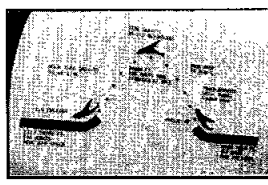




Spark adjustment

JSC's thermal protection test facility gets an upgrade that will help evaluate lighter, more durable materials. Story on Page 3.



Record ride

JSC's zero-gravity simulating KC-135 aircraft has broken the 100-parabola barrier. Story on Page 4.

Space News Roundup

Vol. 31

April 3, 1992

No. 14

Goldin takes charge at NASA

New administrator pledges to empower employees

By Kelly Humphries

Daniel Goldin took charge as NASA's new administrator this week, urging agency employees Wednesday to "seize the day" and assuring the news media Thursday that he will not be a "puppet" of the National Space Council.

Goldin said President George Bush and Vice President Dan Quayle have assured him that they will empower him to run the world's pre-

eminent space agency and that he, in turn, will do his best to empower NASA's employees to execute the agency's programs.

In a televised message to NASA employees Wednesday, the agency's ninth administrator said he plans to spend the next month or so listening and trying to gain a comprehensive understanding of NASA and all its programs. He said he plans to resist any urge to "shoot

from the hip."

Just hours before President Bush's nomination of Goldin was confirmed by the Senate on Tuesday night, outgoing Administrator Richard Truly bid the agency farewell.

In his farewell message, Truly recalled the many experiences of his career as an astronaut and manager at NASA and urged employees to work with their new administrator.

"You're going to need his support

and I know you're going to get it. But he's also going to need your support and I urge you to give it to him 100 percent and I know that you will," Truly said. "All I can say is keep up the great work, and I've loved every minute of it."

Goldin said he has asked JSC Director Aaron Cohen to stay on as acting deputy administrator to help coordinate the transition.

Please see **GOLDIN**, Page 4



Daniel Goldin

Lenoir quits space flight chief's post

Dr. William B. Lenoir resigned Monday as NASA's associate administrator for space flight, effective May 4.

Lenoir had held the post for three years, and during his tenure had seen 17 successful space shuttle launches and a major restructuring of the Space Station *Freedom* Program.

Following an earlier assignment as a scientist astronaut, NASA Administrator Richard Truly coaxed Lenoir back to the agency as

associate administrator for Space Station *Freedom* in May 1989. In July of that year, he was also named to lead the Office of Space Flight and later directed the consolidation of the two offices. He managed the combined organization until the creation of the Office of Space Systems Development in September 1991.

"Bill has had not one but two distinguished careers in the space program, and made a tremendous personal sacrifice to return to NASA in 1989," Truly said. "At the time I asked him to come back to NASA, he told me he could only commit to stay for about three years. In that short time, Bill has done an absolutely superb job in managing our space programs and the manned space flight centers." "It's been a rewarding three years," Lenoir said. "I'm particularly proud of the way the NASA team has conducted manned space flight activities during the time I've been here."

Lenoir first joined NASA in 1967 as an astronaut. He was a backup astronaut for Skylab 3 and 4 and flew as a mission specialist on STS-5.



NASA Electronic Photo

STS-45 crew members display an Oscar on *Atlantis*' flight deck during a special message recorded for the Academy of Motion Picture Arts and Sciences' Monday awards ceremony. Commander Charlie Bolden congratulated George Lucas, creator of the *Star Wars* and *Indiana Jones* movie trilogies, calling him "an explorer in his own right who has pushed the boundaries of cinematography and science fiction to excite imaginations and to inspire young and old throughout the world about this new ocean we call space."

Scientists laud ATLAS-1 data as watershed

By Kari Fluegel

Atlantis' seven astronauts returned to Houston on Thursday concluding STS-45, the first Mission to Planet Earth and the start of an extensive 11-year study of the atmosphere.

STS-45 ended at 5:24 a.m. CST Thursday when the orbiter carrying Commander Charlie Bolden, Pilot Brian Duffy, Mission Specialists Kathy Sullivan, Dave Leestma and Mike Foale and Payload Specialists Dirk Frimout and Byron Lichtenberg rolled to a stop at the Kennedy Space Center.

At press time, crew members were en route to Ellington Field to be welcomed by family, friends and co-workers.

Atlantis performed virtually without flaw during the nine-day flight.

