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George C. Marshall Space Flight Center
Marshall Space Flight Center, Alabama 35812

Marshall Space Flight Center 1990 Annual Chronology of Events

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FOREWORD

This is the "Marshall Space Flight Center 1990 Annual Chronology of Events" covering the period January 1 - December 31, 1990. It records the Center's most important activities in support of the National Aeronautics and Space Administration during the period. Readers who want to trace the chronological progression of specific programs or topics may consult the detailed index that follows the text of the chronology.

The MSFC Historian, Management Operations Office, compiled the chronology from various sources. The historian also gathered supplemental information from the major MSFC organizations. Readers who want to know more about any of the events that are listed may consult the historian, the appropriate MSFC organization, or the sources that follow the description of events.



C. D. Bean
Director
Administrative Operations Office

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MARSHALL SPACE FLIGHT CENTER
1990 ANNUAL CHRONOLOGY OF EVENTS

January 9

STS-32, Space Shuttle Columbia, rocketed into orbit at 6:35 a.m. CST. As part of the mission, astronauts planned to retrieve NASA's Long Duration Exposure Facility and deploy the Syncom IV-F5 Navy Synchronous Communications Satellite. (Marshall Star, January 10, 1990)

January 9

STS-32 included a series of successful Microgravity Disturbance Experiments which investigated Orbiter and crew induced disturbances on the stability of molten zones used in float-zone crystal growth. The Fluids Experiment Apparatus was conducted under a Joint Endeavor Agreement with Rockwell. (See MSFC History Office Microfiche #2127, "Notable MSFC Events During 1990," January 22, 1990)

January 11

The FBI confirmed that it had closed a Utah investigation of fraud allegations against the Thiokol Corp., manufacturer of the Solid Rocket Motors for the Space Shuttle. The investigation dealt with allegations that Thiokol falsified safety data and withheld information from NASA following the Challenger accident. ("FBI Closes Thiokol Investigation," Huntsville News, January 12, 1990)

January 11

The Boeing Company announced plans to put a new \$15 million building for its Space Station Freedom work in Alabama. Robert Hager, Boeing's Vice President for its Huntsville Division, said the new 130,000-square-foot building would house more than 1,000 company employees dedicated to \$1.6 billion in Space Station contract work by the end of the year. ("Boeing Announces Plans for New Building," Huntsville News, January 12, 1990)

January 12

Columbia's astronauts rescued the Long Duration Exposure Facility by steering Columbia alongside it and having Mission Specialist Bonnie Dunbar reach out and grab it with the wire fingers of the Orbiter's mechanical arm. ("Shuttle Crew Grabs Falling Lab in Space," Decatur Daily, January 12, 1990)

January 12

The Marshall Center created the Mission Operations Laboratory to further support the Center's increasing involvement in space flight mission operations. (MSFC Management Announcement, January 12, 1990)

January 14

A 24-hour simulation of the Astro-1 mission was conducted January 14-15. The purpose of this test was to simulate mission replanning problems. Participants included science replanning representatives from the four instrument teams, MSFC mission planning personnel, and Payload Operations Control Center Cadre members. (See MSFC History Office Microfiche #2127, "Notable MSFC Events During 1990," January 22, 1990)

January 17

Phase A Contract final reviews for the Advanced Launch System Solid Rocket Booster Systems Definition Study were conducted at the Marshall Center January 17-19. Hercules, Atlantic Research, Chemical Systems Thiokol, and Aerojet Solid Propulsion each presented a summary of the results of the 9-month study contracts. (See MSFC History Office Microfiche #2127, "Notable MSFC Events During 1990," January 22, 1990)

January 17

Marshall's Joe T. Galey and Teledyne Brown's Charlie Glass received awards from the NASA Space Flight Safety Panel. Galey's and Glass' insistence on proper testing of flight hardware led to audits at 15 metal bolt suppliers and fraud convictions against at least four contractors. ("Managers Here Win NASA Safety Awards," Huntsville News, January 18, 1990)

January 19

A meeting between representatives from NASA, Boeing, the Italian Space Agency, and Aeritalia was held at NASA Headquarters to discuss the Italian participation in Space Station Freedom. (See MSFC History Office Microfiche #2127, "Notable MSFC Events During 1990," February 5, 1990)

January 20

The Space Shuttle Columbia touched down at 3:35 a.m. CST at Edwards Air Force Base in California. ("Shuttle Back Safely After Record Trip," Huntsville Times, January 20, 1990)

January 22

MSFC presented an overview of the Transfer Orbit Stage Vehicle and its airborne support equipment and systems as part of the Critical Design Review for the Advanced Communications Technology Satellite. The meeting was held at the Lewis Research Center January 22-23. (See MSFC History Office Microfiche #2127, "Notable MSFC Events During 1990," January 29, 1990)

January 23

MSFC Director Jack Lee announced that NASA had completed a culture study at each of its field centers and that the results for the Marshall Center would be delivered to employees. The study was commissioned by NASA Headquarters to get employees' views of the overall operation and the culture within the agency. Lee made the announcement at a Marshall Center Employee Update. (Marshall Star, January 31, 1990)

January 23

MSFC Deputy Director Dr. J. Wayne Littles announced the establishment of an MSFC Steering Group to provide overview and guidance to the Shuttle-C Task Team in the planning and preparation of a phase C/D Request for Proposal release. ("Shuttle-C Steering Group," DD01/J. Wayne Littles to Distribution, January 23, 1990)

January 24

A planned 180-second test of a modified Space Shuttle Main Engine ended after only 5 seconds. The problem appeared to be a less-than-adequate supply of liquid oxygen to the engine, causing a computer to automatically shut down. ("Shuttle Motor Test Is Stopped Early," The Huntsville Times, January 25, 1990)

January 25

Marshall Center officials recognized local school leaders, community members, and Marshall volunteers for their support of Project LASER (Learning About Science, Engineering and Research). (Marshall Star, January 31, 1990)

January 25

In a special article carrying his by-line in the Birmingham News, MSFC Director Jack Lee outlined justification for Space Station Freedom. "I can't over emphasize the importance of Space Station Freedom to the success of our national program. In order to return to the moon and go on to Mars -- goals President Bush has set for our nation -- and in order to benefit from the rich resources of the other planets, we must have Space Station Freedom." ("It's Easy for NASA to Justify Need for Space Station Freedom," Birmingham News, January 25, 1990)

January 26

NASA Headquarters confirmed the following U.S. complement as the payload for the Spacelab-J payload: Protein Crystal Growth; Frog Embryology Experiment; Lower Body Negative Pressure; Autogenic Feedback Training Experiment; Space Acceleration Measurement Systems; Fluid Therapy System Experiment; and Magnetic Resonance Imaging. In addition, a number of U.S./Japanese experiment collaborations were confirmed. (See MSFC History Office Microfiche #2127, "Notable MSFC Events During 1990," January 29, 1990)

January 27

The STS-31 Orbiter/Hubble Space Telescope end-to-end test was conducted. (See MSFC History Office Microfiche #2127, "Notable MSFC Events During 1990," February 5, 1990)

