West Coast. QuikSCAT will gather data about ocean surface winds. Funding also was requested for a follow-on mission to the highly successful U.S./French TOPEX/Poseidon effort that has provided invaluable data about the El Niño weather phenomenon.

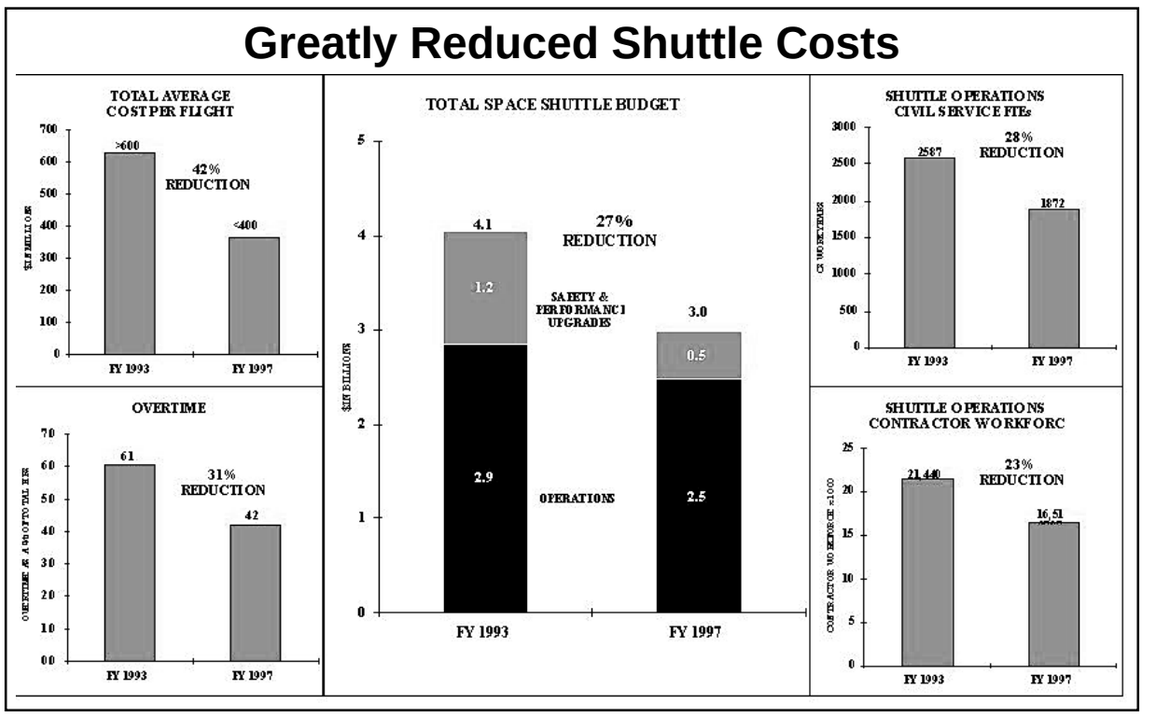
The Earth science request also includes funding for the Earth probes program, which addresses specific Earth science questions that are new or complementary with other parts of NASA's Earth Science Enterprise. Proposed under this program is LightSAR, a free-flying, Earth-observing lightweight synthetic aperture radar. Goldin said starting LightSAR will depend on commercial sponsorship of the program.

• **Space science:** This year, an armada of spacecraft are slated for launch as part of NASA's space science effort, including: the Transition Region and Coronal Explorer (TRACE), March; Deep Space 1, July; Far Ultraviolet Spectroscopy Explorer (FUSE), October; Mars Surveyor '98 orbiter, December; and the Wide-Field Infrared Explorer (WIRE), late 1998. Also, the Europa Orbiter has been selected as NASA's first outer planet technology mission.

NASA FY 1999 Budget Summary
(Millions of Dollars)

	FY 1998	FY 1999
Human space flight	5,679.5 *	5,511.0
Science, aeronautics & technology	5,552.0 *	5,457.4
Mission support	2,388.2 *	2,476.6
Inspector general	18.3	20.0
TOTAL BUDGET AUTHORITY	13,638.0	13,465.0

*Reflects transfer of $128 million from the science, aeronautics & technology appropriation and $45 million from the mission support appropriation to human space flight appropriation.