"We believe it was an outstanding mission. The vehicle has performed very well," said Bill Lenoir, NASA's associate administrator for space flight. "We even had no small problems that we could attempt in the back rooms to blow up and make look more important than they actually were."

Please see **ATLANTIS**, Page 4



NASA chooses 19 new astronaut candidates

By Barbara Schwartz

NASA Tuesday announced the selection of 19 new astronaut candidates for the space shuttle program, including three JSC employees.

The 1992 group consists of four pilot astronaut candidates and 15 mission specialist astronaut candidates, including nine civilians and 10 military officers.

The candidates were chosen from 2,054 qualified applicants, 87 of whom received interviews and medical examinations in December

and January. Candidates will report to JSC in August to begin a year of training and evaluation, after which they will receive technical assignments leading to selection for shuttle flight crews.

Pilot candidates are:

U.S. Air Force Capt. Scott J. Horowitz, 35, experimental test pilot, Edwards AFB, Calif., BS, MS, Ph.D.

U.S. Navy, Lt. Cdr. Brent W. Jett Jr., 33, fighter pilot/squadron department head, USS *Saratoga*, NAS Oceana, Va., BS, MS.

Kevin R. Kregel, 35, aeronautical research pilot, JSC, Houston, civilian, BS, MPA.

U.S. Navy Lt. Cdr. Kent V. Rominger, 35, operations officer, NAS Miramar, San Diego, Calif., BS, MS.

Mission specialist candidates are:

Daniel T. Barry, 38, assistant professor, University of Michigan Medical Center, Ann Arbor, Mich., civilian, BS, MSE, MA, Ph.D., M.D.

U.S. Navy Cdr. Charles E. Brady Jr., 40, flight surgeon, NAS Whidbey

Island, Wash., M.D.

U.S. Air Force Capt. Catherine G. Coleman, 31, research chemist, Wright-Patterson AFB, Ohio, BS, Ph.D.

Michael L. Gernhardt, 35, vice president/general manager of Oceanering Space Systems, Webster, Texas, civilian, BS, MS, Ph.D.

John M. Grunsfeld, 33, senior research fellow at California Institute of Technology, Pasadena, Calif., civilian, BS, MS, Ph.D.

Please see **ASTRONAUT**, Page 4

Work begins on new Saturn Lane

By Kelly Humphries

Construction began this week on the new Saturn Lane and other JSC roadways that will provide easy access to Space Center Houston when it opens this fall and improve traffic flow in and around JSC.

The roadwork, which will permanently change how JSC employees enter the center from the south, was approved by the METRO board of directors last Thursday. The board awarded the \$3,997,645 contract to HUBCO Inc., the same contractor that is doing the site work for Space Center Houston.

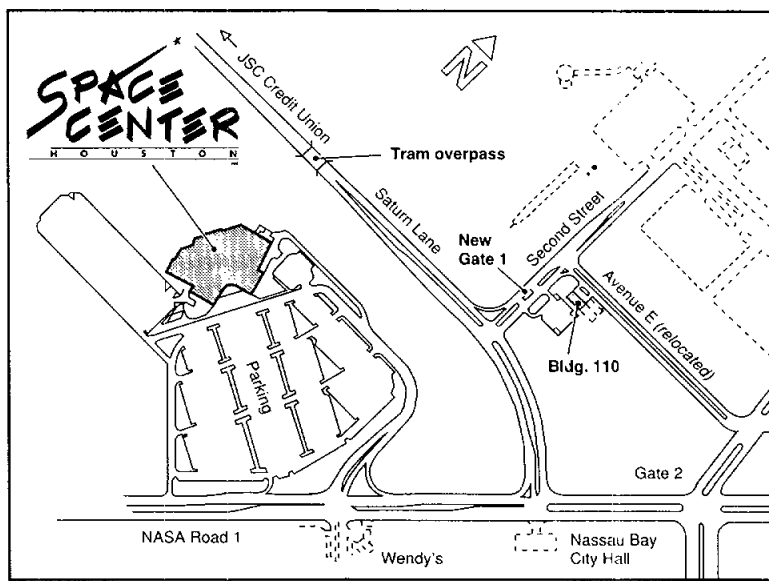
The project involves turning Saturn Lane into a four-lane, public thoroughfare that extends from Bay Area Blvd. to a new intersection with NASA Road 1 opposite the Nassau Bay City Hall. JSC is granting the easement for the road to the City of Houston, and moving its security fence to the north side of Saturn Lane. JSC's current main entrance will become the entrance to Space Center Houston. JSC traffic will use the new intersection, one block east. Avenue E will be relocated north of the new Bldg. 110 security badging office.

