NASA News Release ON LINE

JOHN F. KENNEDY SPACE CENTER

January 10, 1994
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KSC Release No. 1-94

Note to Editors/News Directors:
TCDT MEDIA OPPORTUNITIES WITH STS-60 CREW SET THIS WEEK

News media representatives this week will have an opportunity to photograph and talk informally with STS-60 crew members, including Russian cosmonaut Sergei Krikalev. The crew will be at KSC Jan. 11-14 for the Terminal Countdown Demonstration Test.

News media wishing to photograph the crew arriving in their T-38 aircraft must be at the press site by 4 p.m. tomorrow for transportation to the Shuttle Landing Facility.

On Thursday at 1 p.m., the STS-60 crew will be available for an informal question and answer session at Launch Pad 39A. News media representatives must be at the press site by 12 noon for transportation to the pad.

As part of their pre-launch training exercises, STS-60 commander Charles Bolden, pilot Kenneth Reightler, and mission specialists Franklin Chang-Diaz, Jan Davis, Ronald Sega and Krikalev will receive instructions on emergency escape procedures to be used at the pad in the event of a contingency.

At 8 a.m. Thursday, KSC's launch team will begin the mock countdown which extends until 11 a.m. Friday. On Friday morning, the crew will be awakened at about 6 a.m. and will practice launch day events including boarding the Shuttle Discovery and simulating preparing the orbiter for launch.

The six-member crew will return to the Johnson Space Center, Houston, Texas, Friday afternoon for final flight preparations.

Launch of Discovery is targeted for early February. NASA managers will set the official launch date on Jan. 25 at the Flight Readiness Review.

January 21, 1994

KSC Release No. 2-94

NOTE TO EDITORS/NEWS DIRECTORS:

GOES-I WEATHER SATELLITE ARRIVES IN FLORIDA FOR FINAL TESTS

The GOES-I weather satellite, to be launched aboard an Atlas Centaur rocket in mid-April, arrived today by C-5A air cargo plane at KSC's Shuttle Landing Facility. This is the first spacecraft to be launched in the new advanced series of geostationary weather satellites for the National Oceanic and Atmospheric Administration (NOAA).

The satellite will be transported today to Astrotech in Titusville where final testing and fueling will be performed. The spacecraft will be transported to Launch Complex 36 at the end of March for mating to the AC-73 Atlas 1 vehicle manufactured by General Dynamics.

GOES-I is a three-axis internally stabilized weather satellite which will be the first to have the capability of providing pictures while performing atmospheric sounding. These functions can be performed independently and simultaneously using sensors which are in constant view of the Earth. Current spin-stabilized satellite sensors view the Earth about five percent of the time.

The launch of GOES-I is currently targeted for April 12. The spacecraft will be called GOES-8 in orbit and after checkout will be positioned over the equator at 75 degrees west longitude. This coincides with a position over the Atlantic Ocean between North Carolina and Bermuda.

GOES-J will be launched next year which will then create an Eastern and Western satellite in what is called the GOES-Next series.

The Atlas 1 AC-73 rocket which will launch GOES-I arrived at Cape Canaveral Air Force Station by C-5 air cargo plane from General Dynamics San Diego, Calif., on January 13. Erection of the launch vehicle on Pad 36-B is scheduled to begin next week with the Atlas stage on Monday, Jan. 24 and the Centaur upper stage on Wednesday, Jan. 26.

The GOES-I spacecraft is built for NASA and NOAA by Space Systems/LORAL of Palo Alto, Calif. Major GOES-I subcontractors include ITT Aerospace Communications Division, Fort Wayne, Ind., which built the satellite's imager and sounder; Panametrics, Waltham, Mass., which built the high-energy proton and alpha detector, energetic particles sensor and the x-ray sensor; Schonstedt Instrument Company, Reston, Va., which built the magnetometer.

NASA's Goddard Space Flight Center in Greenbelt, Md., is responsible for the project management of the GOES program including final testing in Florida. NOAA manages the operational spacecraft program.

The Kennedy Space Center is responsible for government oversight of the Atlas 1 processing activities for AC-73, integration of the GOES-I spacecraft with the launch vehicle and launch countdown activities.

NASA's Lewis Research Center in Cleveland, Ohio, is responsible for the NASA launch services management. General Dynamics Corporation Commercial Launch Services of San Diego, Calif., is under contract to Lewis Research Center to provide launch services.

NASA's Office of Mission to Planet Earth, Headquarters, Washington, D.C., is responsible for GOES-I program management and associated government launch oversight.

NOTE TO EDITORS: There will be a media opportunity to witness and photograph the Atlas and Centaur erection by General Dynamics. Those representatives wishing to attend should be at the KSC News Center for transportation to Complex 36 at 10:15 a.m. on Monday, Jan. 24 for the Atlas

stage erection and at 10:15 a.m. on Wednesday, Jan. 26 for the Centaur stage erection. Spokesmen from General Dynamics will be on hand to answer questions about the operation. Media wishing to attend should check with the KSC News Center on Monday morning to assure that these times have not changed.

GO TO THE *KSC PRESS RELEASES* HOME PAGE

January 26, 1994

KSC Release No. 3-94

CEREMONY MARKING KSC'S SWITCH TO NATURAL GAS SET FOR FEB. 1

A ceremony commemorating the beginning of a new era of energy usage at NASA's Kennedy Space Center is scheduled for 11 a.m. on Tuesday, Feb. 1. Tuesday's ceremony will mark the start of an energy program that features environmentally-friendly and domestically-produced natural gas, which will be used throughout KSC for the foreseeable future. The event will be held in the Rocket Garden of Spaceport USA, the KSC visitors center, and is open to the public.

Diesel oil and gasoline have historically fueled most of the government-owned machinery and vehicles at America's Spaceport, but a gradual transition to natural gas-powered equipment and vehicles is now in the works. The first sections of the estimated 25-mile pipeline were set in place this week.

Last fall, KSC entered into a 10-year agreement with City Gas Company of Hialeah, Fla., a subsidiary of NUI Corporation of Bedminster, N.J., to provide natural gas for use at KSC and to construct the pipeline system. City Gas Co. is financing the entire cost of the pipeline, and no taxpayer funds are being used for the materials or construction of the system.

The pipeline will link much of KSC with a main natural gas spur located near the Orlando Utilities Commission facility, situated south of the NASA Causeway on U. S. Route 1. The pipeline will run along the public rights-of-way of the NASA Causeway and other KSC thoroughfares. Hydraulic dredging will enable the pipeline to cross underneath the Indian River, resulting in no permanent impact to boat traffic. All aspects of the dredging operation have been coordinated with appropriate federal and state officials to assure minimal impact to the Indian River's ecosystem.

Natural gas will eventually be used for many purposes, but one of the initial roles will be in the area of transportation. KSC, or General Services Administration, will convert 126 government buses, sedans, vans and light trucks from gasoline to natural gas-burning vehicles by the end of 1994.

To accommodate vehicle fueling needs, a natural gas service station will be constructed by June 1994. This station - which will be one of the nation's largest natural gas fuel stations - is unique in that it will be powered only by natural gas and solar energy and will operate completely independent of electrical power. Additionally, the station will feature state-of-the-art equipment.

The dozens of tour buses based at Spaceport USA will be converted to natural gas beginning in 1996, and many of the center's forklifts and delivery trucks will be running on natural gas in the years following. By the end of the decade, it is estimated that natural gas will be the fuel of choice for more than 75 percent of the space center's land-roving vehicles.

KSC's switch to natural gas will also result in a substantial decrease in combustion emissions around the center. By converting large hot water heaters, vehicles and miscellaneous other equipment to natural gas, the amount of sulfur dioxide and similar emissions will be reduced by about 99 percent by the year 2000. KSC's move to natural gas will also nearly eliminate the center's annual need for approximately 500 truckloads of petroleum fuel.

The featured speakers at Tuesday's ceremony include KSC Director Robert Crippen, NUI Corporation President and CEO John Kean, American Gas Association Senior Vice President Michael Germain and Natural Gas Vehicle Coalition Executive Director Jeffrey Seisler. Many other senior members of the aerospace and gas-related industries are also expected to be in attendance.

Members of the news media wishing to cover the ceremony may proceed directly to Spaceport USA's Rocket Garden. Public affairs representatives from NASA and NUI Corporation will be onsite to provide background material and to arrange interviews.

GO TO THE *KSC PRESS RELEASES* HOME PAGE

January 27, 1994

KSC Release No. 4-94

STS-60 COUNTDOWN TO BEGIN MONDAY

The countdown for launch of the Space Shuttle Discovery on mission STS-60 is scheduled to begin Monday, Jan. 31 at 4 a.m. EST, at the T-43 hour mark.

The countdown includes 32 hours and 10 minutes of built-in hold time leading to the opening of the launch window at 7:10 a.m. (EST) on Thursday, Feb. 3. The 2 hour, 30 minute window extends until 9:40 a.m.

The launch of Discovery will mark the beginning of the first Space Shuttle mission scheduled for this calendar year. The STS-60 mission will feature the deployable/retrievable Wake Shield Facility (WSF) and the second flight of the SPACEHAB Module.

WSF is a 12-foot diameter free-flyer stainless steel disk designed to produce an extremely high vacuum in its orbital wake. It will be deployed for 50 hours and fly at a distance of about 40 miles from the orbiter creating a vacuum wake 10,000 times greater than any produced on Earth.

The crew for mission STS-60 are: Commander Charles F. Bolden, Pilot Kenneth S. Reightler, and Mission Specialists N. Jan Davis, Ronald M. Sega, Franklin R. Chang-Diaz and Sergei Krikalev, the first Russian cosmonaut to fly on the Space Shuttle.

The STS-60 crew is scheduled to arrive at KSC at about 2:30 p.m. on Monday, January 31. Their activities at KSC for the days prior to launch include flight crew equipment fit checks, medical examinations and opportunities to fly in the Shuttle Training Aircraft and the T-38 trainers.

Beginning on Monday in Firing Room 1 of the Launch Control Center, the KSC launch team will start verifying all systems to assure the Shuttle is powered up and the data processing and backup flight control systems are operating trouble free.

Verifications will be conducted throughout the count to ensure reviews are being made of the flight software stored in the orbiter's twin memory banks. Computer controlled display systems will be activated and the backup flight system general purpose computer will be loaded.

Operations will also be underway to prepare the orbiter for on-board cryogenic loading. Later, orbiter navigation aids will be turned on and tested and the inertial measurement units will be activated.

Ground crews will make the final storage of mid-deck and flight deck supplies, perform microbial samplings of the flight crew's drinking water and check water levels in the crew waste management system.

At T-27 hours, the countdown will enter its first scheduled hold. This is a four-hour hold lasting from 8 p.m. to 12 midnight Monday.

When the countdown resumes, the launch pad will be cleared of all personnel in preparation for cryogenic fuel loading of the power reactant and storage distribution system tanks located under the payload bay lining. These tanks hold the super-cold liquid hydrogen and liquid oxygen reactants used by the orbiter's fuel cells to provide electricity to the orbiter and drinking water for the crew.

Cryogenic flow is scheduled to start at about 2 a.m. Tuesday and continue for about 5 hours.

As servicing of the cryogenic tanks concludes, the clock will enter another four-hour built-in hold at the T-19 hour mark. This hold will last from 8 a.m. to 12 noon on Tuesday.

Following cryogenic loading operations, the pad will be re-opened for scheduled pre-launch activities and the orbiter mid-body umbilical unit used to load the super-cold reactants in the orbiter's fuel cell tanks will be demated and retracted into the launch structure.

When the countdown resumes, technicians will complete final vehicle and facility closeouts and begin activating the orbiter's communications systems and configuring Discovery's cockpit for flight. The orbiter's flight control system and navigation aids will be activated. The stowable crew seats will be installed in the flight and mid-decks.

The countdown will enter another built-in hold at the T-11 hour mark at 8 p.m. Tuesday. This 20-hour, 50-minute hold will last until 4:50 p.m. Wednesday. During this hold, time critical equipment will be installed in the orbiter's cockpit and the inertial measurement units will be activated and warmed up.

At about 9 a.m. Wednesday, the Rotating Service Structure is scheduled to be moved away from the vehicle and placed in launch position.

At T-9 hours, about 6:50 p.m. Wednesday, the onboard fuel cells will be activated. At T-8 hours, the launch team will begin evacuating the blast danger area and clear the pad for loading the external tank with the super-cold cryogenic propellants for the orbiter's main engines. At T-7 hours, 30 minutes, conditioned air that is flowing through the orbiter's payload bay and other areas on the orbiter will be switched to gaseous nitrogen in preparation for fueling the external tank. The inertial measurement units will transition from the warm up stage to the operate/attitude determination mode at T-6 hours, 45 minutes.

The countdown will enter another planned built-in hold at the T-6 hour mark at 9:50 p.m. Wednesday. During this one-hour hold, final preparations for loading the external tank will be completed. Also, a pre-tanking weather briefing will be conducted for the benefit of the Mission Management Team prior to their giving approval to begin tanking operations.

Chilldown of the lines that carry the cryogenic propellants to the external tank usually begins when the clock starts counting again at 10:50 p.m. Wednesday. Filling and topping off the external tank should be complete about three hours later at the beginning of the next planned hold at T-3 hours, or about 1:50 a.m. Thursday.

During the two-hour hold at T-3 hours, an ice inspection team will conduct a survey of the external tank's outer insulation and other Shuttle components. Also, the closeout crew will be dispatched to the pad and begin configuring the crew module and white room for the flight crew's arrival. Liquid oxygen and liquid hydrogen will be in a stable replenish mode during this time to replace any propellant that "boils" off.

After entering the hold at T-3 hours, the six-member STS-60 crew will be awakened at about 2:15 a.m. Thursday.

Following breakfast, the crew will receive their briefing on weather conditions at KSC and around the world via satellite from Mission Control, Houston.

The flight crew will suit-up in their partial-pressure suits, then leave the Operations and Checkout Building at 3:55 a.m. Thursday. They will arrive at the pad 39A white room at about 4:25 a.m. where they will be assisted by white room personnel in getting into the crew cabin.

Just prior to the T-1 hour mark, the test team and the flight crew will get another weather update, including observations from chief astronaut Robert "Hoot" Gibson flying in a Shuttle Training Aircraft in the KSC area.

The last two built-in holds will be 10 minutes in duration and will occur at the T-20 minute mark (6:30 a.m.) and at

the T-9 minute mark (6:51 a.m.). During the final hold, the flight crew and ground team receive the NASA launch director's and the mission management team's final "go" for launch.

Milestones after the T-9 minute mark include start of the ground launch sequencer; retraction of the orbiter access arm at T-7 minutes, 30 seconds; start of the orbiter's auxiliary power units at T-5 minutes; pressurization of the liquid oxygen tank inside the external tank at T-2 minutes, 55 seconds; pressurization of the liquid hydrogen tank at T-1 minute, 57 seconds; ground power disconnection from the orbiter at T-50 seconds; and the electronic "go" to Discovery's onboard computers to start their own terminal countdown sequence at T-31 seconds. The orbiter's three main engines will start at T-6.6 seconds.

COUNTDOWN MILESTONES

Launch - 3 Days (Monday, Jan. 31)

Prepare for the start of the STS-60 launch countdown and perform the call-to-stations at the T-43 hour mark. Countdown begins at 4 a.m. All members of the launch team report to their respective consoles in Firing Room 1 in the Launch Control Center for the start of the countdown.

Enter the first planned built-in hold at T-27 hours for a duration of four hours.

Check out back-up flight system and review flight software stored in mass memory units and display systems. Load backup flight system software into Discovery's general purpose computers.

Begin stowage of flight crew equipment. Inspect the orbiter's mid-deck and flight-deck and remove crew module platforms. Start external tank loading preparations and prepare the Shuttle's main engines for main propellant tanking and flight. Perform test of the vehicle's pyrotechnic initiator controller.

Launch - 2 Days (Tuesday, Feb. 1)

Resume countdown. Start preparations for servicing fuel cell storage tanks and begin final vehicle and facility closeouts for launch.

Clear launch pad of all personnel and begin loading liquid oxygen and liquid hydrogen reactants into Discovery's fuel cell storage tanks.

After loading operations, the pad will be reopened for normal work. Orbiter and ground support equipment closeouts will resume.

Enter planned built-in hold at T-19 hours for a duration of 4 hours. Demate orbiter mid-body umbilical unit. Resume countdown.

Activate orbiter communications systems, flight control and navigation systems. Install mission specialists' seats in crew cabin. The tail service masts on the mobile launcher platform will be closed out for launch.

Enter planned hold at T-11 hours for a duration of 20 hours, 50 minutes.

Launch - 1 Day (Wednesday, Feb. 2)

Perform orbiter ascent switch list in crew cabin. During this hold at T-11 hours, the orbiter's inertial measurement units will be activated and kept in the "warm up" mode and film will be installed in the numerous cameras on the launch pad. In addition, safety personnel will conduct a debris walkdown and the pad sound suppression system water tank will be filled.

The Rotating Service Structure will be moved to the park position during the T-11 hour hold at about 9 a.m.

Final stowage of mid-deck experiments and flight crew equipment stowage will begin.

Resume countdown. Install time critical flight crew equipment and perform the pre-ingress switch list. Start fuel cell flow-through purge.

Activate the orbiter's fuel cells. Configure communications at Mission Control, Houston, for launch. Clear the blast danger area of all non-essential personnel and switch Discovery's purge air to gaseous nitrogen.

Enter planned one-hour built-in hold at the T-6 hour mark.

Launch team verifies there are no violations of launch commit criteria prior to cryogenic loading of the external tank. Clear pad of all personnel.

Resume countdown. Loading the external tank with cryogenic propellants is targeted to begin at about 10:50 p.m.

Launch Day (Thursday, Feb. 3)

Complete filling the external tank with its flight load of liquid hydrogen and liquid oxygen propellants.

Perform inertial measurement unit preflight calibration and align Merritt Island Launch Area tracking antennas.

Enter two-hour hold at T-3 hours.

Perform open loop test with Eastern Space and Missile Center and conduct gimbal profile checks of orbital maneuvering system engines.

Wake flight crew at 2:15 a.m. Closeout crew and ice inspection team proceeds to Launch Pad 39A.

Resume countdown at T-3 hours.

Crew departs Operations and Checkout Building for the pad at 3:55 a.m.

Complete closeout preparations in the white room and cockpit switch configurations.

Flight crew enters orbiter. Astronauts perform air-to-ground voice checks with Mission Control, Houston. Close Discovery's crew hatch. Begin Eastern Space and Missile Center final network open loop command checks.

Perform hatch seal and cabin leak checks. The white room is closed out and the closeout crew moves to fallback area. Primary ascent guidance data is transferred to the backup flight system.

Enter planned 10-minute hold at T-20 minutes.

NASA Shuttle Test Director conducts final briefing.

Resume countdown. Transition orbiter onboard computers to launch configuration and start fuel cell thermal conditioning. Close orbiter cabin vent valves. Backup flight system transitions to launch configuration.

Enter last planned hold at T-9 minutes.

Launch Director and Mission Management Team complete final polls for launch.

Resume countdown and:

Start automatic ground launch sequencer (T-9:00 minutes)
Retract orbiter crew access arm (T-7:30)
Start mission recorders (T-5:30)
Start Auxiliary Power Units (T-5:00)
Arm SRB and ET range safety safe and arm devices (T-5:00)
Start liquid oxygen drainback (T-4:55)
Start orbiter aerosurface profile test (T-3:55)
Start MPS gimbal profile test (T-3:30)
Pressurize liquid oxygen tank (T-2:55)

Begin retraction of the gaseous oxygen vent arm (T-2:55)
Fuel cells to internal reactants (T-2:35)
Pressurize liquid hydrogen tank (T-1:57)
Deactivate SRB joint heaters (T-1:00)
Orbiter transfers from ground to internal power (T-0:50 seconds)
LPS go for start of orbiter automatic sequence (T-0:31 seconds)
Ignition of Shuttle's three main engines (T-6.6 seconds)
SRB ignition and liftoff (T-0)

SUMMARY OF HOLDS AND HOLD TIMES FOR STS-60

T-TIME/LENGTH OF HOLD/HOLD BEGINS /HOLD ENDS

T-27 hours / 4 hours / 8 pm Mon. - 12 mid. Mon.
T-19 hours / 4 hours / 8 am Tues. - 12 noon Tues.
T-11 hours / 20 hrs., 50 mins. / 8 pm Tues. - 4:50 pm Wed.
T-6 hours / 1 hour / 9:50 pm Wed. - 10:50 pm Wed.
T-3 hours / 2 hours / 1:50 am Thurs. - 3:50 am Thurs.
T-20 minutes / 10 minutes / 6:30 am Thurs. - 6:40 am Thurs.
T-9 minutes / 10 minutes / 6:51 am Thurs. - 7:01 am Thurs.