NASA safety panel issues 1997 report

The Aerospace Safety Advisory Panel (ASAP) has issued its annual report on NASA safety plans and operations. Formed in 1968 after the Apollo 1 fire, the panel's latest review gives the agency high marks at present, but does voice concern about maintaining the right workforce skill mix in the future. The panel's report is posted on the NASA Headquarters Web site at:

http://www.hq.nasa.gov/office/codeq

Europa's icy surface could hide ocean, and life, below

High scientific interest surrounds the moon Europa because it may have a liquid ocean beneath its frozen surface which could harbor life in some form.

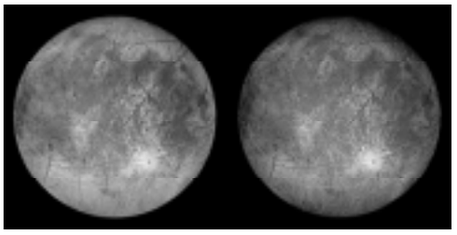
Funding for a mission to Europa, the fourth largest satellite of Jupiter, was included in the Fiscal 1999 budget request for NASA. It would be one of three Outer Planets/Solar Probe Program missions and if the funding is approved, the Europa Orbiter mission would take place in the 2002-2003 time frame.

The Galileo spacecraft recently began a highly focused extension of its mission to Jupiter, starting with a detailed study of Europa over a 14-month period that began last December. The spacecraft already has returned images of Europa that strongly suggest there is a deep ocean beneath the moon's icy surface.

Galileo will make eight consecutive close encounters with Europa studying and characterizing the crust, atmosphere and possible ocean using imaging, gravity and space physics data.

The mission of the Europa Orbiter will be to characterize the surface processes of Europa; determine the depth and extent of liquid water; and determine the energy sources and response of the crust.

The spacecraft also would map the entire surface in several colors; measure the depth of the ice crust using active radar sounding and characterize the tidal response of the surface.



GALILEO images of Europa from September 1996 show the moon's striated appearance, believed to be due to stressing of its icy crust caused by the contorting tidal effects of Jupiter's strong gravity pull.

Europa at a glance

• Sixth largest satellite in the solar system, but smallest of Jupiter's four moons;
• Diameter: 1,950 miles across, slightly smaller than Earth's moon;
• Smoothest object in our solar system, with no surface feature exceeding 0.6 miles in height;
• Very bright surface, about five times brighter than Earth's moon;
• Covered largely with smooth white and brownish-tinted ice that may be only about 3,250 feet thick in places. Internal heating due to Jupiter's tidal pull could melt the underside of the icepack, forming an ocean of liquid water underneath the surface. Inner core of iron-sulfur;
• Lack of craters indicates a young age for Europa's surface, perhaps about 30 million years old;
• Atmosphere was detected by Galileo during encounters in late 1996/early 1997.

STS-94 research could yield important breakthrough here on Earth

A protein crystal growth experiment performed during Shuttle Mission STS-94 July 1– 17 last year may lead to a medical breakthrough that could greatly impact children's health.

NASA and industry biotechnology researchers have taken an important step toward developing a treatment for a life-threatening virus that causes pneumonia and severe upper respiratory infection in infants and young children.

The infection, called Respiratory Syncytial Virus, attacks the respiratory airways and lungs. According to the National Academy of Sciences' Institute of Medicine in Washington, D.C., nearly four million children ages 1 to 5 are infected every year in the United States by the virus. Approximately 100,000 of these children require hospitalization and 4,000 die annually from the resulting infection.

The virus is considered by physicians to be the most serious infectious disease for infants in the United States.

"Through NASA funding research in space and on the ground, and the application of space technology, we have determined the three-dimensional atomic structure of a potentially very important therapeutic antibody to this virus," said Dr. Daniel Carter, president of New Century Pharmaceuticals in Huntsville, Ala. Antibodies aid the individual's immune system by neutralizing toxins, such as viruses, as they attempt to invade healthy cells.