January 29

President Bush asked Congress to increase NASA's FY91 budget by 17.5 percent, including money for a start on his plan to send astronauts back to the moon and later to Mars. NASA would be authorized to spend \$14.1 billion in the Fiscal Year beginning October 1, an increase of \$2.1 billion over the current Fiscal Year. (Huntsville News, "Bush Asks Hike in NASA Budget." Huntsville News, January 30, 1990)

January 31

Air Force General Samuel Phillips, who served as NASA's Apollo Program Director from 1964-69, died of heart failure. (Marshall Star, February 7, 1990)

January 31

The Inertial Upper Stage/Payload Assist Module-S Quarterly Review was held at MSFC. (MSFC Space Systems Office Inputs for Draft Chronology of MSFC Events for 1990)

January 31

Technicians began replacing a turbopump in one of the three Main Engines in Space Shuttle Atlantis. The turbopump became a concern after the failure of an unrelated fuel pump during a routine pressure test at the engine's manufacturer, the Rocketdyne Division of Rockwell International. ("Repairs Not Expected to Delay Shuttle Launch," Huntsville Times, February 1, 1990)

During January

Dr. Ulf D. Merbold, European Space Agency, and Dr. Roberta L. Bondar, Canadian Space Agency, were designated primary flight payload specialists for the first International Microgravity Laboratory mission. (Marshall Star, January 24, 1990)

February 2

Miss America Debbye Turner spoke to employees as part of Black History Month at the Marshall Center. (Marshall Star, February 7, 1990)

February 4

Marshall's Dr. Ann Whitaker and other Marshall scientists who had experiments on the Long Duration Exposure Facility (LDEF) arrived at the Kennedy Space Center to observe LDEF's condition after 6 years in space. (Marshall Star, February 14 1990)

February 6

Six papers were presented by MSFC employees at the first Space Station Evolution Conference held February 6-8, 1990, at League City, Texas. The conference focused on NASA's research and technology, transportation, and exploration programs and their relationship to Space Station Freedom. (See MSFC History Office Microfiche #2127, "Notable MSFC Events During 1990," February 12, 1990)

February 6

The flight hardware for the Burst and Transient Source Experiment/Gamma-Ray Observatory was delivered to the Kennedy Space Center. (See MSFC History Office Microfiche #2127, "Notable MSFC Events During 1990," February 12, 1990)

February 7

A launch pad rehearsal was conducted at the Kennedy Space Center with the Hubble Space Telescope placed in the launch configuration. (See MSFC History Office Microfiche #2127, "Notable MSFC Events During 1990," February 12, 1990)

February 8

NASA Deputy Administrator James R. Thompson visited the Marshall Center to discuss the Space Station Freedom program. ("Thompson Confident of Space Station Funding," Huntsville News, February 9, 1990)

February 12

The Combined Release and Radiation Effects Satellite Design Certification Review was held at the Marshall Center on February 12-14. (See MSFC History Office Microfiche #2127, "Notable MSFC Events During 1990," February 20, 1990)

February 12

Vehicle closeout activities for the launch of the Hubble Space Telescope occurred throughout the week of February 12. (See MSFC History Office Microfiche #2127, "Notable MSFC Events During 1990," February 12, 1990).

February 13

MSFC announced the selection of Teledyne Brown Engineering for negotiations for Payload Mission Integration activities for a 10-year period beginning in October 1990. (See MSFC History Office Microfiche #2127, "Notable MSFC Events During 1990," February 20, 1990)

February 14

The Marshall Star reported that Marshall's Dr. Daniel C. Carter, inventor of the Human Serum Albumin Crystals and Method of Preparation, had been selected as NASA's Inventor of the Year for 1989. (Marshall Star, February 14, 1990)

February 14

Approximately 30 industry representatives attended an industry briefing on a NASA Research Announcement entitled, "Advanced Design-Verification Methodology for Pump-Fed Earth-to-Orbit Propulsion Systems." (See MSFC History Office Microfiche #2127, "Notable MSFC Events During 1990," February 20, 1990)

February 15

Technology Test Bed Firing 015 was conducted for the scheduled 150 seconds. The test was delayed 3 hours due to weather. All test objectives were met. (See MSFC History Office Microfiche #2127, "Notable MSFC Events During 1990," February 20, 1990)

February 15

The first hotfire test of the Space Shuttle Main Engine alternate high pressure fuel turbopump was successfully run for a programmed duration of 25 seconds. (See MSFC History Office Microfiche #2127, "Notable MSFC Events During 1990," February 20, 1990)

February 15

Two hundred scientists and engineers at the Marshall Center were engaged in a 60-hour simulation of the planned Astro-1 science mission. ("MSFC Engineers, Scientists Take Spacelab Practice Run," Huntsville Times, February 15, 1990)

February 16

Parker V. Counts, Manager of the Upper Stage Projects Office, was notified by the Center Director of selection to attend the Harvard University Program for Management Development under the 1990-91 NASA Fellowship Programs. (MSFC Space Systems Office Inputs for Draft Chronology of MSFC Events for 1990)

February 16

MSFC Director Jack Lee headed a Marshall Center delegation in a visit to Governor Guy Hunt who participated in discussions related to the technology transfer agreement between the State of Alabama and the Marshall Center. The Governor also signed a proclamation declaring the week of April 22-28 as National Science and Technology Week in Alabama. (See MSFC History Office Microfiche #2127, "Notable MSFC Events During 1990," February 20, 1990)

February 19

Two Marshall Center representatives participated in a Joint NASA/Italian Space Agency meeting in Rome and Torino as participants in a 3-month study to define Italy's contribution to the Space Station Program. (See MSFC History Office Microfiche #2127, "Notable MSFC Events During 1990," February 26, 1990)

February 19

The nickel-hydrogen batteries for the Hubble Space Telescope arrived at the Kennedy Space Center. This was the first Marshall project to use this type of battery. (MSFC Observatory Projects Office, Draft Chronology of Events for 1990)

February 21-22

The Aeroassist Flight Experiment Phase I Safety Review was held at the Johnson Space Center. (MSFC Space Systems Office Inputs for Draft Chronology of MSFC Events for 1990)

February 22

Marshall Center Director Jack Lee spoke to a large gathering of students at Glenclyff High School in Nashville as part of the Center's support for Tennessee Space Week, a state-wide aerospace education program sponsored by the Tennessee Education Association and NASA. Additional Marshall personnel also spoke to groups in other areas of the state during the week. (Marshall Star, March 7, 1990)

February 22

Robert Schwinghamer, Deputy Director for Space Transportation Systems in Marshall's Science and Engineering Directorate, was named one of the top 10 engineers in the federal government. He was honored at the 11th Annual Federal Engineer of the Year Awards Banquet in Arlington, Virginia. (Marshall Star, February 28, 1990)

February 23

Marshall Center scientists and engineers supported the sounding rocket launch of a Marshall-developed low energy ion mass spectrometer from the Poker Flat Research Range in Catanika, Alaska. (Marshall Star, March 7, 1990)