CREW FOR MISSION FOR STS-60

Commander (CDR): Charles F. Bolden
Pilot (PLT): Kenneth S. Reightler
Mission Specialist (MS1): N. Jan Davis
Mission Specialist (MS2): Ronald M. Sega
Mission Specialist (MS3): Franklin R. Chang-Diaz
Mission Specialist (MS4): Sergei K. Krikalev

SUMMARY OF STS-60 LAUNCH DAY CREW ACTIVITIES

Thursday, Feb. 3, 1994

2:15 a.m. - Wake up
2:45 a.m. - Breakfast
3:15 a.m. - Weather briefing (CDR, PLT, MS2)
3:15 a.m. - Don flight equipment (MS1, MS3, MS4)
3:25 a.m. - Don flight equipment (CDR, PLT, MS2)
3:55 a.m. - Depart for launch pad 39-A
4:25 a.m. - Arrive at white room and begin ingress
5:40 a.m. - Close crew hatch
7:10 a.m. - Launch

GO TO THE *KSC PRESS RELEASES* HOME PAGE

January 27, 1994

KSC Release No. 5-94

NOTICE TO EDITORS/NEWS DIRECTORS:

NEWS CENTER HOURS OF OPERATION, EVENTS SET FOR MISSION STS-60

KSC's News Center operating hours have been set for the upcoming launch of the Space Shuttle Discovery on Mission STS-60. Countdown status briefings will be held next week at the KSC Press Site auditorium and media events in connection with the launch have been outlined.

The six STS-60 crew members are scheduled to arrive at KSC on Monday, Jan. 31, at 2:30 p.m. News media representatives wishing to cover the event need to be at the News Center by 1:30 p.m. Monday for transportation to the Shuttle Landing Facility. Arrival of the STS-60 astronauts will be carried live on NASA Select.

News media representatives will have an opportunity to discuss the status of the launch countdown with NASA test directors during three briefings at the News Center next week. The following briefings will be carried live on NASA Select. (A separate news release will be issued detailing briefings to be held the day before launch at KSC.)

L-3 Countdown Status briefing - Jan. 31 - 9 a.m. EST
Mike Leinbach, Shuttle Test Director
Roelof Schuiling, STS-60 Payload Manager

L-2 Countdown Status - Feb. 1 - 9 a.m. EST
Al Sofge, Shuttle Test Director
Roelof Schuiling, STS-60 payload manager
Ed Priselac, Shuttle Launch Weather Officer

L-1 Countdown Status - Feb. 2 - 9 a.m. EST
Bill Dowdell, NASA Test Director
Roelof Schuiling, STS-60 payload manager

News Center hours are as follows:

(Launch minus 3 days) Monday, Jan. 31	7 a.m. - 4:30 p.m.
(Launch minus 2 days) Tuesday, Feb. 1	7 a.m. - 4:30 p.m.
(Launch minus 1day) Wednesday, Feb. 2	7 a.m. - around the clock -
Flight day 1, Thursday, Feb. 3-(Launch day)	- 7 p.m.
Flight day 2, Friday, Feb. 4	7 a.m. - 5:30 p.m.
Flight days 3-4, Feb. 5-6	CLOSED
Flight days 5-8, Feb. 7-11	7 a.m. - 5:30 p.m.
Landing Day, Friday, Feb. 11	7 a.m. - 5:30 p.m.

News media representatives may obtain STS-60 mission credentials and annual Shuttle badges at the Pass and Identification Building at Gate 2 on State Road 3, Merritt Island, during the following times: 8 a.m. to 4:30 p.m. Monday, Jan. 31 and Tuesday Feb. 1; 8 a.m. to 6 p.m. Wednesday, Feb. 2; and from 2 - 6 a.m. on launch day.

News media are reminded to sign the log book at the photo and interview counter in the News Center.

NEWS MEDIA ARE REQUIRED TO BE UNDER PUBLIC AFFAIRS ESCORT EXCEPT WHEN DRIVING TO THE NEWS CENTER OR THE COMPLEX 39 CAFETERIA.

GO TO THE *KSC PRESS RELEASES* HOME PAGE

February 1, 1994

KSC Release No. 6-94

INSTALLATION OF STS-60 TIME CRITICAL EXPERIMENTS BEGINS TODAY

Final payload prelaunch preparations begin tonight at Pad A on Complex 39 with the late stowage of time critical experiments aboard SPACEHAB-2 and will continue on Wednesday on Discovery's mid-deck.

The SPACEHAB module will be powered up for flight at 5 p.m. today. Then, at launch minus 33 1/2 hours which is at 9:40 p.m., SPACEHAB-2 stowage activities will begin with the "MVAK" operation, which stands for Module Vertical Access Kit. Specially trained technicians from SPACEHAB Incorporated and McDonnell Douglas, will be lowered down inside the SPACEHAB-2 module.

To be installed by the technicians are ASTROCULTURE, an experiment to validate the performance of plant growth technologies in the microgravity environment of space, and ORSEP, an organic separation of cells and polymers experiment which could produce a pure laboratory materials sample not achievable in gravity. An Interface Verification Test (IVT) for each experiment will follow.

Next, support equipment will be installed aboard SPACEHAB-2 for two experiments which are located on Discovery's mid-deck: the Commercial Generic Bioprocessing Apparatus (CGBA) and the Commercial Protein Crystal Growth (CPCG) experiment. Also undergoing installation at this time is the support equipment necessary for the Stirling Orbiter Refrigerator Freezer unit (SORF). In addition, SPACEHAB-2 flight data file to be used by the astronauts will be installed, and the Three Dimensional Microgravity Accelerometer (3-DMA) and the SORF will be powered on for flight. Conclusion of the SPACEHAB-2 MVAC activities is nominally scheduled for 2:40 a.m. on Wednesday at the launch minus 28 1/2 hour mark in the countdown.

Approximately 7 1/2 hours later, the mid-deck stowage operations will follow with the installation of the CGBA and CPCG experiments and followed by a brief Interface Verification Test. Then the Bioserve Pilot Laboratory (BPL) experiment trays will be installed. This experiment is designed to mix sample fluids to gather biomedical and fluid science data. This will be followed by installation of the experiment trays for CGBA.

Next to be placed into the mid-deck will be the Immunology-Mission 1 (Immune-1) experiment consisting of 12 rodents for the study of a drug to suppress reduction in the immune system, and the Penn State Biomodule (PSB) to study biological systems and chemical reactions under the influence of microgravity.

All STS-60 time critical experiments should be in place by 4:40 p.m. on Wednesday, or launch minus 14 1/2 hours.

GO TO THE *KSC PRESS RELEASES* HOME PAGE

February 3, 1994

KSC Release No. 7-94

Note to Editors/News Directors:
USMP-2/OAST-2 PAYLOAD FOR STS-62 AVAILABLE FOR SHOWING FRIDAY

The second United States Microgravity Payload (USMP-2) to fly on the next Space Shuttle mission, STS-62 with Columbia, will be available for viewing by the news media on Friday, Feb. 4. at 1 p.m.

USMP-2 consists of five major microgravity science experiments and an acceleration measurement package. The experiment hardware is mounted on a pair of Mission Peculiar Experiment Support Structures (MPESS). OAST-2 is a collection of five In-Space Technology Experiment Program (IN-STEP) experiments, all designed to develop or extend space flight technology. The payload is also mounted on an MPESS carrier.

Media representatives will be taken to the Operations and Checkout Building (O&C) to view these two payloads which are installed in the payload canister ready for transportation to the payload changeout room at Pad 39-B. The STS-62 KSC payload manager, Russ Lunnen, will be available to answer questions.

Those wishing to attend should be at the KSC News Center at 1 p.m. on Friday for transportation to the O&C building. In the facility, no special attire will be required. However, media are requested not to wear shorts or skirts. No flame producing devices are permitted, and all photography equipment must be self-contained as no external power is available.

Project management for USMP-2 is by the Marshall Space Flight Center in Huntsville, Al. Project management for OAST-2 is by the Goddard Space Flight Center in Greenbelt, Md. Program Management for USMP-2 and OAST-2 is by the Office of Life and Microgravity Science and Applications, and the Office of Advanced Concepts and Technology.

GO TO THE *KSC PRESS RELEASES* HOME PAGE

February 11, 1994

KSC Release No. 8-94

Note to Editors/News Directors:
SPACE RADAR LABORATORY READY FOR FACILITY TRANSFER--MEDIA PHOTO OPPORTUNITY SCHEDULED FEB. 14

Space Radar Laboratory 1 (SRL-1), the primary payload for STS-59, will be transferred on Monday, Feb. 14, from the Operations and Checkout Building (O&C) to bay 1 of the Orbiter Processing Facility (OPF) for installation into Endeavour.

Testing the payload using the Cargo Integrated Test Equipment has been successfully completed verifying the SRL-1 mission readiness and its electrical compatibility with the Space Shuttle. Members of the STS-59 flight crew participated in portions of these tests which were conducted in mid-January.

SRL-1 will be installed into the payload bay of Endeavour on Feb. 15. This will be followed by a five-day Interface Verification Test which begins Feb. 18 to verify electrical connections and payload readiness. On Feb. 24 an end-to-end test will be performed to verify the SRL-1 compatibility with the NASA Communications Network which provides communications between SRL-1 in the payload bay, the Tracking and Data Relay Satellite, the Goddard Space Flight Center in Greenbelt, Md., and Mission Control at the Johnson Space Center in Houston. This will complete the major prelaunch tests.

The main payload for SRL-1 is the Spaceborne Imaging Radar C/X-Band Synthetic Aperature Radar (SIR-C/X-SAR), a sophisticated set of radars that fills nearly all of Endeavour's payload bay. SIR-C, built by the Jet Propulsion Laboratory and the Ball Communications Systems Division for NASA, is a two-frequency radar including L-band (23-cm wavelength) and C-band (6-cm wavelength). X-SAR, provided by the German and Italian space agencies is a single frequency X-band radar (3-cm wavelength). Scientists will use SIR-C/X-SAR to study how our global environment is changing. The science team is particularly interested in studying the amount of vegetation coverage, the extent of snow packs, wetlands areas, geologic features such as rock types and their distribution, volcanic activity, ocean wave heights and wind speed.

SRL-1 also includes the Measurement of Atmospheric Pollution from Satellites (MAPS) instrument which will study carbon monoxide concentrations in the middle troposphere on a global scale. Launch is targeted for early April.

The C-band, X-band and L-band instruments are a joint project between NASA, the German Space Agency and the Italian Space Agency. The Jet Propulsion Laboratory, Pasadena, Calif., manages the project for NASA. The Langley Research Center in Hampton, Va., is responsible for the MAPS instrument.

NOTE TO EDITORS: On Monday, Feb. 14 media will have an opportunity to see and photograph the Space Radar Laboratory before it goes to the OPF. Media will also observe the payload canister doors closing for the move to the OPF. Those wishing to attend must be at the KSC News Center at 8:15 a.m. for transportation to the O&C.

Flash photography will be permitted. However, all equipment should be self contained since no external power will be available. Since some photography will be from elevated work platforms, straps or tethers will be required for all cameras. No white room attire is necessary, but long pants and flat closed-toe shoes are required. STS-59 KSC Payload Manager Scott Higginbotham and Deputy Project Manager Neil Herman from the Jet Propulsion Laboratory will be available to answer questions.

PREVIOUS LANDINGS AT KSC

1) STS 41-B - Challenger, Feb. 11, 1984
2) STS 41-G - Challenger, Oct. 13, 1984
3) STS 51-A - Discovery, Nov. 16, 1984
4) STS 51-C - Discovery, Jan. 27, 1985
5) STS 51-D - Discovery, April 19, 1985
6) STS-38 - Atlantis, Nov. 20, 1990
7) STS-39 - Discovery, May 6, 1991
8) STS-43 - Atlantis, Aug. 11, 1991
9) STS-45 - Atlantis, April 2, 1992
10) STS-50 - Columbia, July 9, 1992

11) STS-46 - Atlantis, Aug. 8, 1992
12) STS-47 - Endeavour, Sept. 18, 1992
13) STS-52 - Columbia, Nov. 1, 1992
14) STS-54 - Endeavour, Jan. 19, 1993
15) STS-56 - Discovery, April 17, 1993
16) STS-57 - Endeavour, July 1, 1993
17) STS-51 - Discovery, Sept. 22, 1993
18) STS-61 - Endeavour, Dec. 13, 1993

KSC End Of Mission Landing Weather Constraints

At decision time for the deorbit burn (about 90 minutes before landing), general weather restrictions for a KSC landing are specified in part as:

* Visibility must be five miles or greater;

* Peak surface winds must be less than 20 knots in any direction;

* The peak crosswind must not exceed 15 knots, 12 knots at night. If the mission duration is greater than nine days the limit is 12 knots, day or night;

* The cloud ceiling must be greater than 10,000 feet. For scattered clouds below 10,000 feet, cloud cover must be observed to be less than 20 percent;

* There can be no precipitation at the surface or aloft in the proximity of the orbiter's glide path;

* Thunderstorms, rain or the potential for lightning cannot exist within 30 nautical miles of the landing site;

* Vertical cloud clearance at the 30 nautical mile range must be greater than 2 nautical miles.

KSC Ground Operations

Once the orbiter is on the ground, safing operations will commence and the flight crew will prepare the vehicle for post-landing operations. The Crew Transport Vehicle (CTV) will be used to assist the crew, allowing them to egress the vehicle and doff their launch and re-entry suits easier and quicker.

The CTV and other KSC landing convoy operations have been in an "on-call" status since the launch of Discovery Feb. 3. The primary functions of the Space Shuttle recovery convoy are to provide immediate service to the orbiter after landing, prepare the orbiter for towing to the Orbiter Processing Facility and assist crew egress.

Convoy vehicles are stationed at the SLF's mid-point. About two hours prior to landing, convoy personnel don SCAPE suits, or Self Contained Atmospheric Protective Ensemble, and communications checks are made.

A warming up of coolant and purge equipment is conducted and nearly two dozen convoy vehicles are positioned to move onto the runway as quickly and as safely as possible once the orbiter coasts to a stop. When the vehicle is deemed safe of all potential explosive hazards and toxic gases, the purge and coolant umbilical access vehicles move into position at the rear of the orbiter.

Following purge and coolant operations, flight crew egress preparations will begin and the CTV will be moved into position at the crew access hatch located on the orbiter's port side.

Once access to the vehicle is gained, a physician will board the shuttle and conduct a brief preliminary examination of the astronauts. The crew will then make preparations to leave the vehicle.

About 2 hours, 40 minutes after landing, the orbiter will be towed to Orbiter Processing Facility bay 1 for post-flight deservicing and preparations will begin for its next scheduled mission, STS-64, in September.

Following departure from the SLF, the crew will be taken to their quarters in the O&C Building, meet with their

families, undergo a physical examination and depart for the skid strip at Cape Canaveral Air Force Station for their flight back to JSC.

The crew is planning to depart for JSC roughly 5 to 6 hours after landing. The exact time of departure will be determined following touchdown.

In the event a landing at KSC is not feasible and Discovery lands at Edwards, an augmented KSC convoy team will be on-site to safe the vehicle, disembark the crew and move the orbiter to the Mate/Demate Device. The turn around team will be deployed to Edwards by charter aircraft on landing day.

NOTICE TO EDITORS: Specific information is available at the KSC news center regarding news media departure times for the SLF, photo opportunities, the post landing press conference and news center operational hours.

GO TO THE *KSC PRESS RELEASES* HOME PAGE

February 10, 1994

KSC Release No. 9-94

DISCOVERY SCHEDULED TO LAND AT KSC

The orbiter Discovery is scheduled to land at Kennedy Space Center on Friday, Feb. 11 at 12:44 p.m. EST, at the conclusion of its current STS-60 mission, which began Feb. 3 from KSC.

Landing of Discovery at KSC's Shuttle Landing Facility (SLF) is slated for orbit 130 at mission elapsed time of 8 days, 5 hours and 34 minutes. Deorbit burn will occur on orbit 129 at about 11:38 a.m. Friday, at 8 days, 4 hours and 28 minutes.

A second landing opportunity for Friday occurs on orbit 131 at about 2:17 p.m. A single landing opportunity also exists on Friday for Edwards Air Force Base, Calif., at 3:47 p.m. EST.

Two additional opportunities for landing at KSC exist on Saturday at about 12:59 p.m. and 2:32 p.m. Two more opportunities for landing at Edwards exist on Saturday: 2:45 p.m. and 4:14 p.m. EST.

During descent for landing at KSC on Friday, Discovery will enter Florida airspace near Jacksonville and travel southeast down the northeastern coast of the state. Discovery will pass over the cities of St. Augustine, Daytona Beach and Titusville before landing at KSC's SLF. The orbiter will pass over the Florida/Georgia border about 9 minutes before touchdown at an altitude of about 115,100 feet, traveling at a speed of about Mach 5. The orbiter will pass north of Daytona Beach about 7 minutes before touchdown at an altitude of about 87,200 feet, traveling at a speed of about Mach 3.

Shuttle Landing Facility

The SLF was built in 1975. It is 300 feet wide and 15,000 feet long with 1,000 foot overruns at each end. The strip runs northwest to southeast. It is located about 3 miles northwest of the Vehicle Assembly Building.

The up-coming landing of Discovery, if weather permits, will be the nineteenth landing at KSC in the 12-year history of Space Shuttle flight. It is the first of eight planned KSC landings scheduled for this year.

GO TO THE *KSC PRESS RELEASES* HOME PAGE

February 10, 1994

KSC Release No. 10-94

Note to Editors/News Directors:
KSC TO HOST ANNUAL COMMUNITY LEADERS' BREAKFAST ON FEB. 16

KSC Director Robert Crippen will give details on the space center's impact on Brevard County, provide an inside look at what is happening in the Shuttle program and address NASA's budget issues at the annual community leaders' breakfast on Feb. 16 at Spaceport USA.

Community leaders will also view the newest attraction at Spaceport USA: the high-fidelity, life-size replica of a Space Shuttle orbiter which has been named "Explorer." Guided tours will be given of the Vehicle Assembly Building as well as the new Space Station Processing Facility and the Center for Space Education, both now under construction.

Almost 300 are expected to attend the half-day event which begins with a continental breakfast at 8 a.m. in the Orbit Cafeteria at the visitors center.

Media representatives are invited to attend the events listed above and should contact the KSC News Center at 867-2468 to make arrangements.

GO TO THE *KSC PRESS RELEASES* HOME PAGE

NASA News Release ON LINE

JOHN F. KENNEDY SPACE CENTER

February 10, 1994
KSC Contact: Bruce Buckingham
KSC Release No. 11-94

COLUMBIA ROLLED OUT TO PAD 39B

Rollout of the Space Shuttle Columbia from the Vehicle Assembly Building to Launch Pad 39B occurred today with first motion beginning at 3:15 a.m. Columbia, slated for mission STS-62 will be making its 16th flight into space.

The Space Shuttle vehicle, atop its mobile launcher platform, was carried to the launch pad by the crawler transporter. The 4.2-mile trip to pad 39B took over six hours to complete.

Columbia was transferred from the Orbiter Processing Facility to the VAB on Feb. 3. While there, it was stacked with the solid rocket boosters and external tank on mobile launcher platform 1 in VAB high bay 1. Following mating operations, the vehicle underwent a series of interface tests to verify all electrical and mechanical systems.

Launch of Columbia is currently targeted for 8:54 a.m. EST March 3, on a two-week mission. On board in the payload bay will be the United States Microgravity Payload (USMP) on its second flight and the Office of Aeronautics and Space Technology (OAST-2) payload.

The STS-62 Flight Readiness Review is scheduled to occur at KSC next week on Feb. 16. At that time a firm launch date is expected to be announced. Also next week, the 5 member crew for mission STS-62 is scheduled to arrive at KSC for the standard terminal countdown demonstration test.

Crew for mission STS-62 are: Commander John H. Casper, Pilot Andrew M. Allen, and Mission Specialists Pierre J. Thuot, Charles D. (Sam) Gemar, and Marsha Ivins.

GO TO THE *KSC PRESS RELEASES* HOME PAGE

February 24, 1994

KSC Release No. 12-94

COCOA SMALL BUSINESS FIRM AWARDED KSC CONTRACT

NASA's Kennedy Space Center recently awarded V. A. Paving, Inc., a small business firm in Cocoa, Fla., a $278,460 contract to repair 3 1/2 miles of the northbound lanes of Kennedy Parkway from the NASA Causeway to the Saturn Causeway.

The work will begin around the middle of April after the resident eagles who nest in trees along this roadway have departed with their young. The work will be performed during first shift working hours, or 8 a.m. - 4:30 p.m.

In addition, both the northbound lane at Security Gate 2C and the Saturn Causeway intersection, will be reinforced with concrete to support the heavy weight of the various payloads and the high volume of traffic that flows through these areas.