Knowledge of the molecular structure of the antibody will permit scientists to understand key interactions between the antibody and virus, facilitating development of treatments for the disease.

"Currently, there is no vaccine against the virus," said Simon McKenzie, chief executive officer of Intracel Corp. in Issaquah, Wash., which developed and produces the antibody. "Since this antibody neutralizes all known variants of the virus, therapeutics developed from it should have a major impact on lowering the mortality rate caused by the disease. And knowing its structure will provide key insight into our future development activities."

STS-94 marked the reflight of the Microgravity Science Laboratory -1 (MSL-1). Crew members are shown here inside the Spacelab module, where much of the protein crystal growth research took place.

The illness most frequently begins with a fever, up to 101 degrees Fahrenheit, along with runny nose, cough and sometimes wheezing and trouble breathing. When his six-week old daughter caught the respiratory infection, Carter saw the effects of the virus first-hand. "There was nothing the hospital could do for her," he said. "We brought her home, watched as the infection ran its course and hoped for the best," he said. His daughter recovered.

Carter's research team used the viral antibody to grow antibody crystals aboard the Space Shuttle Columbia in July of 1997. The experiment, called Protein Crystallization Apparatus for Microgravity, was one of three protein crystal growth studies conducted during the nearly 16-day flight.

In the weightless environment of space, the antibody crystals grew larger and were of better quality than those previously grown on Earth.

Using highly specialized X-ray equipment and computers, scientists at New Century Pharmaceuticals located the key positions of individual atoms in the crystal structure and constructed a model of the antibody. Because of the increased size and perfection of the space-grown crystals, the researchers will be able to more precisely determine the atomic structure of the antibody.

Montgomery joins SES ranks


Montgomery

KSC Deputy Logistics Director Ann Montgomery has joined the Senior Executive Service ranks effective Feb. 15. A space program veteran who began her NASA career in 1968, Montgomery holds the distinction of becoming the first woman to serve as an orbiter vehicle flow director. She has served as deputy director of Shuttle Logistics, Deputy Director of Logistics Operations and Acting Director of Logistics Operations. She has received numerous awards, including the prestigious Center Director's Award in 1996.

Scholarships offered to NASA dependents

The KSC NASA Scholarship Fund is offering five $2,000 scholarships for the 1998-99 school year.

To qualify, applicants must be pursuing an undergraduate science or engineering degree at an accredited college or university in the United States and be a dependent of a NASA employee or retiree. The application deadline is March 31. Applicants will be notified of the results in May. Applications may be obtained from Diane Holden, room 3630H, Logistics Building on Contractors Road, or phone 861-1495 for more information.

Forms available to attend Southcon '98

The KSC NASA Technology Programs and Commercialization Office has pre-registration forms for floor show admission to Southcon '98, an electronics trade exhibition and conference that will be held March 24 – 26 at the Orange County Convention Center.

Registering by March 6 allows free admission to the floor show, which will feature more than 250 exhibit booths highlighting manufacturing tools, test and measurement equipment, active and passive components and other items.

The forms are available from Pam Bookman, tel. 867-6291, room 3384, Headquarters Building.

Honored in February

FEBRUARY employees of the month are (from left): Tricia Koger, Payloads Processing; Jean Dilts, Chief Financial Officer's Office; Marilee Tewksbury, Installation Operations; Marshall Scott, Engineering Development; Diane Holden, Logistics Operations; Sharon Lowry, Administration Office; Dave Guibeau, Space Station Hardware Integration; and Scott Estes, Checkout and Launch Control Systems. Not shown are Diane Welford, Chief Counsel's Office; Grant Stoddard, Safety and Mission Assurance; George Marmaro, Biomedical Operations; Cheryl Hurst, Procurement Office; and Leslie Boatwright, Shuttle Processing.

STS-89 SFA civil service honorees are (from left): Jean Flowers; John Hueckel; Bob Zuber; Greg Breznik; Dan Lewis; June Perez; Bryan Bookhart; and Todd Brandenburg. Not shown are Rick Nelson and Rodger Hall.

