

NASA News Release

ONLINE



JOHN F. KENNEDY SPACE CENTER

February 4, 1993

KSC Contact: Bruce Buckingham

KSC Release No. 10-93

Notice To Editors/News Directors:

KSC NEWS CENTER OFFICE HOURS FOR PEGASUS ARRIVAL

The NASA B-52 aircraft carrying the Orbital Sciences Corporation Pegasus rocket is scheduled to arrive at KSC on Sunday, Feb. 7, with launch targeted for Feb. 9.

The aircraft is currently scheduled to depart Edwards Air Force Base, Calif., at about 10:00 a.m. EST on Sunday with a single refueling stopover planned at Sheppard AFB, Texas. If weather permits, arrival of the aircraft at KSC's Shuttle Landing Facility should be about 4:30 p.m. EST.

Status updates regarding the cross-country flight will be made on KSC's codaphone over the weekend. This can be reached by calling 407/867-2525.

Public Affairs officers will be in the KSC Press Site office by 9:30 a.m. Sunday in order to provide status updates by phone. The office, however, will not officially open until it is determined the aircraft will in fact be arriving at KSC.

If it is determined that the aircraft will be successful in completing the day-long trip to KSC on Sunday, the office will officially open at 3:00 p.m. In that event, media interested in viewing the B-52/Pegasus arrival should plan on calling the KSC news center at 407/867-2468 for departure times to the Shuttle Landing Facility.

News media who do not possess current credentials must contact the Public Information Office before close of business Friday, Feb. 5, to arrange for badging. No badging capability will be available on Sunday.

Launch is currently set for Tuesday, Feb. 9, with the B-52 scheduled to take-off from the SLF at about 7:15 a.m. EST. Launch is scheduled for about 8:15 a.m. - 8:30 a.m. News media interested in covering launch day activities must arrange for badging before the close of business Monday at 4:30 p.m.

GO TO THE [KSC PRESS RELEASES](#) HOME PAGE

NASA News Release

ONLINE



JOHN F. KENNEDY SPACE CENTER

February 8, 1993

KSC Contact: Bruce Buckingham

KSC Release No. 11-93

Notice To Editors/News Directors:

KSC NEWS CENTER OFFICE HOURS FOR PEGASUS LAUNCH

The NASA B-52 aircraft carrying the Orbital Sciences Corporation Pegasus rocket is scheduled for launch Tuesday, Feb. 9. The aircraft is expected to depart from KSC's Shuttle Landing Facility (SLF) at 7:01 a.m. Launch is targeted for 8:15 a.m.

To support launch day operations, the KSC Press Site office will be open for media access beginning at 6:00 a.m. Tuesday. Media who wish to view the B-52/Pegasus departure from the SLF mid-point should plan on being at the Press Site by 6:15 a.m.

Mission commentary will be aired on NASA Select beginning at 6:45 a.m. and continue through orbit insertion, about 10 minutes after launch.

News media interested in covering launch day activities must contact the Public Information Office and arrange for badging before the close of business today at 4:30 p.m.

GO TO THE [KSC PRESS RELEASES](#) HOME PAGE



JOHN F. KENNEDY SPACE CENTER

May 21, 1993

KSC Contact: Bruce Buckingham

KSC Release No. 57-93

Note to Editors:

NASA SETS JUNE 3 AS TARGET DATE FOR NEXT SHUTTLE MISSION

NASA managers today set June 3, 1993 as the target date for the next flight of the Shuttle system. The mission, designated as STS-57, will see Space Shuttle Endeavour and her six person crew conduct a mission highlighted by the retrieval of the European observation satellite EURECA and the first flight of a commercial spacelab facility known as Spacehab.

The June 3 date is based on successful completion of work in progress to understand the cause of a noise/vibration event experienced during launch pad processing.

The launch window on June 3 opens at 6:17 p.m. EDT and extends for 1 hour and 11 minutes. The limited launch window time is based on EURECA retrieval requirements. The mission duration is planned for 7 days. However, it may be extended by 1 day immediately after launch if projections calculated at that time for electrical power consumption permit an extra day in space. The extra day will give two members of Endeavour's crew the opportunity to perform an extravehicular activity (EVA) or spacewalk.

The STS-57 EVA will be the second in a series of spacewalks designed to refine training methods and expand the EVA experience level of astronauts, flight controllers and instructors. The STS- 57 spacewalk also will assist in refining several procedures being developed to service the Hubble Space Telescope on Shuttle Mission STS-61 in December.