February 27

MSFC Director Jack Lee announced the appointment of Dr. F. Max Croft as Director of Marshall's Information Systems Office in the Institutional and Program Support Directorate. (MSFC Management Announcement, February 27, 1990)

February 28

STS-36, Space Shuttle Atlantis, was launched at 1:50 a.m. on a Department of Defense classified mission. (Kennedy Space Center, Spaceport News, January 11, 1991)

March 1

MSFC Director Jack Lee briefed the Huntsville-Madison County Chamber of Commerce on the Center's programs and their economic impact. ("NASA Hopeful About Getting Most of Budget Hike, Lee Says," Huntsville Times, March 2, 1990, Page 7B)

March 7

The Marshall Star reported that NASA and TRW had completed negotiations of a cost-plus-award-fee contract to provide high resolution mirror optics technology and a mirror development program for the Marshall-managed Advanced X-ray Astrophysics Facility through October 31, 1991. (Marshall Star, March 7, 1990)

March 8

NASA Administrator Richard H. Truly testified before the Senate's Science, Technology, and Space Subcommittee. In regard to the President's budget request for the Space Station, Truly said, "This is a critical time for the Space Station... The program is transitioning from the preliminary design to the fabrication and testing of development hardware." ("NASA Chief Sees Space Station Partnership Endangered by Budget Cuts," Huntsville Times, March 10, 1990)

March 8

President Bush announced his approval of the first of a series of policy decisions for the long-term space exploration initiative that he announced on July 20, 1989. Acting upon the recommendation of the Vice President and the National Space Council, the President approved a program that would give early focus to technology development and a search for new and innovative technical approaches to the moon and Mars missions. (Weekly Compilation of Presidential Documents, Statement by Press Secretary Fitzwater on the President's Space Exploration Initiative, March 8, 1990)

March 14

One of a series of training sessions for the ATLAS-1 Payload Crew was held March 14-23 in the Payload Crew Training Complex. (See MSFC History Office Microfiche #2127, "Notable MSFC Events During 1990," April 2, 1990)

March 15

Officials at the Marshall Center stated that four teams were being organized to monitor operations of the Hubble Space Telescope from the Huntsville Operations Support Center. Plans called for the teams to provide round-the-clock support to the project for 60 days then man one shift per day to troubleshoot problems for another 60-day period. ("Marshall Engineers to Babysit Telescope," Huntsville Times, March 16, 1990)

March 15

Jack R. Bean was appointed Assistant Manager, Payload Projects Office. (MSFC Management Announcement, March 15, 1990)

March 15

NASA began moving Space Shuttle Discovery to the launch pad in preparation for the launch of the Hubble Space Telescope. ("Discovery Rolled Out," Huntsville News, March 16, 1990)

March 16

The first Mobile Teacher Resource Center was dedicated in Washington D.C. at a ceremony attended by NASA Administrator Richard Truly and Marshall Center Director Jack Lee. Developed with corporate sponsorship as part of Project LASER (Learning about Science, Engineering, and Research), the pilot unit was designed to offer NASA resources to teachers unable to visit a NASA facility. (Marshall Star, March 21, 28, 1990)

March 20

Technology Test Bed-017/engine 0208 was successfully fired for a programmed duration of 160 seconds. (See MSFC History Office Microfiche #2127, "Notable MSFC Events During 1990." March 26, 1990)

March 20

The Astro-1 payload was installed in Columbia's payload bay. (Marshall Star, April 11, 1990)

March 20

The fourth annual Marshall Center dinner honoring retirees was held at the Von Braun Civic Center. (Marshall Star, February 7, 1990)

March 22

The first Astro-1 Joint Integrated Simulation was completed. (See MSFC History Office Microfiche #2127, "Notable MSFC Events During 1990," March 26, 1990)

March 23

The Combined Release and Radiation Effects Satellite arrived at the Kennedy Space Center from Ball Space Systems Division facility in Boulder, Colorado. (See MSFC History Office Microfiche #2127, "Notable MSFC Events During 1990," March 26, 1990)

March 23

The Hubble Space Telescope was installed in the Payload Canister. (See MSFC History Office Microfiche #2127, "Notable MSFC Events During 1990," March 26, 1990)

March 26

Final Hubble Space Telescope electrical systems testing at the Vertical Processing Facility was concluded successfully. (See MSFC History Office Microfiche #2127, "Notable MSFC Events During 1990," March 26, 1990)

March 28

The Marshall Star reported that NASA had announced the award by Stanford University of two fixed-price, \$1 million Science Mission Studies contracts for the Gravity Probe-B Program to Lockheed Missiles and Space Company, and Fairchild Space Company. (Marshall Star, March 28, 1990)

March 28

MSFC Director Jack Lee spoke to members of the Huntsville Press Club. Lee said NASA could "fix" newly discovered maintenance requirements for Space Station Freedom that appeared larger than first expected. (Huntsville News, March 29, 1990)

March 29

The Hubble Space Telescope was installed in the Shuttle Discovery after a 2-day delay caused by small mosquito-like bugs known as midges. The bugs were found in the payload preparation room at the launch pad. (Huntsville News, March 30, 1990)

March 29

Technology Test Bed firing #018 was successfully conducted for 160 seconds. (See MSFC History Office Microfiche #2127, "Notable MSFC Events During 1990," April 2, 1990)

March 31

A Flight Readiness Review for the launch of the Hubble Space Telescope was completed with a decision to launch STS-31 on April 10, 1990. (See MSFC History Office Microfiche #2127, "Notable MSFC Events During 1990," April 2, 1990)

April 3-4

A preliminary design review was held on the Rarified Flow Aerodynamics Measurement at KMS Fusion. (MSFC Space Systems Office Inputs for Draft Chronology of MSFC Events for 1990)

April 4

The Marshall Star reported that an improved technique for measuring global atmospheric temperature changes and possible global warming had been developed by scientists at the Marshall Center and at the University of Alabama in Huntsville. (Marshall Star, April 4, 1990)

April 5

A status review of the Laser Inertial Navigation System procurement was held at MSFC on April 4, 1990, with Orbital Sciences Corporation and Honeywell personnel. The contract negotiations for this procurement were completed on April 5, 1990. (MSFC Space Systems Office Inputs for Draft Chronology of MSFC Events for 1990)

April 10

NASA scrubbed the launch of the Hubble Space Telescope just 4 minutes before a 7:37 a.m. CDT liftoff. Erratic performance of an auxiliary power unit was blamed for the delay. ("NASA Scrubs Shuttle Launch," Huntsville Times, April 10, 1990)

April 10

Mississippi Governor Ray Mabus, as well as officials from NASA and the Marshall Center, formally kicked off construction of NASA's Advanced Solid Rocket Motor Plant in Tishomingo County. ("New Day for Mississippi" Proclaimed at Groundbreaking for Rocket Plant," Decatur Daily, April 10, 1990)

April 10

The Block II Space Shuttle Main Engine Controller completed its initial hotfire test. Extensive development testing and acceptance testing had taken place in 1989. The main engine controllers perform prelaunch engine checkout and monitor the status at engine start. (Marshall Star, April 18, 1990)