"These changes will help separate tourist traffic from JSC employee and

contractor traffic and provide visitors with easy access to Space Center Houston," said Harold S. Stall, president of the Manned Space Flight Education Foundation that is building the new visitor center. "It will also improve traffic circulation in and around JSC, and release to employees some 200 parking spaces that are now being used by visitors."

Related work will include the widening of Bay Area Blvd. to six lanes between Buccaneer and Saturn Lane, and the installation of traffic lights on Saturn at Gemini and Hercules. The total project is scheduled for completion by March 1993.

Please see **SATURN**, Page 4



Ultra Hot

Upgrade gives reentry test facility new tools for evaluating lighter, more durable thermal protection

By Kelly Humphries

When a space shuttle reenters the Earth's atmosphere, it takes a real pounding. Temperatures rise to about 2,900 degrees Fahrenheit on its nosecone and wing leading edges. Pressures on the outside of the spacecraft start to build. A sheath of plasma engulfs the vehicle, bathing the flight deck in an eerie orange glow.

Inside, crew members are confident the thermal protection system will keep the cabin temperature at a comfortable level, even though they are perspiring in their partial pressure flight suits.

Besides the practical evidence of 46 successful shuttle reentries, one of the things that bolsters the crew's confidence in the orbiter's ability to survive the buffeting of its journey back into the atmosphere is the testing at JSC's Atmospheric Reentry and Materials Structure Evaluation Facility in Bldg. 222.

There, a team of 22 engineers and technicians have tested every type of thermal protection used on American spacecraft since Gemini. Their work supports improvements in thermal protection system technology, better understanding of operational limitations and the life span of thermal protection materials, and the development of advanced concepts for new lunar and Mars exploration missions.

JSC has just completed a major upgrade of the ARMSEF, adding a new 12-foot-diameter vacuum test chamber, associated diffuser and aftercooler sections, a new large steam boiler to supply an existing steam ejector vacuum pumping system, and a new automated

control system for the facility. The existing facility's aging systems also were refurbished completely.

"The upgrade and modernization of JSC's test facility were accomplished through a dedicated team effort that crossed organizational lines," said Donald Tillian, head of JSC's Experimental Heat Transfer Section.

The Experimental Heat Transfer Section, which manages the ARMSEF for Engineering's Structures and Mechanics Division, Lockheed Engineering and Science Co.

employees who operate the facility, and the Center Operations Directorate's Facility Development and Plant Engineering Divisions worked together on the upgrade.

Lockheed, because of its familiarity with the facility, was able to provide about half of the materials needed as government furnished equipment to the general contractor, Harrop Inc. of Houston.

Walter Leuke, the NASA project engineer for Structures and Mechanics, said the \$4.9 million project was proposed in 1984. Actual construction began in 1989, and took 18 months to complete on schedule and on budget.

An operational readiness committee certified ARMSEF was ready to resume safe operations on Nov. 26, 1991.

"It was a very diverse, interdisciplinary type of project with

very good cooperation among all the various organizations," Leuke said. "One unique aspect was that Lockheed, because of its familiarity with the facility's operations, was able to support enhancements conceived during the project."

Gene Hajdik, project engineer for the Facility Development Division, said the project was an

heater surrounds the spark and becomes electrically heated. The heated gas expands and is expelled through nozzles of various sizes that shape it into a supersonic flow as it enters the vacuum chamber. The supersonic gas flow engulfs the thermal protection system models in reentry temperatures and

pressures, producing what can be seen through an observation port as the same kind of orange glow seen by shuttle astronauts on reentry.

"A test engineer looking in through the window first sees high temperature gases exiting from the nozzle," Tillian explained.

"Then a test model is placed into the gas stream and a supersonic shock envelopes the model. You see a supersonic shock and a glowing piece of TPS material."