Leading the STS-57 crew will be Mission Commander Ronald Grabe. Pilot for the mission is Brian Duffy. Heading up the science team will be Payload Commander David Low who is also designated as Mission Specialist-1. The three other mission specialists for this flight are Nancy Sherlock (MS-2), Jeff Wisoff (MS-3) and Janice Voss (MS-4).

This will be the fourth flight of Space Shuttle Endeavour and the 56th flight of the Space Shuttle system.

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GO TO THE [KSC PRESS RELEASES](#) HOME PAGE

NASA News Release

ONLINE



JOHN F. KENNEDY SPACE CENTER

June 7, 1993

KSC Contact: Bruce Buckingham

KSC Release No. 61-93

NASA SETS JUNE 20 AS NEW DATE FOR THE STS-57 SHUTTLE MISSION

NASA managers today set June 20, 1993 as the new launch date for the next flight of the Shuttle system. The STS-57 mission will see Space Shuttle Endeavour and her six person crew conduct a mission highlighted by the retrieval of the European observation satellite EURECA and the first flight of a commercial spacelab facility known as Spacehab.

The decision to go with a June 20 date follows the completion of work to remove and replace the liquid oxygen turbopump from Endeavour's #2 main engine. The pump was changed out because of an issue which was raised with a part on the pump. The decision to remove and replace the pump delayed the launch of Endeavour which was originally scheduled for June 3.

The launch window on June 20 opens at 9:37 a.m. EDT and extends for 1 hour and 11 minutes. The limited launch window time is based on EURECA retrieval requirements. The mission duration is planned for seven days. However, it may be extended by one day immediately after launch if projections calculated at that time for electrical power consumption permit an extra day in space. The extra day will give two members of Endeavour's crew the opportunity to perform an extravehicular activity (EVA) or spacewalk.

This will be the fourth flight of Space Shuttle Endeavour and the 56th flight of the Space Shuttle system.

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GO TO THE [KSC PRESS RELEASES](#) HOME PAGE

NASA News Release

ONLINE



JOHN F. KENNEDY SPACE CENTER

September 9, 1993

KSC Contact: Bruce Buckingham

KSC Release No. 112-93

STS-51 COUNTDOWN BEGAN AS SCHEDULED TODAY

The countdown for launch of the Space Shuttle Discovery on mission STS-51 began as scheduled today at 8 a.m. EDT, at the T-43 hour mark.

This marks the beginning of the fourth launch attempt of the orbiter Discovery since launch was scrubbed on July 17 and 24 due to technical problems and again, most recently, on August 12. Additionally, launch was postponed from August 4 until August 12 due to concerns regarding the Perseid meteor shower and from September 10 to 12 due to concerns with the Advanced Communications Technology Satellite (ACTS) payload.

The countdown includes 28 hours and 45 minutes of built-in hold time leading to the opening of the launch window at 7:45 a.m. (EDT) on Sunday, September 12. The 1 hour, 55 minute window extends until 9:40 a.m.

A primary objective of this mission is the deployment of the ACTS and its Transfer Orbit Stage (TOS). ACTS/TOS is the latest in NASA's series of advanced communication satellites and a test-bed for technology which will be used in future operational satellites. Also, the Orbiting Retrievable Far and Extreme Ultraviolet Spectrometer-Shuttle Pallet Satellite (ORFEUS-SPAS) payload will be deployed and retrieved during this mission.

Also on board is the Commercial Protein Crystal Growth (CPCG) experiment, the Chromosome and Plant Cell Division in Space (CHROMEX) experiment, and the IMAX camera.

In addition, astronauts Jim Newman and Carl Walz are scheduled to perform a six hour spacewalk on the fifth day of the mission as a continuation of a series of test spacewalks to increase experience and refine training methods. They will work with several tools that may be used during the servicing of the Hubble Space Telescope mission later this year.

Today in Firing Room 1 of the Launch Control Center, the KSC launch team is verifying systems to assure that the Shuttle is powered up and that 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 which is 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 are also 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.

Also today, ground crews are making the final storage of mid-deck and flight deck supplies and payloads. They will perform microbial samplings of the flight crew's drinking water and check water levels in the crew waste management system.

The STS-51 crew is scheduled to arrive at KSC at about 1 p.m. today.

At T-27 hours, the countdown will enter its first built-in hold. This is an eight hour hold lasting from 12 midnight to 8 a.m. Friday.

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 fuel cells to provide electricity to the orbiter and drinking water for the crew.

Cryogenic flow is scheduled to start at about 10 a.m. Friday and continue for about five hours.