April 11

Technicians replaced the controller from a faulty hydraulic power unit that prompted the halt of the launch of the Hubble Space Telescope on April 10. ("Repairs on Shuttle May Be Easier Than First Thought -- NASA," The Huntsville Times, April 12, 1990)

April 11

Royce E. Mitchell, Manager of the Space Shuttle Redesign Solid Rocket Motor Project at the Marshall Center, was appointed Manager of NASA's Advanced Solid Rocket Motor (ASRM) Project Office. In addition, Lowell K. Zoller, who had served as manager of the ASRM contract negotiation phase of the program since July 1989, was reassigned as Assistant to the Director, Institutional and Program Support Directorate. (MSFC Management Announcement, April 4, 1990)

April 14

Technicians opened Discovery's payload bay doors to remove the Hubble Space Telescope's batteries for recharging and to replace a faulty auxiliary power unit. ("NASA Removes Hubble's Batteries for Recharging," Huntsville Times, April 15, 1990)

April 20

U.S. Representative Tom Bevill toured the Space Station Freedom mockup at the Marshall Center as part of a visit to the Center. (Marshall Star, April 25, 1990)

April 22

Columbia was rolled out to the launch pad in preparation for Astro 1. ("Discovery's Astronauts Back for Try at Launch," Huntsville Times, April 23, 1990)

April 24

The Twenty-seventh Space Congress was held at Cocoa Beach, Florida, April 24-27. The theme for the congress was "90's - Decade of Opportunity." Several representatives from the Marshall Center attended and presented papers. (See MSFC History Office Microfiche #2127, "Notable MSFC Events During 1990," May 7, 1990)

April 24

STS-31, Space Shuttle Discovery, roared to life at 7:33 a.m. carrying the Hubble Space Telescope. (Kennedy Space Center, Spaceport News, January 11, 1991)

April 24

Alabama Governor Guy Hunt visited the Marshall Center to announce the appointment of Harry Atkins as advisor to the state on ways to utilize NASA technology. (Marshall Star, May 2, 1990)

April 25

The Astro-1 Payload Crew received its final experiment proficiency training at the Payload Crew Training Complex. (See MSFC History Office Microfiche #2127, "Notable MSFC Events During 1990," May 7, 1990)

April 25

A Quarterly Review of the Orbital Maneuvering Vehicle Project was held. TRW presented a briefing on project status, configuration changes, and the top technical issues/concerns. (See MSFC History Office Microfiche #2127, "Notable MSFC Events During 1990," April 30, 1990)

April 25

After a delay in getting one of the Hubble Space Telescope's solar wings unfurled, Astronaut Steven Hawley flexed the Space Shuttle's robot arm and set the Hubble Space Telescope free from Discovery 380 miles over the Pacific Ocean at 2:38 p.m. CDT. ("Hubble Looks 'Great'," The Huntsville Times, April 26, 1990)

April 26

Two MSFC representatives participated in a joint NASA/Italian Space Agency meeting in Rome on April 26 and 27, 1990. The meeting was to review the results of the one-year Joint NASA/ASI Study which identified potential areas for Italian participation in Space Station Freedom. (See MSFC History Office Microfiche #2127, "Notable MSFC Events During 1990," May 7, 1990)

April 26

The Phase I Space Station Preliminary Design Review, including Environmental Control Life Support System, Internal Thermal Control System, Internal Audio/Video, Structures/Mechanisms and Software (Preliminary Requirements Review), began with a kickoff meeting April 26-27 at the Boeing Trade Zone Facility. (See MSFC History Office Microfiche #2127, "Notable MSFC Events During 1990," April 30, 1990)

April 26

Engineers tried unsuccessfully to point two high-speed antennas on the Hubble Space Telescope toward two widely separated Tracking and Data Relay Satellites. The antennas represented the two primary links for relaying scientific information to the ground. ("Telescope's Main Antennas Work on Second Try," Huntsville News, April 27, 1990)

April 26

The first section of the 1700-foot guide tube for the X-ray Calibration Facility at the Marshall Center was installed. (MSFC Observatory Project Office, Draft Chronology of Events for 1990)

April 27

NASA confirmed that it had achieved communications with the Tracking and Data Relay Satellite through the high-gain antennas on the Hubble Space Telescope. ("Telescope's Main Antennas Work on Second Try," Huntsville News, April 27, 1990)

April 27

The first starlight fell on the Hubble Space Telescope's polished primary mirror at 8:48 a.m. CDT. ("Hubble Still Not Ready for Debut," Huntsville Times, April 28, 1990)

April 27

Electronic instruments on the Hubble Space Telescope automatically shut down when they sensed a problem with one of two high-gain antennas. ("Telescope Scientific Apparatus Still Down," Birmingham News, April 29, 1990)

April 29

Space Shuttle Discovery landed at Edwards Air Force Base in California. ("Shuttle Returns; Antenna Problems Plague Hubble," Huntsville News, April 30, 1990)

April 29

The Hubble Space Telescope Orbital Verification Team sent the last in a series of commands that overcame an apparent jam in one of the telescope's two high gain antennas. The jam had precluded the use of the antenna system since the morning of April 27. (Marshall Star, May 2, 1990)

April 30

A Combined Release and Radiation Effects Satellite mission rehearsal was conducted at the Air Force's Consolidated Space Test Center from April 30 through May 4. (See MSFC History Office Microfiche #2127, "Notable MSFC Events During 1990," May 14, 1990)

May 2

MSFC Director Jack Lee and Deputy Director Dr. J. Wayne Little were honored by the American Institute of Aeronautics and Astronautics (AIAA) as a Fellow and Associate Fellow, respectively. Later in the month, Lee received the Holger N. Toftoy award presented by the Alabama-Mississippi Section of the AIAA. (Marshall Star, May 2 and May 23, 1990)

May 2-3

The preliminary design review was held on the Microwave Reflectometer Ionization System. (MSFC Space Systems Office Inputs for Draft Chronology of MSFC Events for 1990)

May 3

Susan Cloud, Marshall's Assistant Director for Policy and Review, received the Arthur S. Flemming Award honoring outstanding and meritorious work for government. Cloud was presented the award by Secretary of Labor Elizabeth Dole and Arthur Flemming in Washington. (Marshall Star, May 9, 1990)

May 3

Vehicle rate disturbance was detected on the Hubble Space Telescope. This was later determined to be solar array induced jitter. (MSFC Observatory Projects Office, Draft Chronology of Events for 1990)

May 4

Representatives from the Marshall Center, Martin Marietta Space Systems, and Stanford briefed officials at NASA Headquarters on the final study results of the External Tank Gamma Ray Imaging Telescope. (See MSFC History Office Microfiche #2127, "Notable MSFC Events During 1990," May 21)

May 5

The Marshall Center hosted the Space Science Student Involvement Program regional symposium May 5-9. Twenty-two students attended, presenting space research proposals and receiving critiques by Center employees. The National Science Teachers Association and NASA jointly sponsor the program. (Marshall Star, May 2, 1990)

May 7

Efforts were underway to learn more about a faulty cooling valve on Columbia. Columbia was scheduled to liftoff in mid-May carrying the Astro-1 Observatory. ("Cooling System Problem May Delay Shuttle Launch," Huntsville Times, May 9, 1990)