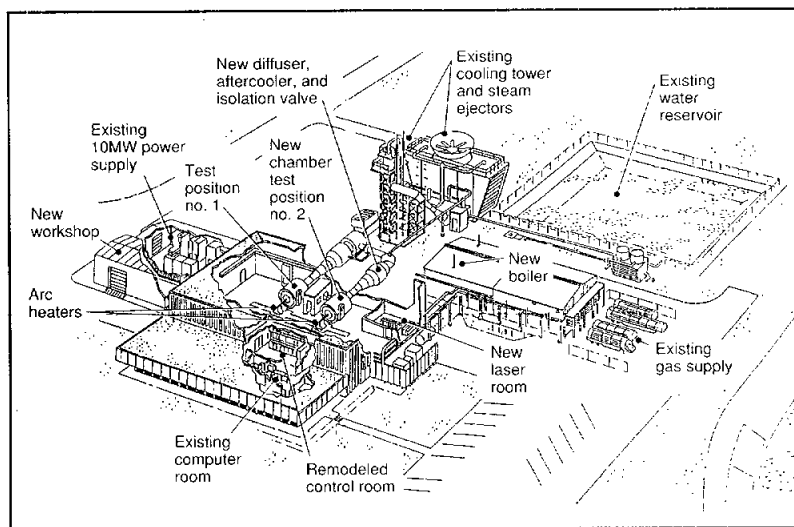
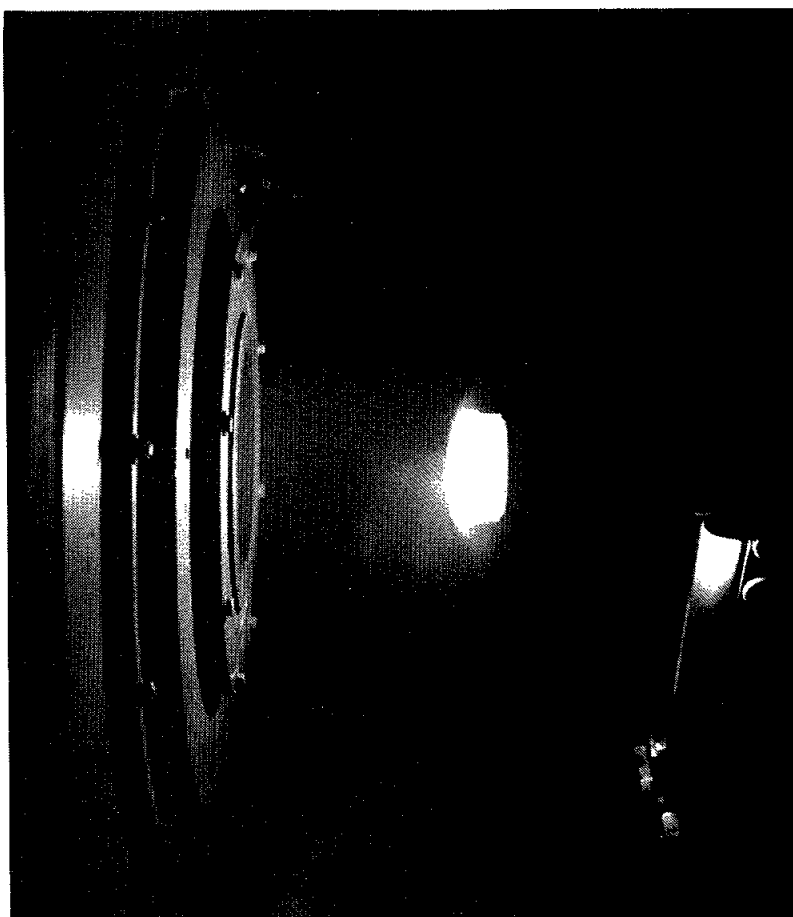
Using these techniques, the test chambers can produce surface pressures ranging from 20 to 300 pounds per square foot and surface temperatures from 1,200 to 3,400 degrees Fahrenheit.

Tillian cautioned that the chamber is nothing like standard wind tunnels, where scale models of aircraft are "flown."

"We don't fly little models in there," he said. "we heat shuttle orbiter components up to reentry temperatures and pressures."