As servicing of the cryogenic tanks concludes, the clock will enter another built-in hold at the T-19 hour mark. This hold will last from 4 to 8 p.m. on Tuesday.

Following cryogenic loading operations, the pad will be re-opened for normal work 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 a built-in hold at the T-11 hour mark at 4 a.m. Saturday. This 13 hour, 25 minute hold will last until 5:25 p.m. Saturday. 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. Saturday, the Rotating Service Structure is scheduled to be moved away from the vehicle and placed in launch position.

At T-9 hours, about 7:25 p.m. Saturday 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 fuels. 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 10:25 p.m. Saturday. During this one-hour hold, final preparations for loading the external tank will be completed and a pre-tanking weather briefing will be conducted.

Chilldown of the lines that carry the cryogenic propellants to the external tank begins when the clock starts counting again at 11:25 p.m. Saturday. Filling and topping off the external tank should be complete at the beginning of the next planned hold at T- 3 hours, or 2:25 a.m. Sunday.

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.

During the hold at T-3 hours, the five-member STS-51 crew will be awakened at about 2:50 a.m. Sunday.

Following breakfast, the crew will receive a briefing on weather conditions both 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 during the T-3 hour hold, or at about 4:30 a.m. They will arrive at the pad's white room at about 5 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 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 (7:05 a.m.) and at the T-9 minute mark (7:26 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; 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 (Thursday, September 9)

Prepare for the start of the STS-51 launch countdown and perform the call-to-stations at the T-43 hour mark. Countdown began at 8 a.m. All members of the launch team reported to their respective consoles in Firing Room 1 in the Launch Control Center for the start of the countdown.

The payload bay doors are scheduled to be closed for flight at about 4 p.m.

Launch - 2 Days (Friday, September 10)

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

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.

Launch - 1 Day (Saturday, September 11)

Enter planned hold at T-11 hours for a duration of 13 hours, 25 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 will be moved to the park position during this hold at about 11 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 scheduled to begin at 11:25 p.m.

Launch Day (Sunday, September 12)

Complete filling the external tank with its flight load of liquid hydrogen and liquid oxygen propellants. Perform open loop test with Eastern Space and Missile Center and conduct gimbal profile checks of orbital maneuvering system engines.

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

Enter two-hour hold at T-3 hours. Wake flight crew at 2:50 a.m.

Closeout crew and ice inspection team proceeds to Launch Pad 39-B. Crew departs Operations and Checkout Building for the pad at 4:30 a.m.

Resume countdown at T-3 hours. 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.

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)
 Orbiter transfers to internal power (T-3:30)
 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)
 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-51

T-TIME	LENGTH OF HOLD	HOLD BEGINS	HOLD ENDS
T-27 hours	8 hours	12:00 am Fri.	8:00 am Fri.
T-19 hours	4 hours	4:00 pm Fri.	8:00 pm Fri.
T-11 hours	13 hrs., 25 mins.	4:00 am Sat.	5:25 pm Sat.
T-6 hours	1 hour	10:25 pm Sat.	11:25 pm Sat.
T-3 hours	2 hours	2:25 am Sun.	4:25 am Sun.
T-20 minutes	10 minutes	7:05 am Sun.	7:15 am Sun.
T-9 minutes	10 minutes	7:26 am Sun.	7:36 am Sun.

CREW FOR MISSION STS-51

Commander (CDR): Frank Culbertson
 Pilot (PLT): Bill Readdy
 Mission Specialist (MS1): Jim Newman
 Mission Specialist (MS2): Dan Bursch
 Mission Specialist (MS3): Carl Walz

SUMMARY OF STS-51 LAUNCH DAY CREW ACTIVITIES

Sunday, September 12, 1993

2:50 a.m. Wake up
 3:20 a.m. Breakfast
 3:50 a.m. Weather briefing (CDR, PLT, MS2)
 3:50 a.m. Don flight equipment (MS1, MS3)
 4:00 a.m. Don flight equipment (CDR, PLT, MS2)
 4:30 a.m. Depart for launch pad 39-B
 5:00 a.m. Arrive at white room and begin ingress
 6:15 a.m. Close crew hatch
 7:45 a.m. Launch

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GO TO THE [KSC PRESS RELEASES](#) HOME PAGE

NASA News Release

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JOHN F. KENNEDY SPACE CENTER

September 29, 1993

KSC Contact: Bruce Buckingham

KSC Release No. 121-93

Notice To Editors/News Directors:

PHOTO OPPORTUNITY AND TOUR OF LANDING SYSTEMS RESEARCH AIRCRAFT SET FOR OCT. 1

NASA's Convair 990 (CV-990) aircraft recently arrived at KSC from the Dryden Flight Research Facility, Edwards, Calif., for a series of landing tests designed to assist in the upgrade of the Space Shuttle's landing capabilities.