KSC employees receive SFA honors

KSC recently honored 48 of its civil service and contractor employees at a special Honoree Event held Jan. 20-22 at the space center.

The KSC employees were among some 250 NASA and industry employees from around the country who were honored by top managers for their significant contributions to the nation's space program. The Honoree Award is the highest form of recognition bestowed upon an employee by the NASA Space Flight Awareness Program. Recipients are selected for their professional dedication and outstanding achievement in support of the human space flight program.

Ten civil service employees were honored. They are Bryan Bookhart, Todd Brandenburg, Greg Breznik, Jean Flowers, Rodger Hall, John Hueckel, Daniel Lewis, Richard Nelson, June Perez, and Robert Zuber.

Contractor employees honored include Scott Barney, Alistair Doig, John Johnson, James Romine, and Susan M. Spector with Boeing, Payload Ground Operations; Teresa Bollig and Nancy Szpara with Boeing, Reusable Space Systems; Cheryl Carter with Boeing Rocketdyne Propulsion & Power; Joseph Kachnic with Dynacs Engineering Co., Inc.; Richard Hall, Theodore Johnson, Michael Lipgens, Donna Pancho, Roland Ross, Deloris Weaver with EG&G Florida, Inc.; Calvin Wright with Sherikon Space Systems, Inc.; Laura Bushard, Gordon M. Edwards, Charles Gardner, Donald Lovelace III, Michael McClain, Sherry McCullum, Harvey Mizell, Steven Pruit, Donald Suffern III, Patrick Thomas, David Trenn, Stephen Wachowski, Gary Whitmore, and Richard Zeitler with United Space Alliance.

Also Frank Rodriguez with Hibex International; Ann Stafford with Sundstrand Aerospace Mechanical Systems; Alicia Akins, James Day, Ronald Summers, and Donna Tate with United Technologies, USBI Co.; Stephen Defeo with Boeing Information Systems; and Larry Brown of Wiltech Corp.

Vanguard reunion set for March 18

The 40th anniversary of the Vanguard 1 launch is being celebrated with an anniversary buffet March 18 at the Patrick Air Force Base Officers' Club.

Members of the Vanguard team, friends and colleagues are invited to attend. A cash bar will be held at 6:30 p.m., followed by the buffet at 7 p.m. Cost is $15.50 per person.

For reservations, send checks prior to March 11 to Bob Gray or Jim Stoms:

Bob Gray
4720 N. Banana River Blvd.
Cocoa Beach, FL 32931
Tel. 407 783-7054

Jim Stoms
520 Andros Lane
Indian Harbor Beach, FL 32937
Tel. 407 773-1124

African-American History Month

CENTER Director Roy Bridges (left) chats with Bobby Bruckner, director of Payload Processing (right) and James Spencer and Terrence Moore (seated, second and third from right, respectively), at the *Meet the Directors* breakfast, one of a series of events planned this month in celebration of African-American History Month. Spencer and Moore, business entrepreneurs who formed the company Intelligent Business Machines, Titusville, were the guest speakers at the Feb. 11 breakfast in the Space Station Processing Facility cafeteria.

Dates set for two spring races

The ninth annual *Spring Intercenter Run* and seventh annual *Beat The Boss 5k Run And 2 Mile Walk* are scheduled for March and April, respectively:

• *Spring Intercenter Run* will be held March 25 at 5:00 pm. The 10K, 5K and 2 Mile Run/Walk on the Shuttle Landing Facility runway are a great way to have some fun and friendly competition with co-workers and friends. Civil and contractor personnel are eligible and registration is free. Prizes will be awarded to the top three male and female finishers of each race. Register at either KSC Fitness Center or contact Amy Douglass, 867-7829, for details. Pre-registration deadline is by close of business, March16.

• *Beat the Boss* competition is April 18, 1998, 8 a.m., Patrick Air Force Base Officers Club Pavilion. Participants can compete against one group of bosses in the 5K-run or a different group in the 2-mile walk. NASA, military and KSC contractor employees and their immediate family are eligible to enter. An entry fee of $7 includes the cost of a post-race pancake breakfast. All participants will receive a special T-shirt. Awards will be given to the first overall male and female employee and to the first overall male and female dependent in each event. All runners/walkers who beat all the bosses in their respected event also will receive awards.