Typically, small sections of

Left: A four-inch-diameter model of space shuttle reinforced carbon-carbon material undergoes reentry environment testing at 3,400 degrees Fahrenheit in JSC's Atmospheric Reentry and Materials Structure Evaluation Facility. The test is helping characterize temperature limits and mass loss of the material during transatlantic abort landings. Center: A map of the recently upgraded ARMSEF. Bottom left: A new 12-foot-diameter vacuum chamber is delivered to Bldg. 222. Bottom right: A Lockheed technician works on the 10 megawatt arc heater outside the new vacuum chamber.

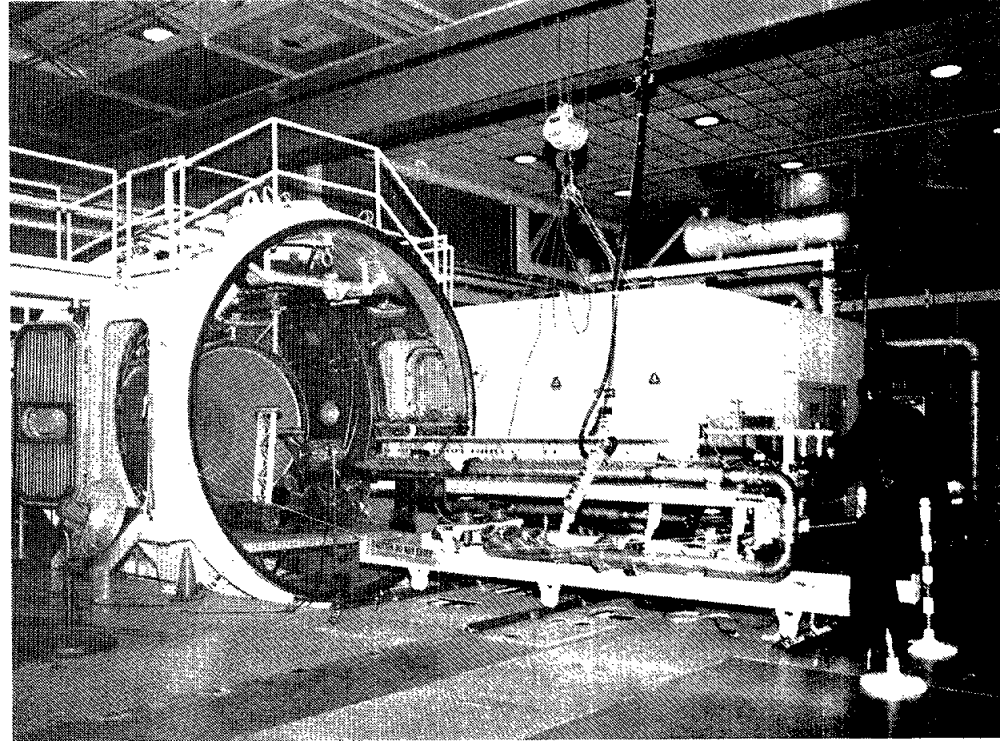
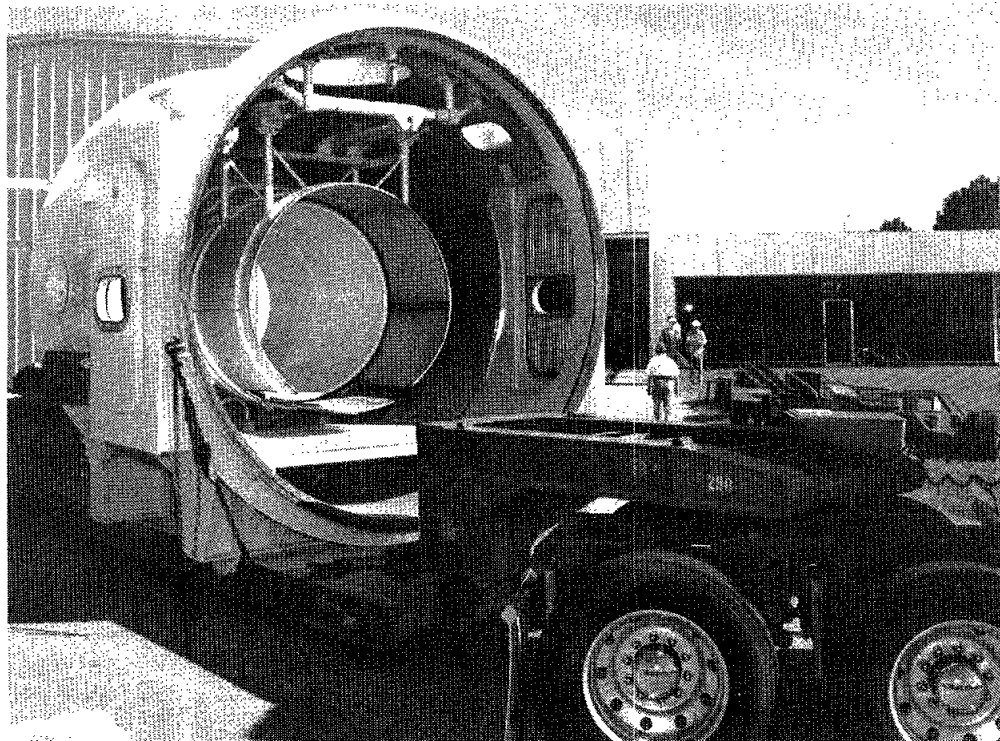