May 8

The Aerospace Safety Advisory Panel visited the Marshall Center and Boeing on May 8-9. Boeing presented a status report on the Space Station Work Package 1 preliminary design activities with emphasis on product assurance. (See MSFC History Office Microfiche #2127, "Notable MSFC Events During 1990," May 14, 1990)

May 9

Marshall's Roberto Garcia and Carol J. Wasserman were among the winners in the 1990 High Tech Regional Federal Employee of the Year Awards competition, the Marshall Star reported. (Marshall Star, May 9, 1990)

May 9

The Inertial Upper Stage/Payload Assist Module Quarterly Review was held at the Marshall Center. (See MSFC History Office Microfiche #2127, "Notable MSFC Events During 1990," May 14, 1990)

May 10

A Quarterly Review for the Transfer Orbit Stage was held at the Marshall Center. (See MSFC History Office Microfiche #2127, "Notable MSFC Events During 1990," May 14, 1990)

May 11

The Marshall Center awarded an approximately 5-year-long contract to Lockheed Missiles & Space Company of Sunnyvale, California, for the design, development, test, and evaluation of the Space Shuttle Advanced Solid Rocket Motor. (MSFC News Release, May 14, 1990)

May 15

A dinner at the National Space Club in Washington saluted about 200 former members of the Army Ballistic Missile Agency for their work on a modified Redstone rocket that made it possible for the United States to enter the space race in 1958. ("Von Braun's Team to Get Space Act Award," The Birmingham News, May 15, 1990)

May 15

The Marshall Center began hosting the fourth biennial conference on Advanced Earth-to-Orbit Propulsion Technology. (Marshall Star, May 2, 1990)

May 16

A 52-foot Starfire 1 rocket blasted off at 8:40 a.m. at White Sands, New Mexico, carrying the Consort 3 payload, sponsored by the University of Alabama Huntsville's Consortium for Commercial Development of Space. ("Consort 3, UAH Rocket Successfully Launched," Huntsville News, May 17, 1990.)

May 17

The Johnson-Marshall Redundant Transmission System was placed in service. The mission-support system combined all mission voice and data circuits between MSFC and Johnson Space Center from discrete circuits into a single multiplexed, 1.544 Mbphs (DS-1) channel. (MSFC Institutional and Program Support Directorate Inputs for MSFC 1990 Annual Chronology of Events)

May 20

At 10:12 a.m. CST the Hubble Space Telescope opened a shutter and recorded its "first light" images of the heavens, which astronomers said were twice as sharp as they had expected in the early stage of the telescope's mission. ("Hubble Space Telescope Records First Images," Washington Post, May 21, 1990)

May 21

The MSFC Mission Operations Laboratory's Mission Planning Division conducted a Space Station Freedom Mission Planning Workshop May 21-25. (See MSFC History Office Microfiche #2127, "Notable MSFC Events During 1990," May 29, 1990)

May 24

In order to help NASA offset personnel costs, House legislators completed work on a \$4.4 billion supplemental appropriations bill that authorized an extra \$33 million for the agency. ("House Passes Extra \$33 Million to Help NASA," Huntsville Times, May 25, 1990)

May 25

MSFC officials briefed Dr. William Lenoir from NASA Headquarters on the Transfer Orbit Stage, the Inertial Upper Stage, the Orbital Maneuvering Vehicle, the Space Station, and other MSFC activities. (See MSFC History Office Microfiche #2127, "Notable MSFC Events During 1990," May 29, 1990)

May 25

MSFC Director Jack Lee announced the appointment, effective July 1, of Thomas J. Irby, Jr., as Deputy Director of the Department of Defense/NASA Advanced Launch System Joint Project Office, Heavy Lift Vehicle Definition Office. (MSFC Management Announcement, May 25, 1990)

May 29

During the launch attempt for the STS-35 mission, a hydrogen leak was detected by onboard hazardous gas detection systems. The leakage was in excess of limits established to maintain safe operating conditions. It was detected both in the aft compartment and external to the liquid hydrogen external tank/orbiter umbilical assembly. (NASA Fact Sheet, Hydrogen Leak Investigation, July 2, 1990)

May 30

The interstage adapter of the Atlas/Centaur-69 launch vehicle for the Combined Release and Radiation Effects Satellite (CRRES) sustained minor damage during a routine tanking test being conducted by General Dynamics at Cape Canaveral Air Force Station. (NASA CRRES Incident Advisory, May 30, 1990)

June 1

Phase C/D contracts for the Science Instruments to fly aboard the Advanced X-Ray Astrophysics Facility were initiated. Pennsylvania State University, Smithsonian Astrophysical Observatory, Goddard Space Flight Center, and Massachusetts Institute of Technology were the involved institutions. (MSFC Observatory Projects Office, Draft Chronology of Events for 1990)

June 7

NASA announced the termination of its Orbital Maneuvering Vehicle (OMV) program. Citing budgetary pressures "across the space flight realm" for the next several years, together with a lack of firm, near-term requirements for such a vehicle, NASA's Associate Administrator for Space Flight, Dr. William B. Lenoir, concluded that it was necessary to terminate the OMV which had been scheduled for a maiden flight in 1995. (NASA News Release, June 7, 1990)

June 15

The STAR 63F solid rocket motor manufacturing test model was successfully fired at the Arnold Engineering Development Center. All test performance parameters were within 0.2-3.0 percent of predicted values. (MSFC Space Systems Office Inputs for Draft Chronology of MSFC Events for 1990)

June 17

Twenty-five teachers from 14 states attended the NASA Educational Workshop for Math and Science Teachers (NEWMAST) at the Marshall Center June 17-29. The purpose of the workshop was to assist teachers in updating and enhancing their knowledge of space science and technology. While at Marshall, the teachers visited each of the seven research and development laboratories in the Science and Engineering Directorate.

June 20

MSFC employees gathered by the hundreds to see and hear President George Bush speak during a visit to the Marshall Center. Bush vowed to continue his fight for space exploration funding as well as other NASA programs. "History tells us what happens to nations that forget how to dream. The American people want us in space," Bush said. (Marshall Star, June 27, 1990)

June 21

The MSFC Technology Utilization Office and an Alabama agency representing small businesses in the state sponsored a technology transfer seminar at the University of Alabama in Birmingham. (See MSFC History Office Microfiche #2127, "Notable MSFC Events During 1990," June 25, 1990)

June 21

NASA announced that during checkout on orbit the Hubble Space Telescope could not be properly focused because of flaws in the optics. Both high-resolution imaging cameras (the Wide Field/Planetary Camera and the Faint Object Camera) showed the same characteristic distortion, called spherical aberration. (The Hubble Space Telescope Optical Systems Failure Report, Issued November 27, 1990)

June 22

The PAM-S Design Certification Review was conducted at MSFC. (MSFC Space Systems Office Inputs for Draft Chronology of MSFC Events for 1990)