Several modifications to the aircraft were required for these tests, including a Space Shuttle landing gear retraction system installed in the lower fuselage area. The series of tests will be conducted throughout the next few weeks at KSC's 15,000-foot-long Shuttle Landing Facility.

To help streamline press interest in covering the month-long set of tests, two press opportunities have been scheduled for Friday, Oct. 1.

News media interested in covering a landing test should be at the KSC Press Site at 8:30 a.m. Friday for departure to the SLF to view the CV-990's 9 a.m. touch-and-go test from the runway's mid-point. Later, at about 2 p.m. Friday, press will be taken back to the SLF for a tour of the aircraft by Program Manager Bob Baron and the CV-990 pilot, Gordon Fullerton.

News media who do not possess credentials must contact the Media Services Branch before close of business Thursday, Sept. 30, to arrange for badging. No early morning badging capability will be available on Friday.

News media who will be participating in the afternoon tour of the aircraft must wear flat, closed-toe shoes and long pants. No high heels or short pants are allowed while on the runway or tarmac.

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GO TO THE [KSC PRESS RELEASES](#) HOME PAGE

NASA News Release

ONLINE



JOHN F. KENNEDY SPACE CENTER

October 14, 1993

KSC Contact: Bruce Buckingham

KSC Release No. 134-93

Notice to Editors/News Directors:

LAUNCH OF COLUMBIA ON MISSION STS-58 RESCHEDULED

NASA has rescheduled the launch of Columbia on Space Shuttle Mission STS-58 for Friday, October 15, 1993. The launch window for Columbia and the Spacelab Life Sciences payload extends from 10:53 a.m. - 1:21 p.m. EDT.

The launch team is currently in a 24-hour turnaround cycle as a result of today's scrub at the T-31 second mark. The countdown clock is currently scheduled to resume counting at the T-11 hour mark at 8:33 p.m. today. Tanking is scheduled to begin at 2:33 a.m. Friday.

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GO TO THE [KSC PRESS RELEASES](#) HOME PAGE

NASA News Release

ONLINE



JOHN F. KENNEDY SPACE CENTER

November 24, 1993

KSC Contact: Bruce Buckingham

KSC Release No. 147-93

STS-61 COUNTDOWN TO BEGIN SUNDAY

The countdown for launch of the Space Shuttle Endeavour on mission STS-61 is scheduled to begin Sunday, Nov. 28 at 9 a.m. EST, at the T-43 hour mark.

The countdown includes 24 hours and 57 minutes of built-in hold time leading to the opening of the launch window at 4:57 a.m. (EST) on Wednesday, Dec. 1. The 1 hour, 7 minute window extends until 6:04 a.m.

The launch of Endeavour will mark the beginning of the 7th and last Space Shuttle mission scheduled for this calendar year. The STS-61 mission will feature a record five spacewalks (EVA) in an effort to service the Hubble Space Telescope (HST) with a variety of new replacement parts, components and instruments while in orbit. These include new Solar Arrays (SAs), an operational Wide Field/Planetary Camera (WF/PC-II), a corrective Optics Space Telescope Axial Replacement (COSTAR), and replacement gyro packages.

Two teams of two astronauts will conduct a scheduled five spacewalks over a period of five days. The four Mission Specialist astronauts slated to service HST on the EVAs are Story Musgrave, Thomas Akers, Jeff Hoffman and Kathy Thornton. The other crew members are Commander Richard Covey, Pilot Ken Bowersox and Mission Specialist Claude Nicollier of the European Space Agency.

The STS-61 crew is scheduled to arrive at KSC at about 11 a.m. on Saturday. The day-early arrival is to allow them time to inspect the HST payloads in the orbiter payload bay. This task is usually performed during the terminal countdown demonstration test, however, they were unable to accomplish this due to the work involved in moving Endeavour from launch pad 39-A to 39-B.

Beginning on Sunday in Firing Room 3 of the Launch Control Center, the KSC launch team will begin verifying systems to assure that the Shuttle is powered up and that 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 which is 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 and payloads and 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 built-in hold. This is a four hour hold lasting from 1 a.m. to 5 a.m. 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 fuel cells to provide electricity to the orbiter and drinking water for the crew.