example of good cooperation among JSC organizations and contractors on construction of facilities project.

Lockheed's project engineer for the upgrade was James Grove.

The heart of the ARMSEF is a 10 megawatt arc heater that simulates the heat and pressure of reentry by electrically heating a gas mixture simulating air and expanding the flow through supersonic or hypersonic nozzles on models in a vacuum test chamber. Here's how it works:

High temperature gases for the simulation are produced as the arc heater uses its 10 megawatts of electrical power to generate a spark. Gas injected into the arc



Goldin: 'I don't know how to manage if I can't be in charge'

(Continued from Page 1)

Goldin emphasized four core issues that he believes are facing the civil space program at his Senate confirmation hearing last Friday and reiterated them in his message to employees Wednesday and his first news conference Thursday.

NASA must work to build a scientific understanding of the interactions of the human species in space, of what is happening to planet Earth, of what the solar system is made of and how those materials can be used by humans, he said, and NASA must recommit itself to supporting the aviation industry and keeping America a world leader in aeronautics.

"I view the space program as the future of America. It's the place

where we're making an investment rather than an expenditure," Goldin said. "As we end the first hundred years of powered flight and the first 35 years of space flight, America must prepare for a new century in which aeronautics and space will be an even greater part of life and commerce. NASA must push the edge of technology to enable the successful execution of our mission, and NASA must continue to transfer these technologies into the private sector to ensure our competitive posture."

Goldin also emphasized his belief in teamwork and the importance of total quality management.

"It's not a set of buildings, it's not a set of facilities, it's the human beings, the brilliance, the genius, the drive

that make NASA what it is," he told employees.

"Over the past five years at TRW, I have come to be a true believer in the value of total quality management to the successful and efficient operation of an organization," he testified during the confirmation hearing. "If you can't measure it, you can't manage it. I intend to bring this philosophy to NASA; to establish clearly defined goals and objectives, and to empower the employees to meet these goals."

Goldin said NASA is a symbol of America's competitive economic spirit, world technological leadership, and desire to explore and discover. American taxpayers have made a significant investment in

NASA, and gotten good return, he said, but the NASA team must work to give taxpayers even more value for their investment.

"I'd like to ask all of you, every employee of NASA to set clear goals for ourselves, goals that go beyond the norm," he said. "Not goals that are beyond the achievable but goals that will cause us to stretch."

Goldin said in his confirmation hearing that despite speculation over whether the National Space Council is positioning itself to interfere in the day-to-day business of the agency, he will "be in charge of NASA."

After quoting from the directive that established the space council and its prohibition of any interference from agencies' lines of authority, Goldin

said: "I don't know how to manage if I can't be in charge. I don't know how to manage if I don't have the confidence of my boss."

Formerly vice president and general manager of TRW Space and Technology Group, Goldin said he would use his business experience to help motivate the NASA team he joined 30 years ago, stressing teamwork, innovation and excellence.

He said he would work with Congress to accomplish the President's goal to deploy Space Station *Freedom* and Mission to Planet Earth by the end of the decade and would strive to maintain and improve the reliability and efficiency of the space shuttle as long as it is needed.

Truly favors flying teacher aboard shuttle

Outgoing NASA Administrator Richard Truly is recommending to his successor Daniel Goldin that NASA fly Barbara Morgan aboard the space shuttle.