GO TO THE *KSC PRESS RELEASES* HOME PAGE

February 14,1994

KSC Release No. 13-94

ORLANDO FIRM AWARDED KENNEDY SPACE CENTER CONTRACT

International Steel Industries, Inc., Orlando, Fla., has been awarded a $762,000 contract to replace approximately 4,500 linear feet of piping and remove minor asbestos insulation in the LC-39 area. The existing pipes were installed in the early 80s and are being replaced due to deterioration from ground water saturation and other time related problem. These leaks have the potential of interrupting water flow to the Orbiter Processing Facility (OPF) where the Space Shuttles are readied for launch.

Work will begin this month and is expected to be completed by mid-December. The design calls for all of the lines to be above ground, going underground only to cross roads and railways. Piping contains compressed air, and chilled and hot water. The chilled and hot water are used for air conditioning and heating to maintain OPF temperature and humidity requirements. The compressed air line is used throughout the OPF during Orbiter processing for a variety of tasks.

International Steel, a small business firm, will do all work related to the above, including installation of a personnel land bridge, fence removal and repair, and pipe supports to accommodate employees working around the installation.

GO TO THE *KSC PRESS RELEASES* HOME PAGE

February 14, 1994

KSC Release No. 14-94

Note to Editors/News Directors:
TCDT MEDIA OPPORTUNITIES WITH STS-62 CREW SET THIS WEEK

News media representatives will have an opportunity to speak informally with and photograph the STS-62 crew as they arrive at KSC this week for the terminal countdown demonstration test.

News media wishing to view the crew arrival should be at the KSC press site by 8:30 a.m. Tuesday, Feb. 15, for transportation to the Shuttle Landing Facility. The crew is scheduled to arrive in their T-38 training aircraft at 9:30 a.m.

On Wednesday, Feb. 16, the STS-62 crew will be available for an informal question and answer session at Launch Pad 39B. News media should be at the KSC press site by 11:30 a.m. for transportation to the pad.

At 8:30 a.m., Wednesday, KSC's launch team will begin the mock countdown which culminates with a simulated T-0 at 11 a.m. Thursday. On Thursday, the five-member crew will be awakened at about 6 a.m. and will rehearse launch day events. They will board the shuttle Columbia at about 8:15 a.m. and remain there through the end of the test.

Following the test, the crew is scheduled to depart KSC for their homes in Houston at about 2 p.m. Thursday, for final flight preparations.

Columbia is currently targeted for launch at 8:57 a.m. EST March 3, on a two-week mission. NASA managers will set the official launch date for mission STS-62 during the Flight Readiness Review scheduled for Wednesday, Feb. 16. On board in the payload bay will be the United States Microgravity Laboratory - 2 (USMP) on its second flight and the Office of Aeronautics and Space Technology (OAST-2) payload.

Crew members for mission STS-62 are: Commander John H. Casper, Pilot Andrew M. Allen, and Mission Specialists Pierre J. Thuot, Charles D. (Sam) Gemar and Marsha Ivins.

GO TO THE *KSC PRESS RELEASES* HOME PAGE

Space Shuttle Mission STS-62/Columbia
USMP-2, OAST-2

KSC Release No. 15-94
February 1994

The first Extended Duration Orbiter flight of 1994 will carry a diversified collection of experiments that could yield advances in both spaceflight and Earth-based technologies. During the 14-day flight of Mission STS-62, five veteran astronauts will both monitor and conduct numerous experiments located on the middeck and in the payload bay of the Space Shuttle Columbia.

Columbia will lift off from Launch Pad 39B at a 39 degree-inclination to the equator into a 160-nautical mile(185 statute mile/298 kilometer) orbit.

Leading the crew as commander is two-time space traveler John H. Casper (Col., USAF). Pilot Andrew M. Allen (Maj., USMC)is making his second trip into space. The three mission specialists, Charles D. 'Sam" Gemar (Lt. Col., USA), Marsha S. lvins and Pierre J. Thuot (Cdr., USN), have all flown twice before on the Shuttle.

The 61st Space Shuttle mission is scheduled to conclude with a landing at Kennedy Space Center's Shuttle Landing Facility.

USMP-2 and OAST-2

The two primary payloads of Mission STS-62 are clusters of experiments grouped as the Office of Aeronautics and Space Technology-2 (USMP-2) and the U.S. Microgravity Payload-2 (USMP-2),'both making a second flight aboard the Shuttle.

USMP-2 capitalizes on the near weightless environment of space to carry out scientific experiments which could improve technology on Earth. The USMP is sponsored by NASA's Office of Life and Microgravity Sciences and Applications, and managed by the Marshall Space Flight Center (MSFC), Huntsville, Ala. USMP-1 flew on Mission STS-52 in 1992. The USMP missions are designed for Shuttle microgravity experiments which do not require crew interaction, and consist of two spacelab-related Multipurpose

Equipment Support Structures (MPESS) which hold the experiments and are located in the payload bay. After activation by the crew, the experiments will be monitored and controlled from the Spacelab Mission 0perations Control Center at MSFC.

Two of the USMP-2 experiments focus on directional solidification, a well-known industrial process for making semiconductors and metals. On Earth, gravitational influences can affect directional solidification and consequently the quality of the metal or semiconductor being produced. The goal of the Advanced Automated Directional Solidification Furnace (AADSF) is to exploit the gravity-free environment of space to gain understanding of the effects of gravitational forces on the material properties of semiconductors. The sample material, mercury cadmium telluride, is used in infrared detectors for applications such as remote sensing and astronomy. It will be grown very slowly, at only 0.028 inches (0.7 mm) per hour. The result should be a crystal of mercury cadmium telluride that tests theories about the uniformity and properties of materials.

The other directional solidification experiment, Materials for the Study of Interesting Phenomena of Solidification on Earth and in Orbit (MEPHISTO), flew on the first USMP as well. MEPHISTO is a cooperative program between NASA and the French space agency, CNES, which also built the payload. MEPHISTO focuses on the process of directional solidification rather than an end product. When a sample of material is melted and then solidified from one end, there will be a front or interface where solid meets liquid. What happens at this interface influences the final

composition, structure and properties of the solid. MEPHISTO will study the location and shape of the interface, building on data collected on the first flight.

The Isothermal Dendritic Growth Experiment (IDGE) also studies solidification of materials, but on a very different scale. Dendrites are tiny crystalline forms that develop as materials solidify under certain conditions. Their Christmas tree-like shape gave rise to their name, 'dendrite," from the Greek word meaning tree. Many of the metal products that we rely on in our daily lives, such as automobiles and jet engine blades, are formed under conditions that yield dendrites. On STS-62, a single dendrite will be grown and photographed under several different sets of experimental parameters, with the growth process repeated 35 to 4O times. The photos of the space-grown dendrites can be compared with ones grown on Earth under similar conditions, testing theoretical explanations of how a dendrite forms. Greater understanding of the physics could lead to improved industrial production techniques.

The Critical Fluid Light Scattering Experiment/Zeno (CFLSE/Zeno)studies fluid behavior, specifically of a material in a state called the critical point where portions of the substance are simultaneously a gas and a liquid. Studying the critical point on Earth is difficult due to the effects of gravity. In the near weightlessness of space, the critical point zone should be widened and researchers may be able to gain a 100 times more accurate estimate of the behavior of the fluid near the temperature at which the critical point occurs. The substance being studied is xenon gas, chosen not only because R is inert, but also because it develops telltale patches of milky iridescence as it approaches the critical point.

The fifth USMP-2 payload is the Space Acceleration Measurement System (SAMS), which has flown previously. SAMS is designed to provide information about the acceleration environment in which the other four USMP experiments are being conducted.

OAST-2 is sponsored by NASA's Office of Advanced Concepts and Technology, and managed by Goddard Space Flight Center (GSFC), Greenbelt, Md. The OAST series of payloads are designed to advance spaceflight technology. The first OAST payload flew on STS 41 -D in 1984; additional flights are planned. The six OAST-2 experiments are located on a Hitchhiker cross-bay carrier (also managed by GSFC) spanning Columbia's payload bay:

- Experimental Investigation of Spacecraft Glow (EISG)/ Spacecraft Kinetic Infrared Test (SKIRT) consists of two complementary experiment assemblies. Both are designed to measure spacecraft glow, which occurs when the rapidly moving orbiter rams into atoms of oxygen and molecules of nitrogen in low Earth orbit, causing them to give off light. When the orbiter passes in and out of darkness and light as ft circles the Earth, its surface temperature changes, thus affecting the illumination range of the atomic particles. The EISG and SKIRT sensors will measure spacecraft glow as a function of temperature.

- The Emulsion Chamber Technology (ECT) experiment will collect data on radiation in space using photographic plates rather than sensors. ECT is made up of highly sensitive film interleaved with sheets of lead. When exposed to the space environment, radiation particles will pass through the film, leaving tracks that can later be measured and counted with a microscope. NASA hopes that by studying the pattern of radiation particles, ft can better understand requirements for shielding humans and spacecraft in space.

- The Solar Array Module Plasma Interaction Experiment (SAMPIE) will examine a different interaction which can occur between a spacecraft and the widely scattered oxygen and nitrogen atoms found in low Earth orbit. These atoms, called plasma, can harmfully interact with the higher operating voltages present in satellites and launch vehicles.

- SAMPIE contains six individual experiments; each will test a different spacecraft material, including space station materials, for potential electrical interaction with plasma. SAMPlE also includes two electrical probes which will monitor different aspects of the plasma. By collecting information about the arcing and power loss that may occur in these experiments, researchers can improve new solar cell technology and new materials for high voltage space power applications.

- The Thermal Energy Storage (TES) experiment, which simulates a solar dynamic receiver, is contained in two Get Away Special canisters. Inside will be two different thermal storage salts, lithium fluoride and fluoride eutectic. As the salt absorbs heat, ft melts and expands in volume, then cools and solidifies, leading to shrinkage

and the subsequent formation of voids or pockets in the salt. This void formation affects the heat absorption rate of the salt. By repeating the cycle of melting and freezing, data can be collected which will allow better understanding of thermal storage salts in microgravity. The results could lead to improved designs for solar dynamic heat receivers.

- Dissipating heat, not collecting R, is the purpose of the Cryogenic Two-Phase(CRYOTP) experiment. The advanced sensors and electronics common in today's spacecraft and vehicles can generate large Quantities of heat. Two different methods will be tested for dissipating this heat, one featuring a heat pipe containing supercold liquid nitrogen, and the other a cryogenic thermal storage unit called Brilliant Eyes Thermal Storage Unit (BETSU).

OAST-2 experiments, with the exception of TES, send and receive commands through the Hitchhiker avionics unit. The avionics are powered by the orbiter, and turned on and off by the crew. The experiments can then be operated by a control center at Goddard. TES will use a laptop computer that is operated by a crew member.

Additional Payloads

Several other payloads also will be flying in Columbia's payload bay: the Dexterous End Effector (DEE); Shuttle Solar Backscatter Ultraviolet/A (SSBUV/A) experiment; Limited Duration Space Environment Candidate Material Exposure (LDCE) experiment; Orbital Acceleration Research Experiment (OARE); and Inter Mars Tissue Equivalent Proportional Counter (ITEPC).

In the orbiter middeck, the crew will be working with or monitoring a number of payloads: Advanced Protein Crystal Growth (APCG); Physiological Systems Experiment (PSE); Commercial Protein Crystal Growth (CPCG); Commercial Generic Bioprocessing Apparatus (CGBA); Middeck 0-Gravity Dynamics Experiment (MODE): Bioreactor Demonstration System (BDS); and the Auroral Photography Experiment (APE-B). The Air Force Maui Optical Site (AMOS) calibration test requires no onboard hardware.

Columbia

Columbia is the oldest orbiter in the Shuttle fleet and was the first to fly into space. OV-102 also was the first orbiter to be outfitted for extended spaceflight, and its most recent mission, STS-58, was the longest Shuttle flight to date. STS-62 will be Columbia's 16th trip into space.

Preparations for STS-62 began after Columbia was returned to Orbiter Processing Facility high bay 2. Some payloads were installed while Columbia was in the OPF. The vehicle was then rolled over to the Vehicle Assembly Building on Feb. 3 for mating with the external tank/twin solid rocket booster assembly, and on Feb. 10 transferred to Launch Pad 39B, where the two primary payloads were installed in the vehicle.

Go to the *KSC Fact Sheets* home page

Go to the *KSC Press Releases* home page

February 15, 1994

KSC Release No. 16-94

DRAFT PROSPECTUS FOR MANAGEMENT OF PUBLIC VISITOR PROGRAM RELEASED

KENNEDY SPACE CENTER, Fla.- Industry is being asked to review and comment on a draft prospectus for the management and operation of Kennedy Space Center's Public Visitor Program and the facilities of Spaceport USA.

The draft prospectus released today describes NASA’s requirements and includes a proposed agreement under which the successful offeror will operate Spaceport USA and conduct a variety of educational and information programs, including providing tours of Kennedy Space Center and portions of Cape Canaveral Air Force Station.

Spaceport USA attracts the largest attendance of any NASA visitor center and ranks as one of Florida's top attractions. In 1993, an estimated 2.4 million people visited Spaceport USA. Spaceport USA is entirely self-supported by visitor revenues, which totaled nearly $40 million last year.

Potential offerors will have until April I to submit comments to NASA on the draft prospectus. An industry briefing and site visit is scheduled for March 9.

"We're expecting lots of interest," said Hugh Harris, director, Public Affairs. "Given Spaceport USA's 28-year history, the value of existing facilities, and the potential for growth, we think industry will view this as a exciting opportunity."

Recompetition of the current concession agreement with TW Recreational Services, Inc. will formally begin this spring, with an award schedule to take place by April 30, 1995. As a result of the recompetition, NASA expects to enter into a new concession agreement covering a 10-year period beginning May 1, 1995 with an option to extend for one 5-year period.

Requests for copies of the draft prospectus should be directed to Bob Pirkle, Mail Code SEB-SUSA, NASA John F. Kennedy Space Center, Fl 32899.

GO TO THE *KSC PRESS RELEASES* HOME PAGE

February 16, 1994

KSC Release No. 17-94

COCOA FIRM WINS CONSTRUCTION CONTRACT AT KENNEDY SPACE CENTER

Speegle Construction, Inc., Cocoa, Fla., has won a $729,745 contract to construct the Transporter Canister Facility Operations Support Building.

The new office building will be located in Kennedy Space Center's Industrial Area adjacent to the Canister Rotation Facility (CRF), and will be occupied by NASA and contractor support personnel.

As part-of the payload canister transporter system, KSC has two canisters in which Shuttle payloads are moved from processing facilities to the launch pad, or to an Orbiter Processing Facility (OPF) high bay. The canisters are maintained and stored in the CRF.

Additional work incorporated into the contract provides for elevator equipment, a parking lot, driveways and sidewalks.

The fixed-price contract requires Speegle Construction to complete all work within 240 days after notice to proceed.

GO TO THE *KSC PRESS RELEASES* HOME PAGE

February 17, 1992

KSC Release No. 18-94

LINDA A. MAUST HONORED BY NASA ASTRONAUTS

NASA/KSC employee Linda A. Maust of Titusville was recently presented with NASA's prestigious Silver Snoopy Award for service to the Space Shuttle astronauts.

Maust was presented the award on Jan. 18 by astronaut Tom Akers.

A security assistant, Maust was applauded for exhibiting "exemplary performance" in her duties. In particular, she was recognized for creating and maintaining a status board that tracks the details of each Space Shuttle mission. "This status tracking board has proven to be a valuable asset by providing your office with up-to-date Shuttle mission profiles despite the often-changing nature of those missions," Akers told her.

Snoopy, of the comic strip "Peanuts," has been the unofficial mascot of NASA's astronaut corps since the earliest days of manned space flight. The Silver Snoopy Award was created by the astronauts to honor persons who contribute most to the safety and success of manned space flight.

The award is presented to no more than 1 percent of the space center's work force each year. Recipients are given a silver pin depicting the famous beagle wearing a spacesuit. All the pins have flown on a previous Space Shuttle mission. The awardees also receive a framed certificate and a congratulatory letter signed by the presenting astronaut.

GO TO THE *KSC PRESS RELEASES* HOME PAGE

February 22, 1994

KSC Release No. 19-94

IVEY'S CONSTRUCTION, INC. WINS CONTRACT AT KENNEDY SPACE CENTER

Ivey's Construction, Inc., Merritt Island, Fla., was recently awarded a $393,575 contract to replace two power substations and switchgear at Kennedy Space Center's Shuttle Landing Facility.

The two substations, located at each end of the 15,000-foot long runway, provide power to the Precision Approach Path Indicator (PAPI) lights that are used for KSC Shuttle landings and other aircraft. Modified for the unique landing approach of the orbiter, a set of PAPI lights are positioned at 7,500 feet and 6,500 feet from each end of the runway's threshold to help guide the Shuttle to a safe touchdown. To date, a total of 19 Shuttle landings have occurred at KSC.

The fixed-price contract requires Ivey's Construction, Inc. to complete all work within 400 days after notice to proceed.

GO TO THE *KSC PRESS RELEASES* HOME PAGE

February 18, 1994

KSC Release No. 20-94

NASA BUDGET REDUCTION FORCES CUT IN HARRIS CORE CONTRACT

NASA Headquarters has announced a realignment of the Kennedy Space Center's Core Electronics Contract held by the Harris Space Systems Corporation at its Rockledge (Brevard County), Florida, facility due to budget reductions in the Space Shuttle program and constraints within the Space Station budget.

The contract, awarded in June 1989, will be reduced by approximately $95 million from its current estimated value of $355 million to approximately $260 million. The contract revision calls for work completion by late 1995 rather than the original September 1997.

Under the contract, Harris Space Systems Corporation was to engineer, design, develop, manufacture and sustain a replacement Checkout, Control and Monitor System (CCMS II) for the Space Shuttle Launch Processing System, and a Test, Control and Monitor System (TCMS) for future Space Station check-out activities.

The contract realignment calls for a halt to all CCMS II work being performed by Harris and reduces the scope of the Space Station TCMS effort to the establishment of minimal capabilities.

The existing Checkout, Control and Monitor Subsystem (CCMS), which is a major part of KSC's highly automated Launch Processing System housed in the Complex 39 Launch Control Center, will continue to be maintained and used to process and launch the Space Shuttle.

The contract realignment will be effective immediately.

GO TO THE *KSC PRESS RELEASES* HOME PAGE

February 18, 1994

KSC Release No. 21-94

KSC DESIGNATED AS ONE OF SEVEN WONDERS OF THE UNITED STATES

The American Society of Civil Engineers (ASCE) will designate the Kennedy Space Center as one of the "Seven Wonders of the United States" next week in conjunction with National Engineers Week, Feb. 20-26.

Cited as the nation's principal center for the test, checkout and launch of space vehicles and payloads, the ASCE said KSC is a permanent memorial to the crucial role of the American civil engineers in the conquest of space.

"Being selected as one of the Seven Wonders of the United States is a distinction everyone at KSC can be proud of and a real tribute to our nation's gateway to space," said KSC Director Robert Crippen.

The center was created on Merritt(Island and the adjacent coastal strand in the 1960s for Project Apollo's leaps to the moon. It has since been modified extensively for the Space Shuttle program and for the Space Station assembly and servicing missions to be launched from here later in this decade.

Criteria used in evaluating America’s wonders include service to the well-being of people and communities, uniqueness, pioneering(aspects in design and construction, extent to which the work has become a benchmark for later projects and great size and beauty.

The other landmarks chosen as Seven Wonders this year by the ASCE are: Golden Gate Bridge; Hoover Dam; Interstate Highway System; Panama Canal; Trans-Alaska Pipeline; and World Trade Center.

GO TO THE *KSC PRESS RELEASES* HOME PAGE

February 25, 1994

KSC Release No. 22-94

NASA SELECTS CONNECTICUT FIRM TO REPLACE LAUNCH-RELATED EQUIPMENT

NASA’s. Kennedy Space Center has selected DNE Technologies, Inc., Wallingford, Conn., as the contractor to replace Hardware Interface Modules (HIMS) at Kennedy Space Center.

HIMs are electronic boxes that provide the computer interface between various KSC facilities, including payload processing and Shuttle processing facilities, and ground support equipment (GSE). They also support the interface for launch critical function's between the GSE-and the Space’ Shuttle.

The electronic boxes are part of the launch processing system used to. command, control and monitor the Space Shuttle GSE for launch and launch processing. Each HIM controller box is about 44 inches tall and includes about 40 individual processing cards.

The firm-fixed-price contract will run for up to five years. The first period of the contract is valued at $4.8 million for three first article HIMs and advance materials for the production. The total value of the contract is estimated at $13 million and is based on an estimated 250 HIMs in standard and ruggedized versions, which have been shock tested for use on launch facilities.

The new HIMs are being procured to replace 20-year-old existing equipment.

This competitive procurement was a small business set aside contract. Eighteen proposals were received.