Cryogenic flow is scheduled to start at about 6 a.m. Monday and continue for about 6 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 1 p.m. to 5 p.m. on Monday.

Following cryogenic loading operations, the pad will be re-opened for normal work 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 a built-in hold at the T-11 hour mark at 1 a.m. Tuesday. This 13 hour, 37 minute hold will last until 2:37 p.m. Tuesday. 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. Tuesday, the Rotating Service Structure is scheduled to be moved away from the vehicle and placed in launch position.

At T-9 hours, about 4:37 p.m. Tuesday, 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 7:37 p.m. Tuesday. During this one-hour hold, final preparations for loading the external tank will be completed and a pre-tanking weather briefing will be conducted.

Chilldown of the lines that carry the cryogenic propellants to the external tank usually begins when the clock starts counting again at 8:37 p.m. Tuesday. Filling and topping off the external tank should be complete at the beginning of the next planned hold at T-3 hours, or about 11:37 a.m. Tuesday. (Managers may choose to begin tanking operations 30 minutes earlier (at about 8 p.m.) than scheduled to help protect the relatively short 1 hour, 7 minute launch window.)

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.

Prior to entering the hold at T-3 hours, the seven-member STS-61 crew will be awakened at about 9:30 p.m. Tuesday.

Following breakfast, the crew will receive a 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 during the T-3 hour hold, or at about 1:12 a.m. Wednesday. They will arrive at the pad's white room at about 1:42 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 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 (4:17 a.m.) and at the T-9 minute mark (4:38 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 (Sunday, Nov. 28)

Prepare for the start of the STS-61 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.

The payload bay doors are scheduled to be closed for flight at about 9 p.m.

Launch - 2 Days (Monday, Nov. 29)

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

(NOTE: If the Atlas launch scheduled for Sunday night on Cape Canaveral enters a 24-hour turnaround, the T-27 hour hold becomes 28 hours long and launch is postponed until Dec. 2 at 4:26 a.m.)

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. 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.

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 Endeavour'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.

Launch - 1 Day (Tuesday, Nov. 30)

Enter planned hold at T-11 hours for a duration of 13 hours, 37 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 will be moved to the park position during this 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 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 targeted to begin at about 8 p.m. (about 30 minutes ahead of the regularly scheduled time.)

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

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

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

Enter two-hour hold at T-3 hours. Wake flight crew at 9:30 p.m. Closeout crew and ice inspection team proceeds to Launch Pad 39-B.

Launch Day (Wednesday, Dec. 1)

Crew departs Operations and Checkout Building for the pad at 1:12 a.m.

Resume countdown at T-3 hours. 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 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 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.

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-61

T-TIME	LENGTH OF HOLD	HOLD BEGINS	-----	HOLD ENDS
T-27 hours	4 hours	1:00 am Mon.		5:00 am Mon.
T-19 hours	4 hours	1:00 pm Mon.		5:00 pm Mon.
T-11 hours	13 hrs., 37 mins.	1:00 am Tues.		2:37 pm Tues.
T-6 hours	1 hour	7:37 pm Tues.		8:37 pm Tues.
T-3 hours	2 hours	11:37 pm Tues.		1:37 am Wed.
T-20 minutes	10 minutes	4:17 am Wed.		4:27 am Wed.
T-9 minutes	10 minutes	4:38 am Wed.		4:48 am Wed.

CREW FOR MISSION FOR STS-61

Commander (CDR): Dick Covey
Pilot (PLT): Ken Bowersox
Mission Specialist (MS1): Kathy Thornton (EVA3)
Mission Specialist (MS2): Claude Nicollier
Mission Specialist (MS3): Jeff Hoffman (EVA1)
Mission Specialist (MS4): Story Musgrave (EVA2)
Mission Specialist (MS5): Tom Akers (EVA4)

SUMMARY OF STS-61 LAUNCH DAY CREW ACTIVITIES

Tuesday, Nov. 30, 1993

9:30 p.m. Wake up
11:00 p.m. Breakfast
11:30 p.m. Free Time

Wednesday Dec. 1, 1993

12:32 a.m. Weather briefing (CDR, PLT, MS2)
12:32 a.m. Don flight equipment (MS1, MS3, MS4, MS5)
12:42 a.m. Don flight equipment (CDR, PLT, MS2)
1:12 a.m. Depart for launch pad 39-B
1:42 a.m. Arrive at white room and begin ingress
2:57 a.m. Close crew hatch
4:57 a.m. Launch

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GO TO THE [KSC PRESS RELEASES](#) HOME PAGE

NASA News Release

ONLINE



JOHN F. KENNEDY SPACE CENTER

December 12, 1993

KSC Contact: Bruce Buckingham

KSC Release No. 153-93

ENDEAVOUR SCHEDULED TO LAND AT KSC

The orbiter Endeavour is scheduled to land at Kennedy Space Center at the conclusion of its current STS-61 mission, which began Dec. 2 from KSC.