Early registration is encouraged. Applications are available at the KSC exercise facilities, NASA Exchange Stores, at the guard desk in the USA offices in Cape Canaveral or Titusville or at the PAFB gym. Contact Marty Winkel, 861-7502, for information. If you are not planning to participate but would like to help, call Kathy Jacobs, 861-7485.

Photographer built camera for Glenn's flight

By Lora Bartman

On Dec. 6, 1957, horrified spectators watched as the first U.S. attempt to place a satellite into orbit ended in catastrophic failure. Photographer Red Williams was there, watching from the sidelines as the Vanguard rocket rose just four feet off the pad on Cape Canaveral's Launch Complex 18A and then exploded into a huge fireball.

Williams had begun working for RCA, the photo contractor at the Cape, just nine months before, and had helped set up the cameras which captured the Vanguard mishap on film. The spectacular failure didn't deter him a bit from continuing his new career in the rapidly developing American space program. Williams ended up spending the next 41 years supporting the nation's quest to explore beyond Earth's boundaries, contributing to every human spaceflight effort as well as numerous uncrewed missions.

Initially, Williams repaired cameras for other RCA photographers and helped set up the ground cameras that captured prelaunch and launch images.

Following the successful suborbital flight of Alan Shepard in 1961, preparations began for the first orbital flight. Astronaut John Glenn was selected for this mission, just the third in NASA's Mercury program to carry a human being. The one-man Mercury spacecraft had a maximum orbiting mass of just 3,200 pounds and provided just 36 cubic feet of habitable space. "Weight was a very big issue back then," Williams recalled. "Every gram counted."

Even the weight of a small camera mattered. Known for his camera expertise, Williams was asked to modify further the off-the-shelf Ansco Autoset camera Glenn would carry into orbit. He removed any parts unnecessary to its basic function, such as decorative leather or metal and replaced the larger hand-pistol grip with a smaller one (see photo of camera on this page).

He did indulge in one luxury, adding a larger viewfinder taken off a Polaroid camera so Glenn would have a better view.

Circling the Earth three times over the course of a five-hour flight on Feb. 20, 1962, Glenn became the first American to take pictures of the Earth from space. Today, the camera Williams modified for Glenn resides in The Smithsonian's Air and Space Museum. Although Williams is not officially credited for his handiwork, he says knowing that he contributed to such an historic flight is what matters.

Williams went on to modify cameras for other astronauts to use in the Mercury program as well as its successor, Gemini. But as the lunar landing effort moved into full swing, Williams found himself working almost full-time modifying cameras for the astronauts to take into space, leaving no time for repairing those used on the ground. Eventually the workload became so great that the astronaut camera modification work was transferred to Johnson Space Center in Houston, where it remains today. Williams returned to working on the ground cameras that supported every human spaceflight effort after Gemini — including Apollo, Skylab, Apollo-Soyuz and Space Shuttle — as well as numerous uncrewed programs like Viking, Explorer and Pioneer.

THIS photo of Red Williams was taken at Launch Complex 17 on Cape Canaveral Air Station the day he retired from photographic support contractor The Bionetics Corp.

Red Williams retired this past January. Looking back, he counts Alan Shepard's flight and the Challenger accident as the two most memorable moments of his long tenure in the U.S. space effort. He feels proud knowing that photography, and his contribution to it, helped the nation succeed in space exploration. "Photography has been important to the space program," he observed. "The lessons-learned from those early photographs of the Vanguard explosion helped get us off the ground and into space."

Voyager 1 becomes most distant human-made object in space

In a dark, cold, vacant neighborhood near the very edge of our solar system, the Voyager 1 spacecraft has broken another record, becoming the explorer that has traveled farthest from home.