GO TO THE *KSC PRESS RELEASES* HOME PAGE

February 22, 1994

KSC Release No. 23-94

INTERNATIONAL STEEL INDUSTRIES WINS KENNEDY SPACE CENTER CONTRACT

International Steel Industries, Inc., Orlando, Fla., was recently awarded a $644,000 contract to construct a facility that will house ground coolant and hydraulic system equipment for the Space Shuttle. The protective enclosure will be constructed in the Launch Complex 39 area adjacent to the Orbiter Processing Facility (OPF).

The contract also provides for access roads and relocation of the following: electrical power pedestal, fire hydrant, water main valve, environmental control system, hard ducts and water shower.

The fixed-price contract requires International Steel to complete all work within one year after notice to proceed.

GO TO THE *KSC PRESS RELEASES* HOME PAGE

February 24, 1994

KSC Release No. 24-94

STS-62 COUNTDOWN TO BEGIN MONDAY

The countdown for launch of the Space Shuttle Columbia on mission STS-62 is scheduled to begin Monday, Feb. 28 at 9 a.m. EST, at the T-43 hour mark.

The countdown includes 28 hours and 54 minutes of built-in hold time leading to the opening of the launch window at 8:54 a.m. (EST) on Thursday, March 3. The 2 hour, 30 minute window extends until 11:24 a.m.

The launch of Columbia will mark the beginning of the second of eight Space Shuttle missions scheduled for this calendar year and the second longest in shuttle history. The STS-62 mission will feature the United States Microgravity Payload (USMP-2) on its second flight and the Office of Aeronautics and Space Technology (OAST-2) experiments.

USMP is a series of payloads which will permit scientific experimentation and material processing in space. USMP-2 consists of two Multipurpose Equipment Support Structures and includes five experiments that require a minimum microgravity environment.

OAST-2 also consists of five separate experiments mounted on a hitchhiker cross-bay carrier.

Each crew member of mission STS-62 are experienced Shuttle astronauts. They are: Commander John Casper, Pilot Andrew Allen, and Mission Specialists Pierre Thuot, Sam Gemar and Marsha Ivins.

The STS-62 crew is scheduled to arrive at KSC at about 1:30 p.m. on Monday, Feb. 28. Their activities at KSC for the days prior to launch include flight crew equipment fit checks, medical examinations and opportunities to fly in the Shuttle Training Aircraft and the T-38 trainers.

Beginning on Monday in Firing Room 3 of the Launch Control Center, the KSC launch team will start verifying all systems to assure the Shuttle is powered up and the data processing and backup flight control systems are operating trouble free.

Verifications will be conducted throughout the count to ensure reviews are being made of the flight software stored in the orbiter's twin memory banks. Computer controlled display systems will be activated and the backup flight system general purpose computer will be loaded.

Operations will also be underway to prepare the orbiter for on-board cryogenic loading. Later, orbiter navigation aids will be turned on and tested and the inertial measurement units will be activated.

Ground crews will make the final storage of mid-deck and flight deck supplies, perform microbial samplings of the flight crew's drinking water and check water levels in the waste management system.

At T-27 hours, the countdown will enter its first scheduled hold. This is a four-hour hold lasting from 1 a.m. to 5 a.m. Tuesday.

When the countdown resumes, the launch pad will be cleared of all personnel in preparation for cryogenic fuel loading of the power reactant storage and distribution system tanks located under the payload bay lining. These tanks hold the super-cold liquid hydrogen and liquid oxygen reactants used by the orbiter's fuel cells to provide electricity to the orbiter and drinking water for the crew. Also, the Extended Duration Orbiter (EDO) tank sets located on the EDO pallet in the orbiter's payload bay will be filled with the cryogenic reactants. These five extra tank sets allow the orbiter to remain in space for an extended period of time.

Cryogenic flow is scheduled to start at about 5 a.m. Tuesday and continue for about 12 hours.

As servicing of the cryogenic tanks continues, the clock will enter an eight-hour built-in hold at the T-19 hour mark.

This hold will last from 1 p.m. to 9 p.m. Tuesday.

Following cryogenic loading operations, the pad will be re-opened for scheduled pre-launch activities and the orbiter mid-body umbilical unit, used to load the super-cold reactants in the orbiter's fuel cell tanks, will be demated and retracted into the launch structure.

When the countdown resumes, technicians will complete final vehicle and facility closeouts and begin activating the orbiter's communications systems and configuring Columbia's cockpit for flight. The orbiter's flight control system and navigation aids will be activated. The stowable crew seats will be installed in the flight and mid-decks.

The countdown will enter another built-in hold at the T-11 hour mark at 5 a.m. Wednesday. This 13-hour, 34-minute hold will last until 6:34 p.m. Wednesday. During this hold, time critical equipment will be installed in the orbiter's cockpit and the inertial measurement units will be activated and warmed up.

At about 11 a.m. Wednesday, the Rotating Service Structure is scheduled to be moved away from the vehicle and placed in launch position.

At about T-9 hours (8:34 p.m. Wednesday) the onboard fuel cells will be activated. At T-8 hours, the launch team will begin evacuating the blast danger area and clear the pad for loading the external tank with the super-cold cryogenic propellants for the orbiter's main engines. At T-7 hours, 30 minutes, conditioned air that is flowing through the orbiter's payload bay and other areas on the orbiter will be switched to gaseous nitrogen in preparation for fueling the external tank. The inertial measurement units will transition from the warm up stage to the operate/attitude determination mode at T-6 hours, 45 minutes.

The countdown will enter another planned built-in hold at the T-6 hour mark at 11:34 p.m. Wednesday. During this one-hour hold, final preparations for loading the external tank will be completed. Also, a pre-tanking weather briefing will be conducted for the benefit of the Mission Management Team prior to their giving approval to begin tanking operations.

Chilldown of the lines that carry the cryogenic propellants to the external tank begins when the clock starts counting again at 12:34 a.m. Thursday. Filling and topping off the external tank should be complete about three hours later at the beginning of the next planned hold at T-3 hours, or about 3:34 a.m. Thursday.

During the two-hour hold at T-3 hours, the ice inspection team will conduct a survey of the external tank's outer insulation and other Shuttle components. Also, the closeout crew will be dispatched to the pad and begin configuring the crew module and white room for the flight crew's arrival. Liquid oxygen and liquid hydrogen will be in a stable replenish mode during this time to replace any propellant that "boils" off.

After entering the hold at T-3 hours, the five-member STS-62 crew will be awakened at about 4 a.m. Thursday.

Following breakfast, the crew will receive their briefing on weather conditions at KSC and around the world via satellite from Mission Control, Houston.

The flight crew will suit-up in their partial-pressure suits, then leave the Operations and Checkout Building at about 5:30 a.m. Thursday. They will arrive at the pad 39B white room at about 6 a.m. where they will be assisted by white room personnel in getting into the crew' cabin.

Just prior to the T-1 hour mark, the test team and the flight crew will get another weather update, including observations from chief astronaut Robert "Hoot" Gibson flying in a Shuttle Training Aircraft in the KSC area.

The last two built-in holds will be 10 minutes in duration and will occur at the T-20 minute mark (8:14 a.m.) and at the T-9 minute mark (8:35 a.m.). During the final hold, the flight crew and ground team receive the NASA launch director's and the mission management team's final "go,, for launch.

Milestones after the T-9 minute mark include start of the ground launch sequencer; retraction of the orbiter access arm

at T-7 minutes, 30 seconds; start of the orbiter's auxiliary power units at T-5 minutes; pressurization of the liquid oxygen tank inside the external tank at T-2 minutes, 55 seconds; pressurization of the liquid hydrogen tank at T-1 minute, 57 seconds; ground power disconnection from the orbiter at T-50 seconds; and the electronic "go" to Columbia's onboard computers to start their own terminal countdown sequence at T-31 seconds. The orbiter's three main engines will start at T-6.6 seconds.

COUNTDOWN MILESTONES

Launch - 3 Days (Monday, Feb. 28)

Prepare for the start of the STS-62 launch countdown and perform the call-to-stations at the T-43 hour mark. Countdown begins at 9 a.m. All members of the launch team report to their respective consoles in Firing Room 3 in the Launch Control Center for the start of the countdown.

Start preparations for servicing fuel cell storage tanks and begin final vehicle and facility closeouts for launch.

Launch - 2 Days (Tuesday, March 1)

Enter the first planned built-in hold at T-27 hours for a duration of four hours.

Check out back-up flight system and review flight software stored in mass memory units and display systems. Load backup flight system software into Columbia’s general purpose computers.

Begin stowage of flight crew equipment. Inspect the orbiter's mid-deck and flight-deck and remove crew module platforms. Start external tank loading preparations and prepare the Shuttle's main engines for main propellant tanking and flight. Perform test of the vehicle's pyrotechnic initiator controllers.

Resume countdown.

Clear launch pad of all personnel and begin the 12 hour operation to load liquid oxygen and liquid hydrogen reactants into Columbia’s fuel cell storage tanks and the EDO pallet tanks.

Enter built-in hold at T-19 hours for a duration of 8 hours.

After cryogenic loading operations, the pad will be reopened and orbiter and ground support equipment closeouts will resume.

Demate orbiter mid-body umbilical unit. Resume countdown.

Activate orbiter communications systems, flight control and navigation systems. Install mission specialists' seats in crew cabin. The tail service masts on the mobile launcher platform will be closed out for launch.

Launch - 1 Day (Wednesday, March 2)

Enter planned hold at T-11 hours for 13 hours, 34 minutes.

Perform orbiter ascent switch list in crew cabin. During this hold at T-11 hours, the orbiter's inertial measurement units will be activated and kept in the "warm up" mode and film will be installed in the numerous cameras on the launch pad. In addition, safety personnel will conduct a debris walkdown and the pad sound suppression system water tank will be filled.

The Rotating Service Structure (RSS) will be moved to the park position during the T-11 hour hold at about 11 a.m. Following the RSS move, final stowage of mid-deck experiments and flight crew equipment stowage will begin.

Resume countdown. Install time critical flight crew equipment and perform the pre-ingress switch list. Start fuel cell flow-through purge.

Activate the orbiter's fuel cells. Configure communications at Mission Control, Houston, for launch. Clear the blast danger area of all non-essential personnel and switch Columbia’s purge air to gaseous nitrogen.

Enter planned one-hour built-in hold at the T-6 hour mark.

Launch team verifies there are no violations of launch commit criteria prior to cryogenic loading of the external tank. Clear pad of all personnel.

Launch Day (Thursday, March 3)

Resume countdown. Loading the external tank with cryogenic propellants is set to begin at about 12:34 a.m.

Complete filling the external tank with its flight load of liquid hydrogen and liquid oxygen propellants.

Perform inertial measurement unit preflight calibration and align Merritt Island Launch Area tracking antennas.

Enter two-hour hold at T-3 hours.

Perform open loop test with Eastern Space and Missile Center and conduct gimbal profile checks of orbital maneuvering system engines.

Wake flight crew at 3:59 a.m. Closeout crew and ice inspection team proceeds to Launch Pad 39B.

Resume countdown at T-3 hours.

Crew departs Operations and Checkout Building for the pad at 5:29 a.m.

Complete closeout preparations in the white room and cockpit switch configurations.

Flight crew enters orbiter. Astronauts perform air-to-ground voice checks with Launch Control and Mission Control. Close Columbia's crew hatch. Begin Eastern Space and Missile Center final network open loop command checks.

Perform hatch seal and cabin leak checks. The white room is closed out and the closeout crew moves to fallback area. Primary ascent guidance data is transferred to the backup flight system.

Enter planned 10-minute hold at T-20 minutes.

NASA Shuttle Test Director conducts final briefing.

Resume countdown. Transition the orbiter's onboard computers to launch configuration and start fuel cell thermal conditioning. Close orbiter cabin vent valves. Backup flight system transitions to launch configuration.

Enter last planned hold at T-9 minutes.

Launch Director and Mission Management Team complete final polls for launch.

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Resume countdown and:

Start automatic ground launch sequencer (T-9:00 minutes)
Retract orbiter crew access arm (T-7:30)
Start mission recorders (T-5:30)
Start Auxiliary Power Units (T-5:00)
Arm SRB and ET range safety safe and arm devices (T-5:00)
Start liquid oxygen drainback (T-4:55)
Start orbiter aerosurface profile test (T-3:55)
Start MPS gimbal profile test (T-3:30)
Pressurize liquid oxygen tank (T-2:55)
Begin retraction of the gaseous oxygen vent arm (T-2:55)
Fuel cells to internal reactants (T-2:35)
Pressurize liquid hydrogen tank (T-1:57)
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Deactivate SRB joint heaters (T-1:00)
Orbiter transfers from ground to internal power (T-0:50 seconds)
LPS go for start of orbiter automatic sequence (T-0:31 seconds)
Ignition of Shuttle's three main engines (T-6.6 seconds)
SRB ignition and liftoff (T-0)

T-TIME	LENGTH OF HOLD	HOLD BEGINS	HOLD ENDS
T-27 hours	4 hours	1:00 am Tues.	5:00 am Tues.
T-19 hours	8 hours	1:00 pm Tues.	9:00 pm Tues.
T-11 hours	13 hr., 34 min.	5:00 am Wed.	6:34 pm Wed.
T-6 hours	1 hour	11:34 pm Wed.	12:34 am Thurs.
T-3 hours	2 hours	3:34 am Thurs.	5:34 am Thurs.
T-20 minutes	10 min.	8:14 am Thurs.	8:24 am Thurs.
T-9 minutes	10 min.	8:35 am Thurs.	8:45 pm Thurs.

CREW FOR MISSION FOR STS-62

Commander (CDR): John H. Casper
Pilot (PLT): Andrew M. Allen
Mission Specialist (MS1): Pierre J. Thuot
Mission Specialist (MS2): Charles D. (Sam) Gemar
Mission Specialist (MS3): Marsha S. Ivins

SUMMARY OF STS-62 LAUNCH DAY CREW ACTIVITIES

Thursday, March 3, 1994

3:59 a.m.	Wake up
4:29 a.m.	Breakfast
4:54 a.m.	Weather briefing (CDR, PLT, MS2)
4:54 a.m.	Don flight equipment (MS1, MS3)
5:04 a.m.	Don flight equipment (CDR, PLT, MS2)
5:29 a.m.	Depart for launch pad 39B
5:59 a.m.	Arrive at white room and begin ingress
7:24 a.m.	Close crew hatch
8:54 a.m.	Launch

GO TO THE *KSC PRESS RELEASES* HOME PAGE

February 25, 1994

KSC Release No. 25-94

Notice to Editors/News Directors (Revised)
EVENTS, NEWS CENTER HOURS OF OPERATION SET FOR MISSION STS-62

News conferences, events and operating hours for KSC's News Center have been set for the upcoming launch of the Space Shuttle Columbia on Mission STS-62.

The five STS-62 crew members are scheduled to arrive at KSC on Monday, Feb. 28, at 1:30 p.m. News media representatives wishing to cover the event must be at the News Center by 12:30 p.m. Monday for transportation to the Shuttle Landing Facility. Arrival of the STS-62 astronauts will be carried live on NASA Select TV.

News media representatives will have an opportunity to discuss the status of the launch countdown with NASA test directors during three briefings at the News Center next week (all will be live on NASA Select).

L-3 Day Countdown Status Briefing ---------- 9 a.m. EST
· John Guidi, NASA Test Director
· Russ Lunnen, STS-62 Payload Manager

L-2 Day Countdown Status Briefing ---------- 9 a.m. EST
· Bill Dowdell, NASA Test Director
· Russ Lunnen, STS-62 Payload Manager
· Ed Priselac, Shuttle Launch Weather Officer

L- 1 Day Countdown Status Briefing ---------- 8 a.m. EST
· Mike Leinbach, Shuttle Test Director
· Russ Lunnen, STS-62 Payload Manager

L- 1 Day Pre-launch News Conference ---------- II a.m. EST
· Participants to be determined

News Center office hours are as follows:

(Launch minus 3 days) Monday, Feb. 28	8 a.m. - 4:30 p.m.
(Launch minus 2 days) Tuesday, March 1	7 a.m. - 4:30 p.m.
(Launch minus 1 day) Wednesday, March 2	7 a.m. - around the
(Launch day) Flight day 1, Thursday, March 3	clock - 7 p.m.
Flight day 2, Friday, March 4	7 a.m. - 4:30 p.m.
Flight days 3-4, March 5-6	CLOSED
Flight days 5-9, March 7-11	7 a.m. - 4:30 p.m.
Flight day 10, March 12	7 a.m. - 9 a.m.
Flight day 11, March 13	CLOSED
Flight days 12-14, March 14-16	7 a.m. - 4:30 p.m.
Flight day 15, Landing Day, March 17	4:30 a.m. - 4:30 p.m.

News media representatives may obtain STS-62 mission credentials, and annual Shuttle badges, at the Pass and Identification Building at Gate 2 on State Road 3, Merritt Island, during the following times: 8 a.m. to 4:30 p.m. Monday, Feb. 28 and Tuesday March 1. On Wednesday, badges may be obtained from 8 a.m. to 6 p.m. On launch day, the badging gate will be open 4-8 a.m.

News media with annual Shuttle credentials are reminded to sign the log book at the photo and interview counter in the News Center.

NEWS MEDIA ARE REQUIRED TO BE UNDER PUBLIC AFFAIRS ESCORT EXCEPT WHEN DRIVING TO THE NEWS CENTER OR THE COMPLEX 39 CAFETERIA. IN ADDITION, NEWS MEDIA ARE ALLOWED ON CENTER ONLY WHEN THE NEWS CENTER IS OPEN.

GO TO THE *KSC PRESS RELEASES* HOME PAGE

NASA News Release ON LINE

JOHN F. KENNEDY SPACE CENTER

March 3, 1994
KSC Contact: George H. Diller
KSC Release No. 26-94

Note to Editors/News Directors:
GOES-I WEATHER SATELLITE NEWS MEDIA SHOWING SCHEDULED MARCH 8

The GOES-I weather satellite, to be launched aboard an Atlas I rocket next month, will be the subject of a news media interview and photo opportunity on Tuesday, March 8 at 10 a.m. at the Astrotech spacecraft processing facility in Titusville.

GOES-I, built by Space Systems/LORAL, is the first in a series of five next generation advanced technology geostationary weather satellites developed by NASA for the National Oceanic and Atmospheric Administration (NOAA).

The spacecraft, encapsulated in the nose fairing, is scheduled to be transported from Astrotech to Pad B at Launch Complex 36 the end of this month for mating to the Atlas Centaur vehicle. Launch is currently targeted for Tuesday, April 12, at 2 a.m. EDT.

Media wishing to attend the GOES showing should go directly to Astrotech in Titusville on Tuesday morning. NASA, NOAA and Space Systems/LORAL personnel will be on hand for interviews and questions. Due to spacecraft cleanliness requirements, it is likely that media will be staged into the facility in at least two groups and therefore additional time should be allowed to cover this event.

Because of the spacecraft's optical systems, no flash photography will be permitted. The available light is mercury vapor. Since no external power can be furnished, all camera equipment should be self contained. All camera equipment and accessories will be inspected for cleanliness by quality control personnel and a cleaning may be requested using alcohol wipes which will be furnished. Those attending are requested to wear long pants and closed-toe shoes. White room attire will be provided.

If further information is necessary, contact the NASA News Center at KSC at 407/867-2468.

GO TO THE *KSC PRESS RELEASES* HOME PAGE

NASA News Release ON LINE

JOHN F. KENNEDY SPACE CENTER

March 2, 1994
KSC Contact: Bruce Buckingham
KSC Release No. 27-94

Notice To Editors/News Directors:
COUNTDOWN STATUS BRIEFING SET FOR THURSDAY, MARCH 3

An add-on L-1 day countdown status briefing has been scheduled for news media representatives following the announcement to postpone the launch of the Space Shuttle Columbia on mission STS-62 until Friday, March 4, at 8:53 a.m.

The briefing will be carried live on NASA Select TV beginning at 9 a.m. EST Thursday, March 3. Participants in the briefing will include John Guidi, NASA Test Director; Russ Lunnen, STS-62 Payload Manager; and Ed Priselac, Shuttle Launch Weather Officer.

This is the only remaining briefing to be held prior to launch of Columbia. All previously announced media badging and escort requirements remain in effect.

NASA Select TV will begin broadcast of launch day events at 4 a.m. EST, March 4.

NASA News Release ON LINE

JOHN F. KENNEDY SPACE CENTER

March 4, 1994
KSC Contact: Steve Dutczak
KSC Release No. 28-94

Note to Editors/News Directors:
MODEL SHUTTLE LAUNCH SET FOR MARCH 8 AT ORLANDO HIGH SCHOOL

Only days after the launch of the 184-foot-tall Space Shuttle Columbia from Kennedy Space Center, students at University High School in Orlando plan to launch a 4.6-foot-high model Shuttle on March 8 from a launch pad they built themselves.