Landing of Endeavour at KSC's Shuttle Landing Facility (SLF) is slated for 12:26 a.m. Eastern Time, Monday, Dec. 13, on orbit 162. Landing will occur at mission elapsed time of 10 days, 19 hours and 59 minutes. Deorbit burn will occur on orbit 161 at about 11:15 p.m. Sunday, at 10 days, 18 hours and 48 minutes.

During descent, Endeavour will enter Florida airspace near the gulf coast city of Crystal River and travel east across the state. Endeavour will continue across Florida, passing over the cities of Orlando and Titusville before landing at KSC's shuttle landing facility. The orbiter will pass over Crystal River about 9 minutes before touchdown at an altitude of about 122,000 feet and traveling at a speed of Mach 5. The orbiter will pass over Orlando about 5 minutes before touchdown at an altitude of about 91,000 feet and traveling at a speed of about Mach 3.

There are two landing opportunities at KSC on Monday morning, 12:26 a.m. and 2:08 a.m. Two opportunities are available for a landing at KSC on Tuesday at 12:34 a.m. and 3:17 a.m.

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 Endeavour, if weather permits, will be the eighteenth landing at KSC in the 12-year history of Space Shuttle flight. It will be the seventh night landing in the shuttle program, and only the second night landing at KSC. The first KSC nighttime landing occurred earlier this year on Sept. 22, at the conclusion of mission STS-51.

PREVIOUS LANDINGS AT KSC

- 41-B - Challenger, Feb. 11, 1984
- 41-G - Challenger, Oct. 13, 1984
- 51-A - Discovery, Nov. 16, 1984
- 51-C - Discovery, Jan. 27, 1985
- 51-D - Discovery, April 19, 1985
- STS-38 - Atlantis, Nov. 20, 1990
- STS-39 - Discovery, May 6, 1991
- STS-43 - Atlantis, Aug. 11, 1991
- STS-45 - Atlantis, April 2, 1992
- STS-50 - Columbia, July 9, 1992
- STS-46 - Atlantis, Aug. 8, 1992

- STS-47 - Endeavour, Sept. 18, 1992
 - STS-52 - Columbia, Nov. 1, 1992
 - STS-54 - Endeavour, Jan. 19, 1993
 - STS-56 - Discovery, April 17, 1993
 - STS-57 - Endeavour, July 1, 1993
 - STS-51 - Discovery, Sept. 22, 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 Endeavour Dec. 2. 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-59, in April 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 Endeavour 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

ONLINE



JOHN F. KENNEDY SPACE CENTER

May 27, 1993, 6:00 p.m. EDT

KSC Contact: Bruce Buckingham

Launch Advisory:

JUNE 3 LAUNCH OF ENDEAVOUR POSTPONED

NASA managers have decided to changeout Space Shuttle Endeavour's #2 main engine liquid oxygen turbopump because of an issue which was raised with a part on the pump. The decision to remove and replace the pump will move the launch of Endeavour on Shuttle Mission STS-57, originally scheduled for June 3, to sometime around mid-June. A firm launch date will be set after the replacement pump has been installed and checked out.

The specific issue with the turbopump is with one of two springs which are designed to keep the pump's ball bearings in place and in their proper positions. During inspection of the pump, engineers discovered evidence of an inspection etch mark in a high-stress region of the spring. While there is data which indicates the spring will work as designed, NASA managers decided to replace the unit since they could not firmly determine that the pump would operate in a safe manner. If a spring were to fail, the rotor position may not be held accurately and the potential exists for higher vibration.

Springs are etched for a variety of reasons. They are marked to document individual serial numbers, to verify that materials penetration inspections have been complete, and/or to note that the part has been used in ground test operations. The misplaced etch mark on Endeavour's engine was a penetration verification stamp.

The pumps on the main engines to be used on the upcoming flights of Space Shuttle Discovery (STS-51/July 1993) and Space Shuttle Columbia (STS-58/Sept. 1993) will be examined as part of their pre-launch processing.

- end -

GO TO THE [KSC PRESS RELEASES](#) HOME PAGE