June 28

A board was established in the MSFC Technology Utilization Office to review problem statements received from the private sector, screen each statement, and recommend proper staffing actions. The board was established to decide if the problem is appropriate for NASA action and whether to refer it to the Science and Engineering Directorate or to other government technology transfer sources. (MSFC Institutional and Program Support Directorate Inputs for MSFC 1990 Annual Chronology of Events)

June 29

NASA conducted a modified propellant loading test of the STS-38 Space Shuttle vehicle to ensure the safety and integrity of the Orbiter/External Tank umbilical. The test revealed a hydrogen leak. (NASA Factsheet, Hydrogen Leak Investigation, July 2, 1990)

June 29

The final Burst and Transient Source Experiment Calibration Review was held. (See MSFC History Office Microfiche #2127, "Notable MSFC Events During 1990," July 2, 1990)

July 2

NASA established a Hubble Space Telescope Optical Systems Investigation Board. Dr. Lew Allen of the Jet Propulsion Laboratory was appointed Chairman. The Board was charged with determining how and when the problems in the Optical Telescope Assembly occurred, thereby leading to the spherical aberration, and how this aberration could go undetected prior to launch. (Memo from S/Associate Administrator for Space Science and Applications to Director: Jet Propulsion Laboratory, July 2, 1990, Included in The Hubble Space Telescope Optical Systems Failure Report, Issued November 27, 1990; NASA News Release July 2, 1990)

July 5

The Marshall Center announced that the Korte Construction Company of St. Louis, Missouri, had been selected for negotiations leading to the award of a contract to design and potentially construct a new project engineering office facility at the Marshall Center. (MSFC News Release, July 5, 1990)

July 5

The first meeting of The Hubble Space Telescope Optical Systems Board was held in Washington on July 5-6. The meeting focused on presentations arranged by the Hubble Space Telescope Project Office at MSFC. (The Hubble Space Telescope Optical Systems Failure Report, Issued November 27, 1990)

July 5

A dedication ceremony was held at the Michoud Assembly Facility for the Advanced Solid Rocket Motor Nozzle Facility to be located in building 103 at Michoud. (See MSFC History Office Microfiche #2127, "Notable MSFC Events During 1990," July 9, 1990)

July 10

Members of the STS-37 crew visited the University of Alabama in Birmingham (UAB) for a training session on the Protein Crystal Growth Experiment and an overview and tour of the UAB Center for Macromolecular Crystallography. (See MSFC History Office Microfiche #2127, "Notable MSFC Events During 1990," July 16, 1990)

July 10

General John Medaris, former Commander of the Army Ballistic Missile Agency, died. ("Medaris Remembered as Forceful, Flamboyant," Huntsville Times, July 12, 1990)

July 10

A Senate subcommittee met to begin a second session entitled, "Oversight on Recent Problems with the Hubble Space Telescope and the Space Shuttle." Senator Ernest F. Hollings chaired the session. (Committee Print, July 10, 1990)

July 25

For the first time in the history of the Space Shuttle Main Engine test program at the John C. Stennis Space Center, engine tests were conducted on all three test stands during the same day. (NASA News Release, July 26, 1990)

July 25

The second meeting of The Hubble Space Telescope Optical Systems Board of Investigation was held on July 25-26 in the offices of Hughes Danbury Optical Systems, Inc., (HDOS) in Danbury, Connecticut. The meeting involved status reports on work plan elements, reports on specific studies requested by the Board, and interviews with former and current HDOS Project Employees. (The Hubble Space Telescope Optical Systems Failure Report, Issued November 27, 1990)

July 25

An Atlas Centaur rocket launched from Cape Canaveral Air Force Station complex 36B carrying the Combined Release and Radiation Effects Satellite into orbit. (Marshall Star, August 1, 1990)

July 25

The American and Soviet crew members who flew on the historic Apollo-Sovuz Test Project Mission in 1975 made a reunion visit to the Marshall Center to mark the 15th anniversary of the mission. (Protocol Sheet, July 25, 1990)

July 25

A Gamma Ray Observatory functional test was performed. The experiment was powered on for approximately 7 hours while several tests and calibrations were performed. (See MSFC History Office Microfiche #2127, "Notable MSFC Events During 1990," August 21, 1990)

July 26

NASA Administrator Richard H. Truly met in Tokyo with Japan's Minister of State for Science and Technology. The two men discussed new areas of space cooperation. (Johnson Space Center, Space News Roundup, August 10, 1990)

July 26

The United States Microgravity Laboratory-1 Payload Critical Design Review Board meeting was held. (See MSFC History Office Microfiche #2127, "Notable MSFC Events During 1990," July 30, 1990)

July 30

The Imaging Spectrometric Observatory (ISO) was shipped from the Marshall Center to the Kennedy Space Center for commencement of integration activities for the ATLAS-1 Space Shuttle mission. Scientists pointed out that in the course of its development the ISO advanced the state of the art in several areas and was expected to provide much new information on the chemistry and physics of the middle and upper atmosphere. (See MSFC History Office Microfiche #2127, "Notable MSFC Events During 1990," August 6, 1990)

August 1

The second Space Transportation Vehicle Propulsion Workshop was held at MSFC August 1-2. Participants included Boeing, Martin Marietta, General Dynamics, Rocketdyne, Pratt & Whitney, Aerojet, Lewis Research Center, Kennedy Space Center, and Stennis Space Center. (See MSFC History Office Microfiche #2127, "Notable MSFC Events During 1990," August 6, 1990)

August 2

Vice President Quayle announced the names of 11 individuals appointed to serve on the Advisory Committee on the Future of the U.S. Space Program under Chairmanship of Norman R. Augustine. In addition to the Chairman, the panel members were Laurel L. Wilkening, Edward C. Aldridge, Jr., Joseph P. Allen, D. James Baker, Edward P. Boland, Daniel J. Fink, Don Fuqua, Robert T. Herres, David T. Kerns, Louis J. Lazerotti, and Thomas O. Paine. (The Vice President's Office, Office of the Press Secretary, August 2, 1990)

August 9

The Inertial Upper Stage-17/Payload Assist Module-S Flight Readiness Review MSFC Center Board was held. The Board consisted of representatives from various MSFC Laboratories, NASA Headquarters, Johnson Space Center, and Kennedy Space Center. The board certified readiness to proceed with the normal processing and ultimate flight readiness for the IUS-17/PAM-S/ASE-2 for the Ulysses mission. (See MSFC History Office Microfiche #2127, "Notable MSFC Events During 1990," August 13, 1990)

August 10

The Magellan spacecraft was placed into orbit around Venus, making a near perfect entry after its Solid Rocket Motor fired at 11:32 a.m. CDT and burned for 83 seconds. (Martin Marietta Manned Space Systems, Mission Success Bulletin, August 20, 1990)

August 14

The STS-41 Flight Certification Review was held at Kennedy Space Center. (See MSFC History Office Microfiche #2127, "Notable MSFC Events During 1990," August 21, 1990)

August 15

The fourth Joint Integrated Simulation for the Astro-1 mission was successfully completed. (See MSFC History Office Microfiche #2127, "Notable MSFC Events During 1990," August 21, 1990)