Students in the Principles of Engineering Technology class, taught by Rob Catto, spent many months painstakingly completing 1/40 scale drawings for the pad structures and launch vehicle on a computer, then built all the elements themselves. Local engineering experts provided support, including Kennedy Space Center engineer and model rocket expert Dave Sollberger who assisted with construction of the launch vehicle.

To honor National Engineers Week and engineering outreach activities conducted year-round by NASA, contractor and other engineers nationwide, the students agreed to conduct a launch of their Shuttle, named Explorer, on March 8 at 9 a.m. at the high school's Launch Pad 39C. KSC Director and veteran astronaut Robert Crippen will be on hand to serve as the firing officer for the launch. Also scheduled to be present for the event are KSC Launch Director Robert Sieck; Shuttle Management and Operations Director Jay Honeycutt; Payload Management and Operations Director John Conway; and Engineering Development Director Walt Murphy.

University High School is located at 11501 Eastwood Drive, Orlando. News media wishing to cover the event may drive to the launch pad area, located on the northeast side of the school, near a greenhouse.

NASA News Release ON LINE

JOHN F. KENNEDY SPACE CENTER

March 4, 1994
KSC Contact: Lisa Malone
KSC Release No. 30-94

Note to Editors/News Directors:
KSC'S OFF-SITE CENTRAL INDUSTRY ASSISTANCE OFFICE OPENS MARCH 7

Vendors seeking information about business opportunities at KSC will soon have easier access to professional industry assistance specialists at an off-base site at the south entrance to the space center beginning March 7.

Kennedy Space Centees Procurement Office will open for business at Gate 2 on State Road 3 in their newly built Central Industry Assistance Office. KSC Director Robert Crippen is scheduled to speak at a ribbon cutting ceremony planned on March 7 at 1 p.m. at the new facility.

The new KSC office will be used to provide joint-counseling on how to do business with NASA and the prime contractors. In addition, public bid openings will be conducted there without having to obtain a temporary badge. Until now, the procurement office has performed these functions from the Headquarters Building, which has required prospective vendors to obtain badges to have access to these services.

"The principal goals are to provide private industry the maximum opportunity to do business with KSC and to present the ultimate team image -- one face to industry," said Ann Watson, chief of Industry Assistance and Acquisition Management Office.

News media wishing to cover the event may drive directly to the scene of the ceremony.

NASA News Release ON LINE

JOHN F. KENNEDY SPACE CENTER

March 17, 1994
KSC Contact: Bruce Buckingham
KSC Release No. 34-94

COLUMBIA SCHEDULED TO LAND AT KSC

The orbiter Columbia is scheduled to land at Kennedy Space Center on Friday, March 18 at 8:09 a.m. EST, at the conclusion of its current STS-62 mission, which was launched from KSC March 4.

Landing of Columbia at KSC's Shuttle Landing Facility (SLF) is slated for orbit 224 at mission elapsed time of 13 days, 23 hours and 16 minutes. Deorbit burn will occur on orbit 223 at about 7:16 a.m. Friday, at 13 days, 22 hours and 23 minutes.

A second KSC landing opportunity for Friday occurs on orbit 225 at 9:42 a.m. Two additional opportunities for landing at KSC exist on Saturday at about 7:50 a.m. and 9:23 a.m.

During descent for landing at KSC on Friday, Columbia will cross the Florida/Alabama state line entering Florida airspace near Barrineau Park north of Pensacola and travel east through the Florida panhandle. Columbia will pass through the center of the state over the Apalachicola National Forest near Tallahassee, Gainesville and the Ocala National Forest before landing at KSC's SLF.

The orbiter will pass over Gainesville about 9 minutes before touchdown at an altitude of about 115,000 feet, traveling at a speed of about Mach 5. The orbiter will pass over The Ocala National Forest about 7 minutes before touchdown at an altitude of about 87,000 feet, traveling at a speed of about Mach 3.

Shuttle Landing Facility

Built in 1975, the SLF is 300 feet wide and 15,000 feet long with 1,000 foot overruns at each end. The strip runs northwest to southeast and is located about 3 miles northwest of the Vehicle Assembly Building.

Tomorrow's landing of Columbia will mark the twentieth landing at KSC in the history of Space Shuttle flight. It is the second KSC landing scheduled for this year.

Previous Shuttle Landings at KSC

1) 41-B - Challenger, Feb. 11, 1984
2) 41-G - Challenger, Oct. 13, 1984
3) 51-A - Discovery, Nov. 16, 1984
4) 51-C - Discovery, Jan. 27, 1985
5) 51-D - Discovery, April 19, 1985
6) STS-38 - Atlantis, Nov. 20, 1990
7) STS-39 - Discovery, May 6, 1991
8) STS-43 - Atlantis, Aug. 11, 1991
9) STS-45 - Atlantis, April 2, 1992
10) STS-50 - Columbia, July 9, 1992

11) STS-46 - Atlantis, Aug. 8, 1992
12) STS-47 - Endeavour, Sept. 18, 1992
13) STS-52 - Columbia, Nov. 1, 1992
14) STS-54 - Endeavour, Jan. 19, 1993
15) STS-56 - Discovery, April 17, 1993
16) STS-57 - Endeavour, July 1, 1993
17) STS-51 - Discovery, Sept. 22, 1993
18) STS-61 - Endeavour, Dec. 13, 1993
19) STS-60 - Discovery, Feb. 11, 1994

KSC End Of Mission Landing Weather Constraints

At decision time for the deorbit burn (about 90 minutes before landing), general weather restrictions for a KSC landing are specified in part as:

- Visibility must be five miles or greater;
- Peak surface winds must be less than 20 knots in any direction;
- The peak crosswind must not exceed 15 knots, 12 knots at night. If the mission duration is greater than nine days the limit is 12 knots, day or night;
- The cloud ceiling must be greater than 10,000 feet. For scattered clouds below 10,000 feet, cloud cover must be observed to be less than 20 percent;
- There can be no precipitation at the surface or aloft in the proximity of the orbiter's glide path;
- Thunderstorms, rain or the potential for lightning cannot exist within 30 nautical miles of the landing site;
- Vertical cloud clearance at the 30 nautical mile range must be greater than 2 nautical miles.

KSC Ground Operations

Once the orbiter is on the ground, safing operations will commence and the flight crew will prepare the vehicle for post-landing operations. The Crew Transport Vehicle (CTV) will be used to assist the crew, allowing them to egress the vehicle and doff their launch and re-entry suits easier and quicker.

The CTV and other KSC landing convoy operations have been in an "on-call" status since the launch of Columbia March 4. The primary functions of the Space Shuttle recovery convoy are to provide immediate service to the orbiter after landing, prepare the orbiter for towing to the Orbiter Processing Facility and assist crew egress.

Convoy vehicles are stationed at the SLF's mid-point. About two hours prior to landing, convoy personnel don SCAPE suits, or Self Contained Atmospheric Protective Ensemble, and communi- cations checks are made.

A warming up of coolant and purge equipment is conducted and nearly two dozen convoy vehicles are positioned to move onto the runway as quickly and as safely as possible once the orbiter coasts to a stop. When the vehicle is deemed safe of all potential explosive hazards and toxic gases, the purge and coolant umbilical access vehicles move into position at the rear of the orbiter.

Following purge and coolant operations, flight crew egress preparations will begin and the CTV will be moved into position at the crew access hatch located on the orbiter's port side.

Once access to the vehicle is gained, a physician will board the shuttle and conduct a brief preliminary examination of the astronauts. The crew will then make preparations to leave the vehicle.

About 2 hours, 40 minutes after landing, the orbiter will be towed to Orbiter Processing Facility bay 2 for post-flight

deservicing and preparations will begin for its next scheduled mission, STS-65, in July 1994.

Following departure from the SLF, the crew will be taken to their quarters in the O&C Building, meet with their families, undergo a physical examination and depart for the skid strip at Cape Canaveral Air Force Station for their flight back to JSC.

The crew is planning to depart for JSC roughly 5 to 6 hours after landing. The exact time of departure will be determined following touchdown.

In the event a landing at KSC is not feasible and Columbia lands at Edwards, an augmented KSC convoy team will be on-site to safe the vehicle, disembark the crew and move the orbiter to the Mate/Demate Device. The turn around team will be deployed to Edwards by charter aircraft on landing day.

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GO TO THE *KSC PRESS RELEASES* HOME PAGE

NASA News Release ON LINE

JOHN F. KENNEDY SPACE CENTER

March 18, 1994 (3:30 p.m.)
KSC Contact: Diana Boles
KSC Release No. 35-94

FLORIDA FACILITY TO PROVIDE KENNEDY SPACE CENTER COMMUNICATIONS SYSTEM

The ROLM Company, Vienna, Va., was recently awarded a $2,177,913 contract to provide a Digital Voice Telecommunications System (DVTS) for the new Space Station Processing Facility (SSPF) located in Kennedy Space Center's Industrial Area. The DVTS will provide telephone service to employees in the new building.

Most of the work will be done at the manufacturing facility of ROLM's affiliated company Siemens Stromberg-Carlson in Lake Mary, Fla. The work to be performed includes the manufacture, installation, and testing of the telecommunications system, as well as training on operation and maintenance of the system. Digital telephone instruments are also included in the contract.

The SSPF will serve as the central preflight checkout and processing point for Space Station elements.

Expected to be completed sometime in mid-1994, the SSPF will include communications and electrical control areas, offices, laboratories, logistics staging areas, operational control rooms and a cafeteria for employees.

The firm-fixed-price contract requires ROLM to complete all work by December 1994.

Proposals also were submitted by Bell Atlantic Federal Systems, Silver Spring, Md.; Bell South Telecommunications, Inc., Atlanta, Ga.; Cyber Digital, Inc., Holbrook, N.Y.; Sprint United Telephone-Florida, Altamonte Springs, Fla.; and Wiltel Communications Systems, Inc., Beltsville, Md.

NASA News Release ON LINE

JOHN F. KENNEDY SPACE CENTER

April 1, 1994
KSC Contact: Bruce Buckingham
KSC Release No. 40-94

STS-59 COUNTDOWN TO BEGIN MONDAY

The countdown for launch of the Space Shuttle Endeavour on mission STS-59 is scheduled to begin Monday, April 4 at 11 a.m. EDT, at the T-43 hour mark.

The countdown includes 26 hours and 7 minutes of built-in hold time leading to the opening of the launch window at 8:07 a.m. (EDT) on Thursday, April 7. The 2 hour, 30 minute window extends until 10:37 a.m.

Mission managers have left available the option to move the opening of the launch window up by one hour if it is determined the weather may not be acceptable at 8:07 but could be acceptable earlier. This decision will be made the day before launch and adjusted at the T-11 hour hold.

The launch of Endeavour will mark the beginning of the third Space Shuttle mission this year and the sixth for the orbiter Endeavour. The STS-59 mission will feature the first of two planned flights of the Space Radar Laboratory (SRL-1) scheduled for this year.

SRL-1 is an Earth-observing payload that will study and obtain images of vegetation coverage, deforestation, wetlands areas, snowpacks and geologic features such as ocean wave heights and wind speeds. Imaging radar can collect data over any region at any time regardless of weather.

In preparation for this flight, Endeavour was rolled out of the Orbiter Processing Facility and to the Vehicle Assembly Building where it was mated to the external tank and solid rocket boosters on March 15. The Shuttle stack was then transported out to pad 39A on March 19. SRL-1 was installed into Endeavour's payload bay on February 15 prior to OPF rollout.

The crew of mission STS-59 are: Commander Sidney M. Gutierrez, Pilot Kevin P. Chilton, and Mission Specialists Linda M. Godwin, Thomas D. Jones, Jay Apt and Michael Richard Clifford.

The crew is scheduled to arrive at KSC at about 8 a.m. on Monday, April 4. Their activities at KSC for the days prior to launch include flight crew equipment fit checks, medical examinations and opportunities to fly in the Shuttle Training Aircraft and the T-38 trainers.

Beginning on Monday in Firing Room 1 of the Launch Control Center, the KSC launch team will start verifying all systems to assure the Shuttle is powered up and the data processing and backup flight control systems are operating trouble free.

Verifications will be conducted throughout the count to ensure reviews are being made of the flight software stored in the orbiter's twin memory banks. Computer controlled display systems will be activated and the backup flight system general purpose computer will be loaded.

Operations will also be underway to prepare the orbiter for on-board cryogenic loading. Later, orbiter navigation aids

will be turned on and tested and the inertial measurement units will be activated.

Ground crews will make the final storage of mid-deck and flight deck supplies, perform microbial samplings of the flight crew's drinking water and check water levels in the waste management system.

At T-27 hours, the countdown will enter its first scheduled hold. This is a four-hour hold lasting from 3 a.m. to 7 a.m. Tuesday.

When the countdown resumes, the launch pad will be cleared of all personnel in preparation for cryogenic fuel loading of the power reactant storage and distribution system tanks located under the payload bay lining. These tanks hold the super-cold liquid hydrogen and liquid oxygen reactants used by the orbiter's fuel cells to provide electricity to the orbiter and drinking water for the crew.

Cryogenic flow is scheduled to start at about 9 a.m. Tuesday and continue for about 5 hours.

As servicing of the cryogenic tanks ends, the clock will enter another four-hour built-in hold at the T-19 hour mark. This hold will last from 3 p.m. to 7 p.m. Tuesday.

Following cryogenic loading operations, the pad will be re-opened for scheduled pre-launch activities and the orbiter mid-body umbilical unit, used to load the super-cold reactants in the orbiter's fuel cell tanks, will be demated and retracted into the launch structure.

When the countdown resumes, technicians will complete final vehicle and facility closeouts and begin activating the orbiter's communications systems and configuring Endeavour's cockpit for flight. The orbiter's flight control system and navigation aids will be activated. The stowable crew seats will be installed in the flight and mid-decks.

The countdown will enter another built-in hold at the T-11 hour mark at 3 a.m. Wednesday. This 14-hour, 47-minute hold will last until 5:47 p.m. Wednesday. During this hold, time critical equipment will be installed in the orbiter's cockpit and the inertial measurement units will be activated and warmed up.

At about 11 a.m. Wednesday, the Rotating Service Structure is scheduled to be moved away from the vehicle and placed in launch position.

At about T-9 hours (7:47 p.m. Wednesday) the onboard fuel cells will be activated. At T-8 hours, the launch team will begin evacuating the blast danger area and clear the pad for loading the external tank with the super-cold cryogenic propellants for the orbiter's main engines. At T-7 hours, 30 minutes, conditioned air that is flowing through the orbiter's payload bay and other areas on the orbiter will be switched to gaseous nitrogen in preparation for fueling the external tank. The inertial measurement units will transition from the warm up stage to the operate/attitude determination mode at T-6 hours, 45 minutes.

The countdown will enter another planned built-in hold at the T-6 hour mark at 10:47 p.m. Wednesday. During this one-hour hold, final preparations for loading the external tank will be completed. Also, a pre-tanking weather briefing will be conducted for the benefit of the Mission Management Team prior to their giving approval to begin tanking operations.

Chilldown of the lines that carry the cryogenic propellants to the external tank begins when the clock starts counting again at 11:47 p.m. Wednesday. Filling and topping off the external tank should be complete about three hours later at the beginning of the next planned hold at T-3 hours, or 2:47 a.m. Thursday.

During the two-hour hold at T-3 hours, the ice inspection team will conduct a survey of the external tank's outer insulation and other Shuttle components. Also, the closeout crew will be dispatched to the pad and begin configuring the crew module and white room for the flight crew's arrival. Liquid oxygen and liquid hydrogen will be in a stable replenish mode during this time to replace any propellant that "boils" off.

The six flight crew members have been divided into two groups and placed on separate sleep-cycles for the around-

the-clock operations of the Space Radar Laboratory. The blue team (Apt, Clifford, Jones) will be awakened at 6 p.m. Wednesday and the red team (Gutierrez, Chilton, Godwin) will be awakened at 2:30 a.m. Thursday.

All members of the crew will be seated together for their last meal prior to launch at about 3:35 a.m. Following breakfast/dinner, the crew will receive their briefing on weather conditions at KSC and around the world via satellite from Mission Control, Houston.

The flight crew will suit-up in their partial-pressure suits, then leave the Operations and Checkout Building at about 4:52 a.m. Thursday. They will arrive at the pad 39A white room at about 5:22 a.m. where they will be assisted by white room personnel in getting into the crew cabin.

Just prior to the T-1 hour mark, the test team and the flight crew will get another weather update, including observations from chief astronaut Robert "Hoot" Gibson flying in a Shuttle Training Aircraft in the KSC area.

The last two built-in holds will be 10 minutes in duration and will occur at the T-20 minute mark (7:27 a.m.) and at the T-9 minute mark (7:48 a.m.). During the final hold, the flight crew and ground team receive the NASA launch director's and the mission management team's final "go" for launch.

Milestones after the T-9 minute mark include start of the ground launch sequencer; retraction of the orbiter access arm at T-7 minutes, 30 seconds; start of the orbiter's auxiliary power units at T-5 minutes; pressurization of the liquid oxygen tank inside the external tank at T-2 minutes, 55 seconds; pressurization of the liquid hydrogen tank at T-1 minute, 57 seconds; ground power disconnection from the orbiter at T-50 seconds; and the electronic "go" to Endeavour's onboard computers to start their own terminal countdown sequence at T-31 seconds. The orbiter's three main engines will start at T-6.6 seconds.

COUNTDOWN MILESTONES

Launch - 3 Days (Monday, April 4)

Prepare for the start of the STS-59 launch countdown and perform the call-to-stations at the T-43 hour mark. Countdown begins at 11 a.m. All members of the launch team report to their respective consoles in Firing Room 1 in the Launch Control Center for the start of the countdown.

Start preparations for servicing fuel cell storage tanks and begin final vehicle and facility closeouts for launch.

Launch - 2 Days (Tuesday, April 5)

Enter the first planned built-in hold at T-27 hours for a duration of four hours.

Check out back-up flight system and review flight software stored in mass memory units and display systems. Load backup flight system software into Endeavour's general purpose computers.

Begin stowage of flight crew equipment. Inspect the orbiter's mid-deck and flight-deck and remove crew module platforms. Perform test of the vehicle's pyrotechnic initiator controllers.

Resume countdown.

Clear launch pad of all personnel and begin the 5 hour operation to load liquid oxygen and liquid hydrogen reactants into Endeavour's fuel cell storage tanks.

Enter built-in hold at T-19 hours for a duration of four hours.

After cryogenic loading operations, the pad will be reopened and orbiter and ground support equipment closeouts will resume.

Demate orbiter mid-body umbilical unit. Resume countdown.

Start final preparations of the Shuttle's main engines for main propellant tanking and flight. Activate the orbiter's communications systems, flight controls and navigation systems. Install mission specialists' seats in crew cabin. The tail service masts on the mobile launcher platform will be closed out for launch.

Launch - 1 Day (Wednesday, April 6)

Enter planned hold at T-11 hours for 14 hours, 47 minutes.

Perform orbiter ascent switch list in crew cabin. During this hold at T-11 hours, the orbiter's inertial measurement units will be activated and kept in the "warm up" mode and film will be installed in the numerous cameras on the launch pad. In addition, safety personnel will conduct a debris walkdown and the pad sound suppression system water tank will be filled.

The Rotating Service Structure (RSS) will be moved to the park position during the T-11 hour hold at about 11 a.m. Following the RSS move, final stowage of mid-deck experiments and flight crew equipment stowage will begin.

Resume countdown. Install time critical flight crew equipment and perform the pre-ingress switch list. Start fuel cell flow-through purge.

Activate the orbiter's fuel cells. Configure communications at Mission Control, Houston, for launch. Clear the blast danger area of all non-essential personnel and switch Endeavour's purge air to gaseous nitrogen.

Enter planned one-hour built-in hold at the T-6 hour mark.

Launch team verifies there are no violations of launch commit criteria prior to cryogenic loading of the external tank. Clear pad of all personnel.

Resume countdown. Loading the external tank with cryogenic propellants is set to begin at about 11:47 p.m.

Launch Day (Thursday, April 7)

Complete filling the external tank with its flight load of liquid hydrogen and liquid oxygen propellants.

Perform inertial measurement unit preflight calibration and align Merritt Island Launch Area tracking antennas.

Enter two-hour hold at T-3 hours.

Perform open loop test with Eastern Space and Missile Center and conduct gimbal profile checks of orbital maneuvering system engines.

Wake flight crew (red team) at 2:30 a.m. Closeout crew and ice inspection team proceeds to Launch Pad 39A.

Resume countdown at T-3 hours.

Crew departs Operations and Checkout Building for the pad at 4:52 a.m.

Complete closeout preparations in the white room and cockpit switch configurations.

Flight crew enters orbiter. Astronauts perform air-to-ground voice checks with Launch Control and Mission Control. Close Endeavour's crew hatch. Begin Eastern Space and Missile Center final network open loop command checks.