Voyager montage

At approximately 5:10 p.m. EST on Feb. 17, 1998, Voyager 1, launched more than two decades ago, cruised beyond the Pioneer 10 spacecraft and became the most distant human-created object in space, at 6.5 billion miles from Earth. The two are headed in almost opposite directions away from the Sun.

"For 25 years, the Pioneer 10 spacecraft led the way, pressing the frontiers of exploration, and now the baton is being passed from Pioneer 10 to Voyager 1 to continue exploring where no one has gone before," said Dr. Edward Stone, Voyager project scientist and Director of NASA's Jet Propulsion Laboratory (JPL).

"At almost 70 times farther from the Sun than the Earth, Voyager 1 is at the very edge of the solar system. The Sun there is only 1/5,000th as bright as here on Earth, so it is extremely cold, and there is very little solar energy to keep the spacecraft warm or to provide electrical power. The reason we can continue to operate at such great distances from the Sun is because we have radioisotope thermal electric generators (RTGs) on the spacecraft that create electricity and keep the spacecraft operating," Stone said. "The fact that the spacecraft is still returning data is a remarkable technical achievement."

Voyager 1 was launched from Launch Complex 41 on Cape Canaveral Air Station on Sept. 5, 1977.

"The Voyager mission today presents an unequalled technical challenge. The spacecraft are now so far from home that it takes nine hours and 36 minutes for a radio signal traveling at the speed of light to reach Earth," said Ed Massey, project manager for the Voyager Interstellar Mission at JPL. "That signal, produced by a 20-watt radio transmitter, is so faint that the amount of power reaching our antennas is 20 billion times smaller than the power of a digital watch battery."

Having completed their planetary explorations, Voyager 1 and its twin, Voyager 2, are studying the environment of space in the outer solar system. Although beyond the orbits of all the planets, the spacecraft still are well within the boundary of the Sun's magnetic field, called the heliosphere. Science instruments on both spacecraft sense signals that scientists believe are coming from the outermost edge of the heliosphere, known as the heliopause. Both spacecraft have enough electricity and attitude control propellant to operate until about 2020.


VOYAGER 1 began its remarkable journey with launch aboard a Titan Centaur on Sept. 5, 1977.

Counsel ...

(Continued from Page 1)

Goddard, combined with his expertise in the field of civil engineering, make him the ideal candidate to serve as Chief Counsel of Kennedy Space Center."

Anderson most recently served as Chief Counsel for the U.S. Army Corps of Engineers TransAtlantic Programs Center in Winchester, Va., providing legal oversight and support for the Corps' construction and operations and maintenance projects in Europe, the former Soviet Union, the Middle East and Africa. He has a bachelor of science degree in civil engineering from the University of Alabama. He earned his law degree from the same institution in 1975. Between engineering and law school, he was employed as a structural design engineer with Newport News Shipbuilding and Drydock Co., Newport News, Va.

Much of his professional legal career has involved the U.S. Army Corps of Engineers, beginning in June 1975 when he joined the Mobile District of the Corps in Alabama. Anderson went on to serve in a variety of additional posts with other Corps district and division offices in Tennessee, Nebraska and Virginia. He also spent about three years at NASA's Goddard Space Flight Center, Greenbelt, Md., where he was Deputy Chief Counsel.

Anderson also has been an instructor at the University of South Alabama, where he taught an undergraduate engineering course pertaining to legal matters of interest to practicing engineers.

He is a member of several honorary and professional engineering and legal societies and has served as an arbitrator on the American Arbitration Association's Commercial Arbitration Panel. He is licensed to practice law in several states, various U.S. District Courts, various U.S. Circuit Courts of Appeals and the Claims Court.

Given a professional background that combines the fields of law and civil engineering, Anderson said he is thrilled to be the new Chief Counsel at a place like Kennedy Space Center. Many of the facilities on both KSC and Cape Canaveral Air Station were designed and built with the assistance of the Army Corps of Engineers, including the massive Vehicle Assembly Building.

"I'm honored to have the opportunity to practice law at a facility with a history so rich in engineering achievements," Anderson said. "I look forward to serving NASA, KSC and the space program."

John F. Kennedy Space Center

Spaceport News

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