August 15

Alabama Senator Howell Heflin sent a letter, signed by 63 colleagues, to the chairman of a key NASA funding subcommittee, asking the panel to approve the Bush administration's full \$2.5 billion Space Station budget request for Fiscal Year 1991. ("Heflin Orchestrates Senate Supporters of U.S. Space Station," The Birmingham News, August 16, 1990)

August 15

MSFC Director Jack Lee announced that the Phase I definition of the Laser Atmospheric Wind Sounder (LAWS) had been successfully completed under the direction of the Program Development Directorate and that he was transferring management responsibility for the LAWS project to the Payload Projects Office for completion of Phase II and conduct of the project implementation phase. Concurrently, Lee established within the Payload Projects Office the Earth Science and Application Branch. "This branch will provide a focus for our increasing role in managing the development of scientific investigations such as LAWS, that are vital to the success of the President's Mission to Planet Earth Initiative. Included in these responsibilities is management of the MSFC Earth Observation System Data and Information System Development Activities," Lee said. ("Laser Atmospheric Wind Sounder (LAWS) and Earth Observation System (EOS) Data and Information System Responsibilities," DA01/T.J. Lee to Distribution, August 15, 1990)

August 15

The third meeting of The Hubble Space Telescope (HST) Optical Systems Board of Investigation was held August 15-16 at the Offices of Hughes Danbury Optical Systems (HDOS), Inc., in Danbury, Connecticut. A portion of the meeting involved a HDOS report on its review of recently recovered null corrector design documents. HDOS then reported on the completed sensitivity analyses of the HST Optical Telescope Assembly test equipment and procedures which yielded a mathematically plausible source of the error as observed in the HST primary mirror. (The Hubble Space Telescope Optical Systems Failure Report. Issued November 27, 1990)

August 16

Thousands of federal workers began receiving notices that they might soon face furloughs that could reduce their salaries as much as 40 percent during some pay periods because of an impasse in budget negotiations between Congress and the Bush administration. ("Furlough Warnings Going Out," Huntsville Times, August 16, 1990)

August 17

Magellan lost contact with Earth, but contact was restored briefly before the spacecraft went behind Venus. When it emerged the signal was heard again but briefly. Steady contact was re-established about 13 hours later. (Kennedy Space Center, Spaceport News, August 24, 1990)

August 21

Flight controllers at NASA's Jet Propulsion Laboratory lost contact with the Magellan spacecraft at 9:03 p.m. (Johnson Space Center, Space News Roundup, August 24, 1990)

August 22

Negotiations were completed for the design/build construction project entitled "Construct Project Engineering Facility (4203)." (See MSFC History Office Microfiche #2127, "Notable MSFC Events During 1990," August 27, 1990)

August 22

The Magellan spacecraft radar mapping probe confirmed it had responded to a computer command and established constant contact with Earth. (Johnson Space Center, Space News Roundup, August 24, 1990)

August 22

NASA announced that it was assigning the Marshall Center the responsibility for determining the cause of the hydrogen leak that grounded the Space Shuttle Atlantis. ("MSFC Searches for Cause of Hydrogen Leak in Atlantis," Huntsville Times, August 23, 1990)

August 23

Tests that began at the Marshall Center on August 23 demonstrated that the liquid hydrogen leak that caused the postponement of STS-38 was not emanating from the External Tank (ET) flange connection as originally believed. STS-38's 17-inch liquid hydrogen feedline, including the suspect ET flange, and the ET-to-Orbiter disconnect half of the umbilical had been removed from the Space Shuttle and shipped to MSFC's Technology Test Bed facility. (Martin Marietta Manned Space Systems, Mission Success Bulletin, August 31, 1990)

August 24

The vacuum chamber for the X-ray Calibration Facility arrived at MSFC by barge. (MSFC Observatory Projects Office, Draft Chronology of Events for 1990)

August 24

Shipment of the Marshall-managed Tethered Satellite System deployer from its manufacturer in Colorado to Kennedy Space Center began. Development and testing of the deployer were completed by Martin Marietta Astronautics Group in Denver. (MSFC Space Systems Office Inputs for Draft Chronology of MSFC Events for 1990)

August 25

The transition of the Hubble Space Telescope Project from the Marshall Center to Goddard Space Flight Center began. (MSFC Observatory Projects Office, Draft Chronology of Events for 1990)

August 28

The Ulysses spacecraft was transferred to the launch pad at Kennedy Space Center and stored in the rotating service structure's payload changeout room to await Discovery's arrival at the pad. (Johnson Space Center, Space News Roundup, September 7, 1990)

August 29

NASA cancelled the launch of Columbia scheduled for August 31 because of a failed electronic part on one of the four telescopes in the Space Shuttle cargo bay. ("Electronic Failure Causes Launch to be Scrubbed," Huntsville News, August 31, 1990)

August 29

Hubble Space Telescope scientists released two new discoveries made through the orbiting observatory -- a dramatic new look at the great supernova of 1987 and the core of a galaxy 40 million light-years away. (Johnson Space Center, Space News Roundup, August 31, 1990)

August 30

Representatives from the National Space Development Agency of Japan concluded a visit to MSFC where they received briefings related to the development of Space Station Freedom. (See MSFC History Office Microfiche #2127, "Notable MSFC Events During 1990," September 10, 1990)

September 4

The Space Shuttle Discovery rolled to launch pad 39B for the launch of the Ulysses solar probe. (Johnson Space Center, Space News Roundup, September 7, 1990)

September 5

The Marshall Star reported that MSFC Director Jack Lee had been presented NASA's 1990 Equal Employment Opportunity Medal. (Marshall Star, September 5, 1990)

September 5

NASA scrubbed the launch of Space Shuttle Columbia for the third time after discovering a leak as liquid hydrogen and liquid oxygen were being poured into the fuel tank. ("Leak Forces Launch Scrub," Huntsville News, September 6, 1990)

September 10

The first of the chemical releases from the Combined Release and Radiation Effects Satellite occurred at 6:10 a.m. Greenwich mean time. The release occurred over the Pacific at a latitude of 17.50 degrees south and a longitude of 178.79 degrees east. (See MSFC History Office Microfiche #2127, "Notable MSFC Events During 1990," September 10, 1990)

September 10

A new hydrogen recirculation pump was installed and leak checks were performed on the Space Shuttle Columbia in preparation for STS-35. (Marshall Star, September 12, 1990)

September 11

The Marshall Center celebrated its 30th anniversary with festivities that included music, fireworks, and a message from former NASA Administrator Tom Paine. (Marshall Star, September 12, 1990)

September 11

A meeting with the National Space Development Agency of Japan (NASDA) was held at NASDA Headquarters in Tokyo on September 11-12. Participants discussed communication links between NASA and NASDA. Representatives from the MSFC Information Systems Office, NASA Headquarters, Boeing, and NASDA attended the meeting. (See MSFC History Office Microfiche #2127, "Notable MSFC Events During 1990," October 1, 1990)

September 11

Huntsville Mayor Steve Hettinger signed a proclamation declaring October as Quality Month for the City of Huntsville. Representatives from the Marshall Center and the American Society for Quality Control participated in the signing session. (Marshall Star, September 19, 1990)