Perform hatch seal and cabin leak checks. The white room is closed out and the closeout crew moves to fallback area. Primary ascent guidance data is transferred to the backup flight system.

Enter planned 10-minute hold at T-20 minutes.

NASA Test Director conducts final launch team briefings.

Resume countdown. Transition the orbiter's onboard computers to launch configuration and start fuel cell thermal conditioning. Close orbiter cabin vent valves. Backup flight system transitions to launch configuration.

Enter last planned hold at T-9 minutes.

Launch Director, Mission Management Team and NASA Test Director conduct final polls for go/no go to launch.

Resume countdown and:

Start automatic ground launch sequencer (T-9:00 minutes)
Retract orbiter crew access arm (T-7:30)
Start mission recorders (T-5:30)
Start Auxiliary Power Units (T-5:00)
Arm SRB and ET range safety safe and arm devices (T-5:00)
Start liquid oxygen drainback (T-4:55)
Start orbiter aerosurface profile test (T-3:55)
Start MPS gimbal profile test (T-3:30)
Pressurize liquid oxygen tank (T-2:55)
Begin retraction of the gaseous oxygen vent arm (T-2:55)
Fuel cells to internal reactants (T-2:35)
Pressurize liquid hydrogen tank (T-1:57)
Deactivate SRB joint heaters (T-1:00)
Orbiter transfers from ground to internal power (T-0:50 seconds)
LPS go for start of orbiter automatic sequence (T-0:31 seconds)
Ignition of Shuttle's three main engines (T-6.6 seconds)
SRB ignition and liftoff (T-0)

SUMMARY OF HOLDS AND HOLD TIMES FOR STS-59

T-TIME	LENGTH OF HOLD	HOLD BEGINS	HOLD ENDS
T-27 hours	4 hours	3:00 am Tues.	7:00 am Tues.
T-19 hours	4 hours	3:00 pm Tues.	7:00 pm Tues.
T-11 hours	14 hrs.,47 mins.	3:00 am Wed.	5:47 pm Wed.
T-6 hours	1 hour	10:47 pm Wed.	11:47 pm Wed.
T-3 hours	2 hours	2:47 am Thurs.	4:47 am Thurs.
T-20 minutes	10 minutes	7:27 am Thurs.	7:37 am Thurs.
T-9 minutes	10 minutes	7:48 am Thurs.	7:58 am Thurs.

CREW FOR MISSION FOR STS-59

Commander (CDR): Sidney M. Gutierrez (Red team)
Pilot (PLT): Kevin P. Chilton (Red team)
Mission Specialist (MS1): Jerome (Jay) Apt (Blue team)
Mission Specialist (MS2): Michael R. (Rich) Clifford (Blue team)
Mission Specialist (MS3): Linda M. Godwin (Red team)
Mission Specialist (MS4): Thomas D. Jones (Blue team)

SUMMARY OF STS-59 LAUNCH DAY CREW ACTIVITIES

Wednesday, April 6, 1994

6:00 p.m.	Wake up (Blue team)
6:30 p.m.	Breakfast (Blue team)
6:30 p.m.	Sleep (Red team)
11:30 p.m.	Lunch (Blue team)

Thursday, April 7, 1994

2:30 a.m.	Wake up (Red team)

3:00 a.m.	Breakfast (Red team)
3:42 a.m.	Dinner (Blue team)
4:12 a.m.	Weather briefing (CDR, PLT, MS2)
4:12 a.m.	Don flight equipment (MS1, MS3, MS4)
4:22 a.m.	Don flight equipment (CDR, PLT, MS2)
4:52 a.m.	Depart for launch pad 39A
5:22 a.m.	Arrive at white room and begin ingress
6:37 a.m.	Close crew hatch
8:07 a.m.	Launch

GO TO THE *KSC PRESS RELEASES* HOME PAGE

NASA News Release ON LINE

JOHN F. KENNEDY SPACE CENTER

April 5, 1994, 6:45 p.m.
KSC Contact: Bruce Buckingham
KSC Release No. 42-94

LAUNCH ADVISORY:
STS-59 LAUNCH REMAINS ON SCHEDULE FOR APRIL 8

Borescope inspections performed today of Endeavour's three main engine turbo pumps have indicated they are well within specifications, and the KSC launch team is now proceeding with operations to closeout the aft compartment and launch Endeavour on Friday, April 8.

The decision to perform the inspections on the engines, specifically the high pressure oxidizer turbo pumps, was a result of engineers discovering smaller than permittable vanes, or stationary guides, in the preburner on engines at Canoga Park, Calif. The vanes in the preburner help direct the flow of the liquid oxygen through the turbo pump as it operates under extremely high pressures.

Inspections were conducted at Launch Pad 39A with engineers using a borescope camera to inspect the internal components of the turbo pump. Inspections were completed early this evening.

As a result of the need for the additional inspections, the launch of Endeavour was moved from Thursday to Friday. The two-and-a-half hour window opens at 8:06 a.m. (Remaining in the countdown schedule is the option to launch Endeavour as much as an hour earlier at 7:06 a.m. This option will be implemented the day prior to launch day if mission managers judge the weather may not be acceptable at 8:06 but could be acceptable earlier.)

The launch of Endeavour will mark the beginning of the third Space Shuttle mission this year and the sixth for the orbiter Endeavour. The STS-59 mission will feature the first of two planned flights of the Space Radar Laboratory (SRL-1) scheduled for this year.

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GO TO THE *KSC PRESS RELEASES* HOME PAGE

NASA News Release ON LINE

JOHN F. KENNEDY SPACE CENTER

April 20, 1994
KSC Contact: Lisa Malone
KSC Release No. 49-94

KSC OFFICIALS TO PARTICIPATE IN ORLANDO PROCUREMENT SEMINAR ON APRIL 26

Kennedy Space Center Director Robert Crippen will welcome attendees to a one-day procurement seminar on doing business with NASA on April 26 at the Langford Hotel in Winter Park, Fla. Other businesses are participating in the event, which is sponsored by the Winter Park Chamber of Commerce.

Attendees will learn how to do business with NASA from procurement professionals including Ann Wastson, KSC's Industry Assistance Officer and Eugene Rosen, a NASA Headquarters specialist for small and disadvantaged businesses. KSC contractor industry assistance specialists will also participate in the instructional sessions.

Workshop topics include selling to the federal government, preparing proposals and how to pursue opportunities for small purchases, which account for 15 percent of all dollars awarded to small businesses by all government agencies. NASA's prime contractors will discuss subcontracting opportunities and the event will be capped off with a talk about how to participate in the Small Business Innovation Research program.

Last year, Florida's economy benefitted by $1.5 billion from spending by Kennedy Space Center in the form of space-related employment and contracts.

A Minority Business Expo entitled "Diversity in Trade" will cap off the day from 5:30 - 8:30 p.m. at the Winter Park Chamber of Commerce. NASA and prime contractor representatives will provide counseling at the Expo.

For more information and reservations call the Winter Park Chamber of Commerce at (407) 644-8281.

NASA News Release ON LINE

JOHN F. KENNEDY SPACE CENTER

May 3, 1994
KSC Contact: Lisa Malone
KSC Release No. 51-94

Note to Editors/News Directors:
KSC MEDIA CHIEF YOUNG TO RETIRE, HARRISON ASSIGNED TO HELM

News media representatives should take note of key personnel changes in KSC's Media Services Branch which are effective immediately.

After providing worldwide news media and the general public with information about NASA for 25 years, the last six as chief of Kennedy Space Center's Media Services Branch, Dick Young is retiring today.

Ed Harrison, a 36-year NASA veteran who currently serves as chief of the Public Affairs Visitor Center Office, will assume the post at KSC's Press Site immediately following Young's departure.

Young began his career with NASA as a public information specialist in 1969. From 1975 until his promotion to chief, Media Services Branch, Young served as news chief for the Kennedy Space Center.

Harrison began his NASA career in 1958 at Langley Research Center, Hampton, Va., as a photographic laboratory technician. In December 1961, he moved to Florida with the NASA Space Task Group, which was absorbed into KSC in 1964. At that time he was assigned to the KSC Public Affairs Public Information Branch. Harrison has spent most of his career working with news media representatives in the audio-visual area and served as the lead from 1980-1990.

In his new position, Harrison will be responsible for planning and administering an information program designed to keep the public informed, through the news media, of activities, results and significance of aerospace programs conducted at KSC.

NASA News Release ON LINE

JOHN F. KENNEDY SPACE CENTER

May 4, 1994
KSC Contact: Bruce Buckingham
KSC Release No. 53-94

LAUNCH ADVISORY -- NASA'S LAST SCOUT LAUNCH SET FOR MAY 6

NASA has rescheduled the launch of a Solid Controlled Orbital Utility Test (Scout) vehicle from Space Complex 5 at Vandenberg Air Force Base, Calif., for May 6, 1994. The launch window opens at 7:45 p.m. PDT and extends for 10 minutes. Scout will carry a Department of Defense payload called Miniature Seeker Technology Integration (MSTI-2) into low Earth orbit.

The launch had been earlier delayed due to contamination found on electrical relays on the MSTI-3 payload, which is being prepared for launch at a later date. Since identical relays are on MSTI-2, the decision was made to stand down while the relays on MSTI-2 were replaced. MSTI-2 is the second in a series of satellites that will support the development of advanced theater missile defenses for the armed forces.

This launch is the last for the Scout vehicle, a dependable four-stage launch system that has been in service since 1960. This launch will be the 118th for the Scout program in its 34 year career.

Scout will place the 360-pound MSTI-2 spacecraft into a 248.5 mile-high circular orbit at an inclination of 97.13 degrees.

The launch will be carried live on NASA Select television which is carried on Spacenet 2, transponder 5, channel 9, and located at 69 degrees West longitude, with a frequency of 3880 MHz. Commentary will begin about 30 minutes prior to the scheduled liftoff time and continue through spacecraft separation.

NASA News Release ON LINE

JOHN F. KENNEDY SPACE CENTER

May 1994
KSC Release No. 55-94

RESEARCH AND DEVELOPMENT AT NASA

The Origins of Research & Development

Using Research & Development (R&D) to create better tools or weapons extends back beyond recorded history, long before there was a name for the process. People in almost all ancient civilizations tried to produce better containers to hold liquids or dry foods, more powerful bows with arrows that would fly straighter, and edged tools and weapons that would not easily break or quickly become dull. But acquiring new scientific knowledge, with the intention of using it to create a specific, desired application, was not established in most countries until after World War II.

The war was a major catalyst for R&D, with both sides working hard to develop new or improved weapons. It was also demonstrated during World War II that directed R&D could be very effective, producing major new weapons in a comparatively short time. For example, the British used their expertise with high-frequency radio waves to develop radar; Americans used their knowledge of optics and physics to produce the more accurate Norden bombsight; and Germany developed the V-1 and V-2 rockets.

The idea of directed research to produce a specific application continued on into the civilian economy after the war.

Even a quest for knowledge which began as pure scientific research frequently turns out to be basic to some practical development. Specific applications emerge, which then start transforming the environment within which they originated. Pure and applied science thus progress hand-in-hand. The pure fertilizes the applied with ideas. The applied provides the pure with new research tools with which to obtain knowledge for the next great intellectual leap forward.

One primary difference between purely scientific research and a program of Research & Development is that researchers in the latter know what applications they want from the beginning. The research effort is directed toward finding the specific knowledge that will support that known, desired application. Most scientific research is less target-driven, more open to following up sidelights or unexpected developments if interesting ones appear.

Science is, in essence, a body of established knowledge, a base which is always being added to or modified by working scientists. The process of scientific inquiry is never finished; no answer is ever utterly and completely final. Nor can any scientist know in advance all the practical applications, good and bad, which inevitably flow from any major discovery. Often these, more so than the new knowledge itself, determine the benefits or harm it brings to humanity.

In R&D programs, with their emphasis on producing products that can be put to immediate practical use, the scientific research required is just the first step of a two-part process. The second step, applications, develops the new knowledge to the point where it can be utilized to meet a specific need. This development includes the actions that bring a new product or process, incorporating the new scientific discovery, to market.

Research & Development At NASA

NASA is one of the premier aerospace R&D organizations in the world, working on the frontiers of science and technology to create new knowledge, then using that knowledge to build practical products. In most years, a high percentage of NASA's budget is spent on research and engineering, in various forms.

As an example of R&D, NASA and its predecessors performed extensive research during the 1950s and '60s on the behavior of liquid hydrogen, because it was known to be one of the best possible fuels for a planned new rocket engine. But not enough was known about this supercold (-423 degrees F.), extremely thin liquid, which made metals so cold that most became very brittle. The engineers had to design safe and effective storage tanks and piping systems, as well as pumps or other means of moving large quantities at high volumes. After an extensive R&D program, the result was the RL10 engine for the Centaur stage. It burned liquid oxygen as an oxidizer and liquid hydrogen as a fuel. This was the most powerful rocket engine for its size to that time.

Most NASA research is of the R&D type, where the objective is known from the beginning. NASA performs much of this R&D in its own laboratories, but also contracts with private industry for many projects. NASA maintains close control over the objectives and timing of such contracted R&D.

NASA, like most other government agencies, issues R&D contracts on a competitive basis. When a technical manager identifies a specific need that cannot be met by existing technology, NASA initiates a Request For Proposals, or RFP. This goes out to known qualified potential bidders. This starts a complicated process that is designed to procure a high-quality research effort at the lowest practical cost. The preparing and signing of such a contract can take up to a year or more on large and complicated procurements.

NASA usually provides an R&D contractor with a list of specific requirements which clearly spells out the objectives. The contractor performs conceptual studies (sometimes as a part of the bidding process) and works with NASA to choose the one most likely to produce the desired product. NASA checks the progress of the work by holding Preliminary Design Reviews. When the engineering work is complete, a Critical Design Review authorizes the production of hardware. The actual hardware, either as component parts or complete prototype systems,

undergoes wind tunnel, flight, thermal and vacuum, or other testing as appropriate. If the product passes the tests it is declared operational, and a production contract may be issued if the item is needed in larger quantities.

The NASA Centers and Laboratories

There are nine major NASA Centers and one equivalent contractor-operated facility, the Jet Propulsion Laboratory (JPL). The nine NASA centers are Ames, Dryden, Goddard, Johnson, Kennedy, Langley, Lewis, Marshall and Stennis. All of the Centers and JPL perform both R&D and operational functions. At some Centers the emphasis is primarily on R&D, while others may devote more effort to operations. Typical NASA operations are launching space vehicles, controlling spacecraft in flight, and collecting scientific data for later analysis. The R&D work of NASA covers the entire field of aerospace, from airplane design to building and operating interplanetary spacecraft.

Ames Research Center: Ames conducts laboratory and flight research in space missions and aeronautics. The fields of interest in space include atmosphere entry research, planetary atmospheres, fundamental physics, materials, guidance and control, chemistry, and life sciences. Ames aeronautical research includes the areas of supersonic flight, vertical short take-off and landing (V/STOL) aircraft, and operational problems. As lead Center for helicopter research, Ames provides overall direction to the program and conducts research in aeromechanics, which includes technology integration and large-scale testing and simulation. Ames' space flight projects include management of scientific probes and satellites, and payloads for flight experiments.

Dryden Flight Research Center: Dryden is concerned with manned flight inside and outside the atmosphere, including low-speed, supersonic, hypersonic, and re-entry flight; general aviation; and high-performance aircraft and spacecraft, such as the F-15. Space vehicle programs are typified by studies such as flight behavior of lifting bodies and flight systems, and structural characteristics of aeronautical and space vehicles. In biotechnology, man-machine integration problems are studied. Some of the research aircraft previously tested at Dryden include X-1, D-558, X-3, X-4, X-5, XB-70, and the X-1 5, which was piloted to world speed and altitude records of 4,500 miles per hour and 350,000 feet high. The approach and landing tests of the first Space Shuttle Orbiter, Enterprise, were conducted at Dryden, and many landings of Space Shuttle orbiters returning from space.

Goddard Space Flight Center: Goddard is responsible for the development and management of a broad variety of unmanned Earth-orbiting satellites and experiments. These have included many of the Explorer scientific spacecraft; the Landsat Earth resources surveyors; the TIROS and Nimbus weather satellites; and many others. Goddard also managed the development of the Delta vehicle which launched most of these spacecraft. Goddard is the hub for the NASA Communications Network for the manned Space Shuttle, as well as most Earth-orbiting unmanned NASA satellites. Goddard has performed extensive R&D in the areas of satellite communication and control.

Jet Propulsion Laboratory: JPL is NASA's lead Center for the robotic exploration of the solar system. Every planet, with the exception of Pluto, has been explored by one or another of these spacecraft; Mariner, Ranger, Explorer, Surveyor, Viking, Voyager, Magellan, Galileo, Seasat, TOPEX/ POSIDON and Ulysses. High resolution instruments are controlled by complex onboard computers and software.

Ground controllers plan observations and react to new situations. The demanding environment of deep space requires extensive R&D of automated systems.

Extensive technology applications programs applicable to terrestrial use are also the focus of R&D. JPL's R&D work has resulted in biomedical, aviation, computer, safety, robotic, materials, Earth resource management, microdevice and communications spinoffs.

JPL is unique among the NASA Centers, since it is a Federally Funded Research & Development Center (FFRDC), operated for NASA by the California Institute of Technology.

A primary operational function of JPL is to control the antennas of the Deep Space Tracking Network, which command the flights of most NASA interplanetary spacecraft. JPL also supports R&D work related to designing and building these giant antennas. The techniques developed at JPL make it possible to communicate with spacecraft billions of miles away, at the outer edge of the solar system.

Johnson Space Center: Johnson manages the Space Shuttle program, including R&D on the orbiter - the most complex flight vehicle ever built. JSC also develops associated manned spacecraft systems; performs medical research related to space flight; and supports the development and integration of experiments for space flight activities. JSC will provide the basic truss structure, airlocks, guidance, navigation and control, propulsion, thermal control, and other systems for the Space Station.

Kennedy Space Center: Kennedy performs R&D related to its primary function, the checkout and launch of NASA space vehicles. All interplanetary missions, and most other NASA spacecraft that do not require a north-south orbit, have been launched at KSC. (North-south, or polar-orbiting spacecraft, are usually launched from Air Force or KSC facilities at Vandenberg AFB in California.) A notable R&D development at KSC was the Launch Processing System, the computer-controlled checkout and launch function which can be adapted to control other complex operating systems.

Langley Research Center: Langley specializes in aeronautics, though it has also developed technology for both manned and unmanned space exploration. Langley works to improve the safety, performance, and utility of aircraft. The major areas are the theoretical and experimental dynamics of flight, through the entire speed range; flight mechanics; materials and structures; multi-bladed propellers for high-speed subsonic aircraft; space mechanics; instrumentation; solid rocket technology; and advanced hypersonic engine research. Langley also conceives and develops flight simulators, conducts vertical/short take off and landing tests, and manages major spacecraft projects.

Lewis Research Center: The major missions of Lewis are aircraft, spacecraft, and rocket propulsion systems, and the generation of power in space. Other fields of investigation include materials and metallurgy; combustion and direct energy conversion; chemical, nuclear, and electric rocket propulsion systems; advanced turbojet power plants; the reduction of aircraft noise and engine pollution; plasma research; and magnetohydrodynamics. Lewis also maintains a data bank of research information about aerospace safety.

Marshall Space Flight Center: Marshall is a diversified project-management, science, and engineering center. The world's leader in rocket propulsion development, Marshall designed the Space Shuttle's solid rocket boosters, main

engines, and external tank, and provides them for every flight. The Center furnishes NASA's upper stage rockets to boost spacecraft beyond low-Earth orbit. Marshall manages most Spacelab science missions, designs experiments and space systems for the low gravity environment of space, and develops space observatories, such as the upcoming X-Ray Astrophysics Spacecraft. It is the site for development and fabrication of the Space Station's U.S. laboratory and habitation modules, as well as its environment control and life support systems.

Many of Marshall's science and engineering facilities are unique within NASA. Among these are propulsion test stands which hold sensor-laden engines and boosters to evaluate their performance during ground-test firings, and structural test facilities which shake and crush hardware to determine its strength.

Stennis Space Center: The Stennis Space Center in Mississippi provides the facilities, equipment and technical support necessary to develop and flight certify the Space Shuttle Main Engines. Because of its important role in engine testing over the past three decades, SSC has been designated as NASA's center of excellence for large propulsion systems testing. The Center also has the assignment to build the facilities and capabilities to test the propulsion systems hardware of the future.

In addition to these propulsion activities, Stennis is involved in a broad range of other research and technology projects. These activities include remote sensing technology development, earth sciences research, associated data systems development, and the transfer of NASA-developed technology. Stennis has the lead role in the agency's Earth Observations Commercialization and Applications program.