"The time has come to begin a formal program of teaching from space," Truly said while presenting the National Aeronautic Association's Brewer Trophy at the National Congress on Aviation and Space Education in Oklahoma City last Thursday.



Morgan

"We use the medium of space to enhance education

in many areas. The next step for us will be to make routine a program of teaching from space by astronauts in space to take advantage of the weightless environment, the explanation of experiments that are onboard the space shuttle and the view of the Earth, the solar system, and the universe that the space shuttle provides. Later, we will continue the teaching from Space Station *Freedom* and I predict from the surface of the Moon and Mars.

To kick off this Teaching from Space Program in the most positive way, Truly said it is time for NASA to fly Barbara Morgan, who was back-up to Christa McAuliffe, who died in the *Challenger* accident. Truly said he had talked with Morgan, an elementary school teacher in McCall, Idaho, and that she is ready to fly on the shuttle.

"NASA senior management has reviewed this situation annually, and I am more than satisfied; I am eager," Truly said. "I'm making a recommendation to Dan Goldin that, once aboard and quickly, he take his own look and that he invite Barbara to join the crew of some appropriate mission. I have every confidence that this will happen soon."



The KC-135 crew and passengers that made a NASA record 101 parabolas included, left to right: John Cowley, Jack Jacob, Pilot Ace Beall, Charlie Gaever, Pilot A.J. Roy, Henry Marshall, Bob Williams, Jim Havard, Linda Billica and Louis Valle.

And one for good measure

They set a record, and no one got sick — not even once.

And no, it wasn't a pie- or chili-eating contest. It was the NASA record for the most parabolas flown in the zero-G simulating KC-135 on one flight.

The fateful day was March 6, said Bob Williams, JSC's test director for zero-G flights. After taking off from Ellington Field, a group of Marshall Space Flight Center and Lewis Research Center customers was trying to make up for time lost on account of rain. The LeRC group was experimenting with combustion in zero-G, while the MSFC group was working on containerless materials processing that uses sonic waves to suspend the subject matter.

But instead of flying the planned 72 parabolas — those gut-wrenching climbs and dives that provide about 30 seconds of zero gravity and give the KC-135 its nickname of "vomit comet" — the group decided to keep

going and take advantage of good weather and an abundance of fuel.

"At the end, the experiments still needed some more time," Williams said. "We pressed on, and as sure as we got 100, we were going to do one more."

The all-time parabola record of 125 in one flight, set by the Air Force in 1971, still stands. Since then, restrictions have been placed on how much fuel the plane is allowed to carry, so the "modern" record is still an impressive accomplishment, Williams said. The previous NASA record was 78 parabolas.

Williams, who made his first parabolic flight in 1971 and has been in charge of the test program at JSC since 1979, said the record is not expected to set any precedents or challenges.

"We just know we have the capability of doing that many parabolas if it is required," he said.

Ex-NASA chief James Webb dies

James E. Webb, NASA's second administrator and the man who steered the course for the first human landing on the Moon, died last Friday.

Webb, 85, apparently suffered a heart attack at Georgetown Hospital in Washington, D.C.

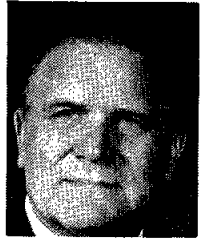
Administrator from Feb. 14, 1961, to Oct. 8, 1968, Webb managed the Mercury, Gemini and Apollo breakthroughs that led to Neil Armstrong's first step onto the surface of the Moon on July 20, 1969. Those milestones included America's first manned space flight and first orbital flight, first two-man flights, and first space walk.

Webb held other important positions in government, including executive assistant to the under secretary of the Treasury, director of the U.S. Bureau of the Budget and under secretary of State.

In business, Webb served as personnel director, treasurer and vice president of the Sperry Gyroscope Co.; director of Sperry Rand Corp.; president of Republic Supply Co.; and assistant to the president and director of Kerr-McGee Corp.

Webb was born in Granville County, N.C. and studied education at the University of North Carolina and law at George Washington University. He was a naval aviator with the Marine Corps during World War II.

Among the many honors he received were the Presidential Medal of Freedom, the Robert H. Goddard Memorial Trophy, the Collier Trophy and the General Accounting Office Award for Public Service.