NASA, as the operator of the Space Shuttle and upcoming Space Station, performs a great many operational functions in addition to R&D. But the main thrust of the agency remains what it has always been, the research and development of aeronautical and space systems. Since its creation in 1958, NASA has often been described as the impetus for "cutting edge technology" in the United States. That is a function the agency will continue to perform into the 21st century.

NASA News Release ON LINE

JOHN F. KENNEDY SPACE CENTER

May 23, 1994
KSC Contact: Lisa Malone
KSC Release No. 58-94

Note to Editors/News Directors:
COSMONAUT TO PLANT TREE IN COMMEMORATION OF MISSION STS-60 MAY 24

News media representatives are invited to observe and photograph a tree-planting ceremony by Cosmonaut Sergei Krikalev on May 24 at 12:50 p.m. in KSC's Industrial Area to commemorate Mission STS-60 launched last February. Krikalev became the first Russian to fly aboard the Space Shuttle.

KSC Launch Director Bob Sieck, STS-60 Commander Charlie Bolden and Krikalev are scheduled to make brief statements at a site near the KSC Training Auditorium where Krikalev will plant a live oak tree.

As part of Russian tradition, cosmonauts plant trees in Russia following each of their space flights. During recent trips to Russia, KSC officials became aware of this tradition and wanted to incorporate the tree plantings locally. More trees will be planted at KSC by cosmonauts after they fly aboard the Shuttle.

Sieck will place a plaque near the tree with an inscription to identify its significance.

News media representatives should be at the KSC Press Site by 12:15 p.m. tomorrow for escort to KSC's Industrial Area for the ceremony. Those needing credentials should contact the News Center for arrangements.

NASA News Release ON LINE

JOHN F. KENNEDY SPACE CENTER

June 25, 1994
KSC Contact: Lisa Malone
KSC Release No. 71-94

Notice to Editors/News Directors:
CONGRESSIONAL REPRESENTATIVES TO VISIT KSC SATURDAY, JUNE 25

Two members of Congress, Corrine Brown (D), Florida, 3rd District, and Kweisi Mfume (D), Maryland, 7th District, will get a behind the scenes tour of the Kennedy Space Center Saturday, June 25.

KSC Director Robert Crippen will participate in their tour as will Jim Jennings, director, Human Resources and Management Systems Office; Jay Diggs, director, Equal Opportunity Program Office; and Joan Higginbotham, shuttle engineer.

While here, the group will tour the Launch Control Center firing rooms, the Orbiter Processing Facility, Vehicle Assembly Building, and Launch Pad 39A where the Shuttle Columbia is being prepared for the upcoming STS-65 mission scheduled for launch on July 8.

News media representatives will have an opportunity to photograph the Congressional members at 1:45 p.m. tomorrow at the Rocket Garden at Spaceport USA, KSC's Visitors Center. Ed Harrison, chief, Media Services Branch, will meet news media at the south end of the Rocket Garden tomorrow. There are no badging requirements for the photo opportunity.

NASA News Release ON LINE

JOHN F. KENNEDY SPACE CENTER

August 1, 1994
KSC Contact: Lisa Malone
KSC Release No. 87-94

IRENE DUHART LONG, M.D. NAMED DIRECTOR, BIOMEDICAL OPERATIONS AND RESEARCH OFFICE AT THE KENNEDY SPACE CENTER

Dr. Irene Duhart Long remembers the exact moment when she decided to become a physician specializing in aerospace medicine.

"I was nine years old," she recalled. "it was 1959, and I was watching a show on television called 'Man and the Challenge.' It was about getting ready for human spaceflight. There was a Lt. Col. John Paul Stapp on the show, and it showed him working with sled tests and other research that they were doing at the time. I remember watching the credits, which showed that Lt. Col. Stapp was an Air Force physician specializing in aviation medicine, and I said to myself, 'Wow, that looks like fun.'"

The show inspired Long to methodically establish goals for her future and set about achieving them. She recalls telling her parents she wanted to attend Northwestern University as an undergraduate, go to medical school in the midwest so she could remain near her family in Cleveland, Ohio, study general surgery at the Cleveland Clinic, and then find work with the space program in Florida.

Many years later, Irene Long has made her dreams into reality. She has just been named director, Biomedical Operations and Research Office, at the Kennedy Space Center. She had served as acting director since January. "Center Director Crippen called me with the news on July 11, the 12th anniversary of my entry into civil service with NASA," Long said. "it was a perfect moment."

As director, Long's job encompasses a diversity of functions, people and facilities. She is responsible for the program management of the center's aerospace and occupational medicine activities. "The bulk of our mission is to support KSC operations by assuring a healthy workforce and a healthy workplace," Long explained.

"The Biomedical Operations and Research Office oversees the Life Sciences Support Contract, as well as the environmental health and medical functions of the Base Operations Contract," Long continued. This includes the employee medical clinics on KSC and adjacent Cape Canaveral Air Station. The center's active environmental and ecological monitoring program also falls under the office's purview. Such diverse tasks as groundwater testing and safe removal of asbestos in certain of the center's older buildings are coordinated by the environmental

monitoring staff.

Another important function carried out under the Biomedical Office is life sciences research. Based at Hangar L on Cape Canaveral, the Controlled Ecological Life Support System (CELSS) project is a long-term NASA effort to develop a self-sufficient food chain to support long-term human stays in space. CELSS is a completely bioregenerative food cycle -- all its components are recycled, including waste. To date, numerous crops of lettuce and other foods have been successfully harvested in a non-soil environment as part of the CELSS project.

Life sciences personnel also provide scientific support to workers processing Shuttle payloads that are biological in nature. All biological experiments are prepared at Hangar L before being installed in the Space Shuttle for flight.

The Biomedical Office also is responsible for providing and coordinating medical, environmental monitoring and environmental health support to launch and landing activities for the Space Shuttle program. Even before she assumed her current position, Long was one of four people designated to staff the biomedical console in the Launch Control Center firing room for a Shuttle launch. "We're getting ready for our 64th Shuttle flight, so I've been at the console for about 16 missions," Long said. "We report four hours before the scheduled liftoff and stay until an hour after launch." She was the medical officer on duty the day of the Challenger accident in 1986, faced with the task of making sure that all the contingency organizations, from area hospitals located off-center to Defense Department medical evacuation teams, were ready to provide assistance. "We had to be ready to provide emergency support in a situation where it was extremely difficult to know what was happening," Long recalled.

Prior to becoming head of of the Biomedical Operations and Research Office, Long served as chief of the Medical and Environmental Health Office. In this capacity, she was responsible for assuring a comprehensive occupational medicine and environmental health program directed toward the maintenance of the health of the KSC workforce.

As a manager, Long is a strong proponent of personal empowerment, a key tenet of Total Quality Management and other continuous improvement work philosophies.

"I believe it's important to involve staff members in defining goals, developing a strategy for reaching them, and then empowering employees to achieve them," she explained. "I like to give overall guidance and direction, and try to act more like a coach or counselor than a traditional boss."

One of Long's proudest achievements during her aerospace medicine career was her part in creating the Space Life Sciences Training Program (SLSTP). "We were tasked by NASA Headquarters with developing a curriculum to inspire students to study science and mathematics," she said. In SLSTP, college students spend a summer at KSC learning about the space program. Now in its tenth year, the program has been so successful that most of the participants have learned about it through word of mouth.

As one of three top-ranking women at KSC, and the top-ranking African-American woman, Long is fully aware that she may be perceived as a role model. "I hope that I am someone that people can look at and say, 'I can do that too,'" she said and went on to emphasize the importance of setting goals early. "There's a saying that to know where you're going, you must know where you've been," she noted. "I think it's just

as important to say, to succeed and prosper in the present, you must know where you're headed."

Long can look out the window of her office on the third floor of the Operations and Checkout Building and see the vast expanse of KSC before her. But staying Earth-bound is not the ultimate goal for this space visionary. She tells the story of proudly phoning her mother in 1982 with the news that she had joined NASA, fulfilling at last the dream she had cherished since she was nine. Her mother reminded Long that she'd had still another goal beyond working at a space center. "She pointed out that the final step in my grand plan was to set up a medical clinic on the moon," Long observed.

Such futuristic goals are still very much a part of Long's mindset. In her far-sighted view, the biomedical, environmental and operational support her office provides to the Space Shuttle program at the spaceport today will become a precedent for future space endeavors. "The foundation we are laying now in the medical and life sciences world here at KSC will support the agency's programs 10, 20 and 30 years down the road," Long stated. "I would like to think that we are pioneers in occupational medicine for the space program. What we're doing here now on the ground will someday be done in space, be it on a space station, the moon or Mars."

Long is a graduate of Northwestern University in Evanston, Ill. She studied medicine at the St. Louis University School of Medicine, earning her medical degree in 1977. She completed two years of a general surgery residency at the Cleveland Clinic and the Mount Sinai Hospital of Cleveland. She then went on to complete another residency and also earned a degree in aerospace medicine from Wright State University School of Medicine, Dayton, Ohio. She is a member of the Aerospace Medicine Association, the Society of NASA Flight Surgeons, the National Medical Association, the Alpha Kappa Alpha Sorority, and the National Association for the Advancement of Colored Persons (NAACP). Originally from Cleveland, Ohio, Long presently lives on Merritt Island.

NASA News Release ON LINE

JOHN F. KENNEDY SPACE CENTER

August 19, 1994
KSC Contact: Lisa Malone
KSC Release No. 100-94

KSC REACHES OUT TO THE COMMUNITY WITH NEW MULTIPURPOSE ROBOT

EMPLOYMENT WANTED:
Security pro, bomb defuser and hazardous materials handler, adept at reconnaissance and rescues, looking for exciting and broadening new challenges. Works best in potentially dangerous and explosive situations. Versatile, mobile, strong and stable. Can traverse rough terrain. Can lift up to 100 pounds without tiring, and even drag a car not in gear. Keen eyesight and hearing, and good communication capabilities. Carries own tools and two cameras at all times. Obeys all commands without complaint. Have own transportation. Will work for free! Call Kennedy Space Center: the NASA Protective Services Office, at (407) 867-7575; or the NASA Advanced Systems Division, at (407) 867-4181.

One of NASA/KSC's latest additions to its work force, an Andros robot, is looking for ways to help surrounding communities and expand its capabilities. Fully operational since July 1, the approximately 900-pound, remote-controlled tracked robot has already proved its usefulness in tackling a tough job at the space center.

The teleoperated robot was used last month to deflate orbiter tires installed on the Convair-990, a research aircraft that was testing a new runway surface at KSC's Shuffle Landing Facility as part of an ongoing effort to enable the Space Shuttle orbiter to land under increased crosswind limits.

The tire testing was considered a hazardous operation -- the bursting of an orbiter tire inflated to its maximum 340 psi would injure or kill any person in the immediate vicinity. With the robot operator at the controls a safe distance away, it was the robot -- not any humans -- who would be in the danger zone in case of a tire blowout. The robot successfully deflated several orbiter tires, two by removing the air valve stem and the others by drilling into the tire sidewalls.

The Andros robot is now being considered for an important role in the convoy of people, vehicles and equipment which support orbiter landings, safing the orbiter before the crew exits. Another possibility? With the addition of sensors, it could do sniff checks at the launch pads during fuel tanking.

The robot is an off-the-shelf product of REMOTEC of Oak Ridge, Tenn. Designed to defuse bombs, the robot has many more potential applications and "tremendous capabilities," according to Steve Van Meter of NASA's Protective Services Office.

He is KSC's bomb technician and the primary operator of the robot.

"It's much more than a security tool," Van Meter said. "It can be used for any hazardous situation where you want to avoid putting people at risk."

For example, the Andros robot could be modified to handle some hazardous materials. If a leak in a container of hazardous fuel was suspected, the robot could be the eyes and even ears, if necessary, of humans positioned out of harm's reach.

In the case of a hostage situation, the robot with its two-way communications system also can be the "voice" of negotiators, as well as provide reconnaissance of the area, giving its operator vital information to make an initial assessment of the situation. While its lifting capacity is limited, especially with its "arm" extended the full 72 inches, the robot's gripper could drag an injured person out of harm's way if necessary.

The robot can defuse a bomb before the trigger mechanism can detonate by discharging water at very high pressure through a cylindrical "disrupter," part of its mostly aluminum anatomy.

The robot can travel up stairs, traverse trenches as wide as 2 feet, and reach vertically up to about 10 feet. It is mobile with its own cargo trailer and a portable generator. It can operate with or without its 480 feet of tether. By radio remote control, it can be manipulated from as far as one-quarter of a mile away. Its dexterity in close quarters with small objects depends largely on the skill of the operator.

"With a lot of practice it can even open doors with a key," Van Meter said.

NASA already has made some modifications to the robot, chief of which was a new and improved way to maintain its power supply. In searching for a way to keep his boat battery charged, Van Meter discovered a battery "manager" or "tender" that uses a computer chip to sense battery temperature, measure voltage and maintain a perfect charge. Van Meter and the lead engineer on the project, Todd Graham of NASA, agreed that the dual battery manager was highly effective in extending the life of the batteries and enhancing their performance -- the robot now can perform a full work day on its two batteries.

In what could be considered an example of technology transfer, with NASA as the intermediary, Van Meter put the maker of the battery tender, Patco Electronics Inc. in Titusville, in touch with REMOTEC which bought three different units and is evaluating them now for potential use.

NASA already has reached out into the community with the robot. Although it was not ultimately needed, the robot was on call for the World Cup soccer games in Orlando this summer. Brevard County Sheriff's Office bomb technician J.R. Hansen also has been trained in manipulating the robot. Besides Van Meter and Hansen, two other KSC employees, technicians Michael Lane of NASA and Kenny Heckle of I-NET, are trained operators.

"Any capability we have with the robot is available to benefit the community," Van Meter commented. He and Graham relish the thought of devising new tasks -- both inside and outside the space center -- for the robot to perform.

In the meantime, they are searching for an appropriate name to christen KSC's

newest trainee. Any suggestions?

NOTE TO EDITORS: Videotape and 8Xl 0 color photographs are available for this story by calling the NASA/KSC Press Site at 867-7819.

For automatic e-mail subscriptions to this daily Shuttle status report or KSC-originated press releases, send an Internet electronic mail message to domo@news.ksc.nasa.gov. In the body of the message (not the subject line) type the words "subscribe shuttle-status", or "subscribe ksc-press-release" (do not use quotation marks). The system will reply with a confirmation via e-mail of each subscription.

NASA News Release ON LINE

JOHN F. KENNEDY SPACE CENTER

September 30, 1994
KSC Contact: Lisa Malone
KSC Release No. 113-94

COLUMBIA TO UNDERGO MODIFICATIONS; FERRY FLIGHT BEGINS OCT. 3

Shuttle Columbia is scheduled to depart Kennedy Space Center en route to the Rockwell International manufacturing plant in Palmdale, Calif., no earher than Monday, Oct. 3. The flagship of the fleet will be taken off flight status for about six months for routine maintenance.

Columbia's departure from KSC had been scheduled to begin on Oct. 1 but departure was delayed due to anticipated adverse weather at KSC this weekend. Pending favorable weather conditions, the cross-country ferry flight will begin with a departure Monday morning. Mission managers are hopeful weather en route will permit a stop-over at Huntsville International Airport/Jetplex, Ala., and an overnight stay in Houston, Texas, at Ellington Field. However, weather will be a deciding factor in determining the final flight route and could result in it being diverted at the last minute to other refueling locations. Real time calls may be made en route.

About 90 modifications will be made to Columbia during its stay in California. Upgrades will be made to the main landing gear thermal barrier, tire pressure monitoring system and radiator drive circuitry. Repairs will be made to the radiators in areas where micrometeorites have made impacts. Other work planned includes intensive structural inspections and the application of an upgraded corrosion control coating on the wings and rudder.

Columbia's orbital maneuvering system pods and reaction control systems will remain at KSC for structural inspections and testing.

Columbia was the first operational orbiter of the fleet and flew the first five Shuttle flights. It has completed 17 of the 64 Shuttle missions and has scored several highlights for the program, including flying the first Spacelab flight, the ASTRO-1 mission, retrieval of the Long Duration Exposure Facility, the first Spacelab Life Sciences flight, the International Microgravity Laboratory and the German D-2 mission.

NOTE TO EDITORS: News media representatives will have an opportunity to photograph the departure of the Shuttle Columbia from the Shuttle Landing Facility. Those interested should call the KSC News Center's codeaphone Sunday night at 407-867-2525 for the time of departure on Monday.

send an Internet electronic mail message to domo@news.ksc.nasa.gov. In the body of the message (not the subject line) type the words "subscribe shuttle-status", or "subscribe ksc-press-release" (do not use quotation marks). The system will reply with a confirmation via e-mail of each subscription.

NASA News Release ON LINE

JOHN F. KENNEDY SPACE CENTER

October 4, 1994
KSC Contact: Lisa Malone
KSC Release No. 114-94

PARTNERSHIP HELPS DEVELOP NEW SPACE TECHNOLOGY

A new type of cost-sharing partnership to develop advanced technology for both NASA and industry was expanded at Kennedy Space Center when a follow-on agreement was recently signed to build an additional type of signal processor for both Space Shuttle processing and commercial use.

Under the new agreement, KSC and its partners will design and develop the Advanced Data Acquisition System (ADAS) that will be used in a future system to interpret engineering data coming from sensors located at the Space Shuttle launch pads during liftoff. The ADAS also has commercial applications for use, such as in test range telemetry systems.

"ADAS was spawned from our success in developing our first targeted technology through this partnership," said Bill Sheehan, chief of the KSC Technology Programs and Commercialization Office. "The team was able to produce a production prototype of the Advanced Universal Signal Conditioning Amplifier (USCA) in less than a year. This process could normally take three to five years if it had been developed in the traditional manner. "

The cost-sharing partnership is the first of its kind in the country and is based on NASA's new dual-use concept, Sheehan said. The concept calls for the formulation of NASA-industry teams to work together from the ground up to develop new technology for both agency and commercial use.

In addition to saving development time, the KSC/State of Florida-pioneered partnership provides cost-saving, economic development and educational benefits, Sheehan pointed out. The partners include KSC, the State of Florida's Technological Research and Development Authority (TRDA), Loral Test and Information Systems (LTIS), Brevard Community College and Bethune-Cookman College. The TRDA, LTIS and KSC are each funding one-third of the project development costs.

"Under this arrangement, we and LTIS will both benefit by gaining a product at far less expense than if each of us had to develop the product on our own," Sheehan said. "The state benefits from helping promote economic development in Florida, while the colleges are able to expand their educational programs by having engineering co-ops participate in a working program to develop new technology."

Three co-ops from Bethune-Cookman will be involved in the ADAS project, Sheehan added.

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NASA News Release ON LINE

JOHN F. KENNEDY SPACE CENTER

October 5, 1994
KSC Contact: Lisa Malone
KSC Release No. 115-94

INDUSTRY BIDS RECEIVED FOR KSC PUBLIC VISITOR PROGRAM CONTRACT

Bids were received for the concession contract to manage and operate Kennedy Space Center's Public Visitor Program and the facilities of Spaceport USA.

Companies that submitted bids for the concession agreement include: The Bionetics Corporation, Hampton, Va.; Delaware North Parks Service, Buffalo, N.Y.; and TW Recreational Services, Spartanburg, S.C., the incumbent concessionaire.

The successful offeror will operate Spaceport USA and conduct a variety of educational and information programs, including providing tours of Kennedy Space Center and portions of Cape Canaveral Air Station.

Spaceport USA attracts the largest attendance of any NASA visitor center and ranks as one of Florida's top attractions. In 1993, an estimated 2.4 million people visited Spaceport USA. Entirely self-supported, Spaceport USA's gross revenues totaled nearly $40 million last year.

NASA expects to enter into a new concession agreement covering a 10-year period beginning May 1, 1995, with an option to extend for one 5-year period.

NASA News Release ON LINE

JOHN F. KENNEDY SPACE CENTER

November 23, 1994
KSC Contact: Lisa Malone
KSC Release No. 130-94

KSC PROVIDES $1.36 BILLION BOOST TO FLORIDA'S ECONOMY DURING FY 94

Space-related employment and contracts at NASA's Kennedy Space Center yielded a $1.36 billion boost to Florida's economy during the 1994 fiscal year which ended Sept. 30.

This figure represents $1.23 billion in Florida contracts and purchases along with $131 million in civil service personnel compensations.

Ninety-six percent of the Florida dollars, or $1.18 billion, were expended within Brevard County. Of this expenditure, $1.14 billion went to contractors operating on-site at the space center.

An additional $43.4 million went to off-site businesses in Brevard County, while $46.5 million was awarded to Florida businesses outside the county. Out-of-state purchases totaled about $81 million.

Furthermore, KSC exceeded its socioeconomic goals, established by the Small Business Administration, by awarding over $68 million in contracts to small, disadvantaged and women-owned businesses located around the country.

The total number of federal employees at KSC was 2,435 during the same period. While 3,162 people held construction and tenant jobs at KSC, the majority of the workers almost 10,900 - were employed by the on-site contractors. Overall, approximately 16,500 workers were employed at KSC through the close of the fiscal year on Sept. 30.

Major contractors at KSC include Lockheed Space Operations Co., the shuttle processing contractor; EG&G Florida, Inc., the base operations contractor; McDonnell Douglas Aerospace, Space and Defense Systems-KSC, the payload ground operations contractor; and Rockwell International Corp., the Shuttle orbiter logistics support contractor.

NASA News Release ON LINE

JOHN F. KENNEDY SPACE CENTER

November 23, 1994
KSC Contact: Lisa Malone
KSC Release No. 131-94

DOCKING HARDWARE FOR SHUTTLE/MIR FLIGHTS SET TO ARRIVE AT KSC

The first major Space Shuttle hardware required for the upcoming Shuttle/Mir docking missions was scheduled to arrive at Kennedy Space Center on Nov. 23.

The Orbiter Docking System (ODS) was shipped from integration contractor Rockwell Aerospace's plant in Downey, Calif., via a C-5 cargo plane to KSC's Shuttle Landing Facility.

The ODS was procured through Rockwell, from Russian entity RSC Energia (formerly NPO Energia) which manufactured it. It will be installed in the payload bay of the orbiter Atlantis and remain there for at least seven Shuttle/Mir dockings currently scheduled, beginning with STS-71 in late May/early June 1995. The dockings constitute one of the major elements of Phase I of the International Space Station program, a cooperative effort between the United States, Russia, Canada, Japan, and the member nations of the European Space Agency.

The ODS will function as the connection point on the orbiter side for docking with the Krystall module on Mir, while also serving as a corridor through which astronauts and cosmonauts can pass. It consists of an external airlock, a truss structure, and a Russian-made docking mechanism called the Androgynous Peripheral Docking System (APDS) mounted on the top of the airlock. For the docking flights, the external airlock will function as a passageway rather than as a true airlock.

The ODS will be installed in the forward section of the orbiter Atlantis' payload bay, and connected to the orbiter's internal airlock via a tunnel adapter.

The ODS will undergo processing in the Extended Duration Orbiter (EDO) Facility, located in the Vehicle Assembly Building in the Launch Complex 39 area. After being uncrated, it will be hoisted to an upright position and begin preflight checkout. Equipment such as cameras and laser controls will be installed here at KSC.

The processing schedule currently calls for the ODS to be transferred to the Orbiter Processing Facility (OPF) on Feb. 20, 1995, for installation in the cargo bay of Atlantis. The Spacelab module will follow, with transfer from the Operations and Checkout Building currently scheduled for March 17, 1995.

Additional tests, including an end-to-end test involving the flight crew, will be

performed in the OPF to verify the hardware. The shipment from Rockwell also included a piece of Russian-built test equipment called the Passive Docking System, which simulates the APDS interface on the Krystall docking port, allowing a realistic test of the actual docking sequence.

NOTE TO EDITORS/NEWS DIRECTORS: Press representatives will have the opportunity to view and photograph the Orbiting Docking System in the Vehicle Assembly Building next week. KSC officials will be on hand to answer questions about the processing of the ODS. For the exact date and time, call the Press Site at 407/867-2468.

NASA News Release ON LINE

JOHN F. KENNEDY SPACE CENTER

December 22, 1994
KSC Contact: Lisa Malone
KSC Release No. 133-94

1994 AT KSC PAVED WAY TO FUTURE SPACE GOALS

One hundred years from now, a historian reviewing activities at the Kennedy Space Center for 1994 would undoubtedly conclude that this has been a pivotal and highly successful year for the U.S. space program.

It is clear in looking over the year's achievements that America's space program is robust and healthy, relying on a complementary mix of manned and unmanned launch vehicles to study the Earth and the solar system, and to conduct research in the near-weightless environment of space. Seven Space Shuttle missions were flown in 1994, two expendable launch vehicles (ELVS) lifted off from the Cape carrying aloft NASA payloads, while a third ELV was launched from the west coast with a Defense Department payload.

By the end of the year, 65 Shuttle missions had been completed since the program began in 1981 -- more than twice as many flights as in all previous U.S. human spaceflight programs combined. And despite the high number of flights already logged, the program still notched up new achievements in 1994.

In addition to the continued accummulation of scientific knowledge, the 20th KSC landing occurred on STS-62 in March; the first Russian cosmonaut flew on the Space Shuttle on STS-60 in February; the first Japanese woman flew in space on STS-65 in July, which also became the longest Shuttle flight to date at 14 days, 17 hours and 55 minutes; and the first untethered U.S. space walk in 10 years occurred on STS-64 in July.

Another hallmark of 1994 was the continued professionalism of a team able to get seven Shuttle launches off the ground, to oversee three expendable vehicle launches, and to prepare numerous payloads for flight during a difficult period of work force shrinkage. Employment at KSC has declined from a post-retum-to-flight peak of 19,050 workers in 1991 to 16,500 at the end of September 1994. A strike between EG&G Florida, which holds the base operations contract, and the Intemational Association of Machinists District 166 was resolved in October when union members accepted a new contract.

Early in the year the American Society of Civil Engineers named the center as one of the seven wonders of the United States. The society makes its selections based on criteria that include service to the well-being of people and communities, uniqueness, pioneering aspects in design and construction, and great size and beauty. And while the center's spectacular civil engineering achievements were noted in particular, the accomplishments of 1994 lent greater luster to the accolade.

Center's Focus on Quality Gains Recognition

A strong emphasis on quality and improved efficiency was honored in 1994 when KSC was named a finalist in the President's Quality Award program for the second year in a row.

The prestigious award recognizes federal government organizations that are leading the way in implementing quality management and achieving high standards of customer satisfaction. Center Director Robert Crippen declared KSC employees winners for being selected as finalists in the process. Final judging will take place Jan.

24-26, 1995.

The center's success in streamlining operations and cutting costs while maintaining customer satisfaction was further acknowledged by the vice president of the United States himself. In a ceremony June 15 at NASA Headquarters, the KSC team was one of several singled out by Vice President Al Gore for taking actions that are in keeping with the National Performance Review to reinvent government. Gore praised the Shuttle processing team, led by Shuttle Management and Operations Director Jay Honeycutt, for reducing the cost of each Shuttle flight in recent years by $43 million, achieving a 40 percent reduction in the time it takes to assemble the Shuttle for launch and doing it with a 30 percent smaller work force. All this was done without compromising safety, and while actually improving quality.

Gore also commended the payload customer service team led by Payload Management and Operations Director John Conway for significant improvements in customer service in the last three years. Customer support involves providing basic services such as telephone lines and work space to payload customer's ranging from multinational teams to high school students. After a survey three years ago found customers were rating 40 percent of the delivered services as unsatisfactory, the support team made a concerted effort to change. As a result, all of those criteria which received poor ratings three years ago are now rated as satisfactory by the customers themselves.

Mature Shuttle Program in Full Stride

The direction of the U.S. space program was unmistakable in 1994. A pattern of strong international cooperation began switching into higher gear to zero in on a major goal: advancing human exploration of the solar system by building a permanently occupied station in space.

The race to the future got off to a running start early on, when the first Russian cosmonaut flew aboard the U.S. Space Shuttle. The flight of veteran space traveler Sergei Krikalev on Mission STS-60 in February marked one of the highlights of Phase I of the international space program, which also will include a series of dockings between the Shuttle and the Russian space station Mir beginning in 1995. The productive start of the new partnership was appropriately celebrated with the inauguration of a new ceremony at KSC: Krikalev and fellow crew members retumed to the space center to honor the successful completion of their spaceflight with a tree-planting ceremony, a Russian tradition now finding its place in U.S. spaceflight history.

Many primary payloads made their second and even third flights on the Shuttle in 1994, demonstrating anew the Shuttle's capability as a research platform in space.

STS-60 carried the SPACEHAB module, flying for a second time. Other major payloads making their second flights in 1994 included the U.S. Microgravity Payload-2 (USMP-2), which flew on STS-62 in March, and the International Microgravity Laboratory-2 (IML-2), which flew on STS-65 in July. One payload, the Space Radar Laboratory, flew twice in the same year, making its maiden flight on STS-59 in April and then again on STS-68 in October. The Atmospheric Laboratory for Applications and Science (ATLAS) made its third trip on the final Shuttle flight of 1994, STS-66 in November.

The year also marked the second time a payload has been controlled from KSC. The Cryogenic Infrared Spectrometers and Telescopes for the Atmosphere - Shuttle Pallet Satellite (CRISTA-SPAS) payload which flew on STS-66 was controlled from NASA's Hangar AM at Cape Canaveral Air Station.

The diverse purposes of the payloads further confirmed the Shuttle's versatility. Observation platforms such as the ATLAS-3 and SRL-2 collected data about the Earth, while others such as IML-2 focused on life sciences and materials processing research in the near weightless environment of space. Much of the research is aimed at preparing for the extended human stays in space that will occur on the space station.

Summary of 1994 Space Shuttle Missions
(60th - 66th Shuttle flights)

Mission/ Orbiter	Pad	Launch	Landing	Crew	Payloads
STS-60 Discovery	39A	Feb. 3	Feb. 11	Charles Bolden, Kenneth Reightler, Franklin Chang-Diaz, Jan Davis, Ronald Sega, Sergei Krikalev	SPACEHAB Wake Shield Facility-1
STS-62 Columbia	39B	March 4	March 18	John Casper, Andrew Allen, Charles Gemar, Marsha Ivins, Pierre Thuot	USMP-2 OAST-2
STS-59 Endeavour	39A	April 9	April 20	Sidney Gutierrez, Kevin Chilton, Linda Godwin, Jay Apt, Michael Clifford, Thomas Jones	SRL-1
STS-65 Columbia	39A	July 8	July 23	Robert Cabana, James Halsell, Richard Hieb, Donald Thomas, Carl Walz, Leroy Chiao, Chiaki Naito-Mukai	IML-2
STS-64 Discovery	39B	Sept. 9	Sept. 20	Richard Richards, Blaine Hammond, Susan Helms, Carl Meade, Mark Lee, J.M. Linenger	LITE SPARTAN-201
STS-68 Endeavour	39A	Sept. 30	Oct. 11	Michael Baker, Terrence Wilcutt, Thomas Jones, Daniel Bursch, Peter Wisoff, Steven Smith	SRL-2
STS-66 Atlantis	39B	Nov. 3	Nov. 14	Donald McMonagle, Curtis Brown, Ellen Ochoa, Joseph Tanner, Scott Parazynski, Jean-Francois Clervoy	ATLAS-3 CRISTA-SPAS

Orbiters on the Move

The year also saw Shuttle orbiters make a number of cross-country trips to and from the center. In late May, Atlantis returned to KSC after spending 19 months at orbiter manufacturer Rockwell Aerospace's facility in Palmdale, Calif. Besides being the last orbiter to be equipped with the landing drag chute, Atlantis also underwent a number of modifications to prepare for extended duration flights and the series of docking missions between the Shuttle and Mir. Routine checkout and maintenance also was performed. Atlantis retumed to the skies in November on STS-66, its first flight since STS-46 in 1992.

In October, the oldest orbiter in the fleet, Columbia, departed for the west coast atop the 747 Shuttle Carrier Aircraft. Columbia is undergoing the routine checkout and maintenance periodically performed on orbiters at Palmdale before heading back to KSC in 1995. When Columbia retums in 1995 it will begin preparations for its 18th spaceflight, STS-73, set to become the longest Shuttle flight to date at 16 days duration.

Expendable Vehicles Complete Launch Picture

While one team of KSC employees was busy readying the Shuttle and its payloads for flight, the expendable launch vehicles (ELVS) team helped send two unmanned flights into orbit from the Cape and a third from the west coast.

The GOES-I satellite was launched on an Atlas-1 expendable rocket in April. Dubbed GOES-8 once in orbit, the advanced technology spacecraft greatly advances U.S. weather forecasting capability. Also launched from the Cape in 1994 was the Wind spacecraft, carrying the first Russian science instrument to fly on a U.S. spacecraft. Wind will continue an international effort to study solar-terrestrial physics.

The team also traveled to the west coast to support the launch of the last Scout vehicle in the NASA inventory.

The May 8 launch carded a Department of Defense payload. It marked a successful finale for one of America's most reliable expendable vehicles, completing more than 115 launches since the program began in 1960.

Summary of 1994 Expendable Vehicle Launches			
Vehicle	**Pad**	**Launch**	**Payload**
Atlas I	**LC 36B Cape Canaveral**	**April 13**	**Geostationary Operational Environmental Satellite (GOES-I, became GOES-8 on orbit). Procured by NASA for National Oceanic and Atmospheric Administration (NOAA).**
Delta II	**LC 17B Cape Canaveral**	**Nov. 1**	**Wind. NASA payload carrying U.S., European and Russian instrumentation.**
Scout	**Vandenberg Air Force Base, Calif.**	**May 8**	**Miniature Sensor Technology Integration-2 (MSTI-2). A Defense Department payload launched on a NASA rocket.**

Government and Industry Pool Resources

The center broke new ground in 1994 when it joined forces with private industry to develop an Advanced Data Acquisition System (ADAS) that will eventually be used to interpret engineering data coming from sensors located at the Space Shuttle launch pads during liftoff. The ADAS also has commerical applications, such as in test range telemetry systems.

The cost-sharing partnership is the first of its kind in the country and is based on NASA's dual-use concept, which calls for the formulation of NASA-industry teams to work together from the ground up to develop new technologies for both agency and commercial use. Joining with NASA/KSC are the state of Florida's Technological Research and Development Authority; Loral Test and Information Systems; Brevard Community College; and Bethune-Cookman College.

The partnership will help reduce development costs by splitting them among the partners, and the pooling of the work is expected to cut development time. The partnership also benefits the state of Florida, and affords the involved educational institutions an opportunity for their students to participate firsthand in a technology development effort.

New Facilities Expand Center's Role

Four new KSC facilities opened their doors in 1994 to continue and expand the center's work. In March, a new building to assist industry opened on State Road 3 just outside the center. The Central Industry Assistance Office, or CIAO, allows potential bidders to review contract solicitations and attend contract bid openings without having to obtain a temporary badge. Representatives of NASA and KSC prime contractors also staff the facility to offer counseling on contract and subcontract opportunities.

The 457,000-square-foot Space Station Processing Facility (SSPF), dedicated in June, will be the final checkpoint for elements of the international space station prior to launch. It includes clean rooms for processing space station elements with supporting control rooms and laboratories. Payload hardware for the second Shuttle-Mir docking flight will be the first flight hardware to be processed in the SSPF. The first space station hardware is due to arrive beginning in June 1997.

The following month, a ribbon-cutting was held at the Center for Space Education. The center houses expanded attractions such as the Educators Resource Center and Exploration Station, formerly located in Spaceport USA. The popularity of these educational opportunities is demonstrated by attendance figures: more than 254,000

students and teachers visited the Exploration Station in 1993 alone.

In October, a facility opened that could help streamline payload processing and save money. Payload operations currently being conducted in buildings located on Cape Canaveral Air Station will eventually be transferred to the 19,600-square-foot Payload Spin Test Facility-Replacement (PSTF-R), conveniently consolidating KSC payload processing work in the Industrial Area.

Center's Progressive Conservation Efforts Pay Off

KSC entered a new era of alternative energy in 1994 when a 25-mile natural gas pipeline was activated in the summer. Increased usage of the energy-efficient, low-emission fuel will save the center an estimated $300,000 per year. Natural gas will be used to eliminate the need for diesel fuel currently used in boiler systems, propane used for the cafeterias, and the gasoline used for motor vehicles. Gasoline-powered government vehicles are being converted from gasoline to natural gas-buming systems.

The switch to natural gas will result in a substantial decrease in combustion emissions around the center. By converting large hot water heaters, vehicles and other equipment to natural gas, the amount of sulfur dioxide and particulate emissions will be reduced by more than 90 percent by the year 2000. Also eliminated will be the requirement for about 500 truckloads per year of petroleum fuel.

The center's aggressive push toward energy conservation did not go unnoticed. In April, the center received three awards from the U.S. Department of Energy for its efforts. The space center was one of just 15 federal facilities govemmentwide to receive the department's energy management award. Cited were energy efficiency projects that saved more than 78 billion British Thermal Units (BTUS) of energy in fiscal 1993 -- enough power for about 1,700 homes for a year -- and saving the government about $870,000 that did not have to be spent for fuel or electrical power.

A KSC employee was honored for lighting conservation efforts that earned a $93,000 rebate from Florida Power, and a KSC team's success in developing an air conditioning system that saved 1.6 million gallons of water also was recognized. The process has been implemented at other facilities and will save about 2,500 gallons of water per day.

Contracts Awarded to Continue Center's Work

Future work at the space center will be molded by two contracts that were awarded during 1994. In October, Rockwell Aerospace received a $1.4 billion contract to continue providing Shuttle Orbiter logistics operations requirements. The cost-plus-award-fee contract extends from 1995 to 1999 with a four-year option covering 2001 to 2004. The contract covers logistics work associated with providing orbiter spare parts and repairs for the Space Shuttle fleet. Much of the work is performed at the Rockwell-operated NASA Shuttle Logistics Depot in Cape Canaveral, a 278,000-square-foot complex considered to be the world's largest maintenance center for the manufacture and repair of hardware for manned spaceflight.

And in November, Dynamac Corp. of Rockville, Md., was awarded a life sciences support services contract potentially worth $61.3 million. The contract covers a year beginning Jan. 1, 1995 with six one-year contract options extending until 2001.

The work includes processing medical, biomedical and biological flight experiments for launch and landing in addition to continuing research on NASA's Controlled Ecological Life Support System (CELSS), a bioregenerative concept for long-term space travel. Dynamac also will be responsible for environmental and ecological monitoring services, life sciences research and development and maintenance of laboratories and facilities at the center.

Other significant contracts awarded in 1994 included the selection in February of Wallingford, Conn.-based DNE Technologies to replace aging equipment in the Launch Processing System (LPS), the automated computer system which handles command, control and monitoring of the Space Shuttle during its processing flow at KSC

through liftoff.

DNE Technologies will replace the Hardware Interface Modules (HIMs), the electronic boxes that provide the interface between the LPS and ground support equipment in KSC facilities as well as between ground support equipment and the Shuttle itself. Total value of the five-year, firm-fixed-price contract is about $13 million.

In April, Air Products and Chemicals Inc., Allentown, Penn., was selected to supply liquid hydrogen for the Space Shuttle program at KSC and other facilities. NASA uses supercold liquid hydrogen as the fuel to help power the Shuttle three main engines during the ascent phase of flight, ground testing and propulsion development. Liquid hydrogen also acts as the propellant for the Shuttle's onboard fuel cells. Liquid hydrogen delivery will begin Dec. 1, 1995, and continue through Nov. 30, 2010. Total estimated value of the contract is about $160 million.

All in all, space-related employment and contracts at KSC yielded a $1.36 billion boost to Florida's economy during the 1994 fiscal year that ended Sept. 30. Furthermore, KSC exceeded its socioeconomic goals, established by the Small Business Administration, by awarding over $68 million in contracts to small, disadvantaged and women-owned businesses located around the country.

Honoring the Past

While working toward the future, the KSC team also took time to reflect on the past when the center joined the world in celebrating the 25th anniversary of the Apollo 11 lunar landing mission in July.

Employees were invited to attend a special ceremony in the Rocket Garden at Spaceport USA featuring speakers from the Apollo era as well as political leaders of today. A commemorative dinner and showings of the IMAX movie Destiny in Space also marked the occasion.

Looking Ahead

The year ended at KSC in the same way it had begun: marching toward the future. In late November a key piece of orbiter hardware needed for the upcoming Shuttle/Mir dockings arrived at the space center to begin preflight processing. After undergoing preflight checkout work in the Extended Duration Orbiter Facility, the Orbiter Docking System will be transferred to the Orbiter Processing Facility for installation in the cargo bay of Atlantis.

The new year also will bring a new director to the helm at the space center. On Dec. 12, KSC Director Robert Crippen announced he was resigning his post effective Jan. 21, 1995. Succeeding him is space program veteran Jay Honeycutt, who came to KSC in 1989 from Johnson Space Center to serve as Shuttle Management and Operations director.

Honeycutt becomes the sixth center director since KSC was formed in 1962. He joined NASA in 1966.

And, for the first time in Kennedy's history, a KSC employee was named as a candidate for the astronaut corps. Kathryn Hire, a test project engineer for Lockheed Space Operations Company, was named a candidate in December after an intensive round of interviews last summer. Two other KSC employees were interviewed as well.

As the year drew to a close the center was preparing for STS-63, the first flight of 1995, which will feature the second flight of a Russian cosmonaut on the Shuttle. Also upcoming in 1995 are the first and second docking flights between the Shuttle and the Mir space station. These activities will signal that the United States and its international partners have advanced one step closer to the goal of a permanently occupied space station. KSC is ready.

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