Webb

Trajectory design, software pioneer John Mayer dies

John P. Mayer, director of JSC's Mission Planning and Analysis Division from 1963 to 1974, died Saturday at St. John Hospital.

Mayer, assistant director for data systems and analysis in the former Mission Support Directorate from 1974 until he retired in 1979, was one of the key people in trajectory design and software formulation—for both ground and spacecraft computers—through the Gemini and Apollo programs.

Mayer joined the National Advisory Committee on Aeronautics, NASA's forerunner, at Langley Research Center in 1944. His early research involved supersonic aircraft, including the X-1.

He was one of the 35 people originally assigned to the Space Task Group and Project Mercury in 1958.



Mayer

Astronaut candidates bring wealth of varied experience

(Continued from Page 1)

U.S. Navy Lt. Cdr. Wendy B. Lawrence, 32, physics instructor, U.S. Naval Academy, Annapolis, Md., BS, MS.

U.S. Navy Cdr. Jerry M. Linenger, 37, medical researcher, Naval Health Research Center, San

Diego, BS, MS, M.D., MPH, Ph.D.

U.S. Army Capt. Richard M. Linnehan, 34, clinical veterinarian, U.S. Army Element, Naval Ocean Systems Center, San Diego, Calif., BS, DVM.

U.S. Navy Lt. Cdr. Michael E. Lopez-Alegria, 33, ES-3A Program

Manager, Naval Air Test Center, NAS Patuxent River, Md., BS, MS.

Scott E. Parazyński, M.D., 30, civilian, emergency medicine resident, Denver, BS, M.D.

U.S. Navy Cdr. Winston E. Scott, 41, deputy director, Tactical Air Systems Dept., Naval Air Develop-

ment Center, Warminster, Pa. BA, MS.

Steven L. Smith, 33, payload flight controller, JSC, civilian, BS, MS, MBA.

Joseph R. Tanner, 41, deputy chief, Aircraft Operations Division, JSC, civilian, BS.

Andrew S. W. Thomas, 40, group supervisor-microgravity research, Jet Propulsion Laboratory, Pasadena, Calif., civilian, BE, Ph.D.

Mary E. Weber, 29, materials engineer, Texas Instruments (assignment to SEMATECH) Austin, Texas., civilian, BS, Ph.D.

Atlantis ends nine-day flight

(Continued from Page 1)

Atlantis' performance allowed mission managers to extend the mission one day for extra data collection with the Atmospheric Laboratory for Applications and Science instruments.

"These extra orbits really have been very valuable," said Mission Scientist Marsha Torr during a Wednesday news conference. "I believe we have established a historical data base that is truly unique. We may not ever again get one as comprehensive as this, at least not for a long time. I think it will be a true ref-

erence data base that we will use for many years to come."

Torr said the additional runs with the Atmospheric Trace Molecule Spectrometer, Grille Spectrometer will give team members several more data takes for comparison to the Upper Atmosphere Research Satellite and data takes at different attitudes.

She added that the extra day gave the Millimeter-Wave Atmospheric Sounder team an opportunity to fly its instrument in a south pointing attitude for the first time, acquiring the best chlorine monoxide measurements of the mission.

Space News Roundup

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Dates and Data submissions are due Wednesdays, eight working days before the desired date of publication.

Editor Kelly Humphries
Associate Editor Kari Fluegel

Saturn road work begins

(Continued from Page 1)

All traffic lanes are expected to remain open throughout the construction period, either through phased construction or detour lanes.

"METRO will make every effort to reduce the effect it has on our traffic flow," said Don Holick, JSC's project engineer for the Center Operations Directorate's Facility Development Division. "The portion at JSC will be done first, and the project then will move westward down to Bay Area Blvd."

Saturn Lane will be elevated about 15 feet over a tram crossing

that will run from Space Center Houston past Rocket Park, providing tours of JSC. Two new bridges will be built to cross the Houston Lighting and Power canal as Saturn intersects NASA Road 1.

The Saturn Lane improvements also include an asphalt overlay from Bay Area Blvd. to the current Credit Union gate and hike and bike trails on both sides of Saturn from the Credit Union gate to NASA Road 1.

According to Holick, Saturn Lane and the new JSC main entrance will be the first improvements completed.