September 12

The fourth meeting of The Hubble Space Telescope Optical Systems Board of Investigation was held on September 12-13 at the offices of Hughes Danbury Optical Systems, Inc., in Danbury, Connecticut. As in the previous meeting, particular attention was paid to the null correctors used in manufacturing and characterizing the primary mirror. (The Hubble Space Telescope Optical Systems Failure Report, Issued November 27, 1990)

September 13

Dr. Lew Allen, Chairman of the Hubble Space Telescope Optical Systems Board, issued a statement saying that most, if not all, of the on-orbit problem for the telescope could be traced to a spacing error in the reflective null corrector, an optical reference device used in the manufacture of the primary mirror. (Statement of Dr. Lew Allen, Chairman, Hubble Space Telescope Optical Systems Board of Investigation, September 13, 1990)

September 14

Fine grinding was completed and the first of 11 polishing cycles began on the paraboloid mirror (PI) for the Advanced X-ray Astrophysics Facility. (MSFC Observatory Projects Office, Draft Chronology of Events for 1990)

September 15

The Magellan spacecraft began bouncing radar off Venus when it received computerized commands radioed 154.9 million miles from Earth. (Johnson Space Center, Space News Roundup, September 21, 1990)

September 17

NASA released Magellan's latest pictures of Venus showing valleys that resembled the animated character Gumby and a meteorite crater that scientists said was unlike any seen in the solar system. (Johnson Space Center, Space News Roundup, September 21, 1990)

September 17

A build-up of hydrogen in the engine compartment caused NASA to cancel a fourth attempt to launch the Space Shuttle Columbia. ("NASA Cancels Fourth Try at Shuttle Launch," Birmingham Post-Herald, September 18, 1990)

September 18

MSFC Director Jack Lee presented an award to the Boeing Company for its role in the development, production, and operation of the Inertial Upper Stage (IUS) booster rocket. The Paris-based Federation Aeronautique Internationale selected Boeing's IUS team to receive its Honorary Group diploma. The award presentation was made at Seattle's Museum of Flight. ("Boeing Honored For Its 'Space Truck,'" The Huntsville Times, September 20, 1990)

September 19

The Aeroassist Flight Experiment (AFE) critical design review met at the Marshall Center. Representatives from the Marshall Center, Johnson Space Center, Ames Research Center, Langley Research Center, and Kennedy Space Center participated as board members. The review marked the start of transition from in-house MSFC design to McDonnell Douglas Space Systems Company's. (See MSFC History Office Microfiche #2127, "Notable MSFC Events During 1990," September 24, 1990)

September 21

The Marshall Center hosted an open house for the new Project LASER Discovery Lab for Huntsville-area school administrators, principals, and local business leaders. The lab was set up to allow instructors to conduct special learning laboratory sessions for area high school teachers and students in basic physical and chemical science topics from space program work underway at the Marshall Center. (MSFC News Release, September 19, 1990)

September 22

A 20-foot-long solid fuel rocket motor was fired successfully for 30 seconds at the Marshall Center. The 48-inch-diameter motor was loaded with 10,000 pounds of solid fuel. The primary purpose was to test rocket nozzle liner material from a new supplier. ("NASA Rocket Motor Fired Successfully," The Huntsville Times, September 23, 1990)

September 24

The Marshall Center's Combined Federal Campaign began with the theme "Help Today for a Better Tomorrow, CFC -- A Great Way to Give." (Marshall Star, September 26, 1990)

September 24

NASA received Office of Science and Technology Policy nuclear launch safety approval for the Ulysses mission. (NASA Press Release, September 25, 1990)

September 25

The General Services Administration completed the transfer of 1,297.51 acres at Yellow Creek in Mississippi from the Tennessee Valley Authority to NASA for the new Advanced Solid Rocket Motor plant. Cost to NASA was \$5.7 million. (See MSFC History Office Microfiche #2127, "Notable MSFC Events During 1990," October 1, 1990)

September 25-26

The critical design review for three experiments for the Aeroassist Flight Experiment was completed. (MSFC Space Systems Office Inputs for Draft Chronology of MSFC Events for 1990)

September 26

MSFC Director Jack Lee announced that J.A. Bethay, who was serving as Executive Assistant to Director, would assume the duties of Associate Director. (MSFC Management Announcement, September 26, 1991)

September 26

The Marshall Star reported that Space Shuttle Director Robert Crippen had announced the formation of a Hydrogen Leak Investigation Team to locate and solve the hydrogen leak problem on the Orbiter Columbia. The leak had forced the postponement of STS-35. Crippen named Marshall's Robert Schwinghamer, Deputy Director for Space Transportation Systems in the Science and Engineering Directorate, to lead the team. (Marshall Star, September 26, 1990)

September 27

MSFC Director Jack Lee announced the appointment of Carolyn S. Griner as Director of MSFC's Mission Operations Laboratory. She was replacing Herman F. (Fletcher) Kurtz, who was retiring. (MSFC Management Announcement, September 27, 1990)

September 28

Testing of a Pratt & Whitney 40,000-pound-thrust subscale liquid oxygen/liquid hydrogen injector for the joint Department of Defense Air Force/NASA Advanced Launch System Space Transportation Main Engine was completed at the Marshall Center. (Marshall Star, October 17, 1990)

September 28

MSFC Director Jack Lee made a presentation to the Advisory Committee on the Future of the U.S. Space Program. (Presentation Package, September 28, 1990)

October 1

A memo was issued by the Director of the Personnel Office requiring that position descriptions for scientific and engineering personnel at MSFC contain language requiring compliance with the "Federal Technology Transfer Act of 1986." The memo also included language to be included in performance plans. In addition, the letter asked that the language be added to existing documents and incorporated into new positions by FY91. (MSFC Institutional and Program Support Directorate Inputs for MSFC 1990 Annual Chronology of Events)

October 1

In preparation for a series of tests to evaluate extravehicular activity hardware design, the Essex Corporation began installation of the Transfer Orbit Stage Neutral Buoyancy Simulator hardware. Suited tests were scheduled with Astronaut Mark Lee as the test subject. (See MSFC History Office Microfiche #2127, "Notable MSFC Events During 1990," October 22, 1990)

October 2

About 300 people from the Marshall Center, the Army, and local industry attended the National Quality Forum VI broadcast and the Government/Local Industry Quality Forum at Marshall. (Marshall Star, October 10, 1990)

October 6

STS-41, Discovery, lifted off from Kennedy Space Center carrying five astronauts and the European Ulysses spacecraft into orbit. Within 2 hours of its deployment, the Ulysses Probe began its 5-year journey to explore the polar regions of the sun. It was sent on its way by a Marshall Center-managed upper-stage booster package consisting of an Inertial Upper Stage and a Payload Assist Module. (Marshall Star, October 10, 1990; "European Ulysses Fired to Jupiter, Sun, As Discovery Returns Astronauts to Space," Aviation Week & Space Technology, October 15, 1990)

October 10

The Huntsville Area Committee on Employment of People with Disabilities announced that Gerry Higgins, a Marshall employee, had been named the Employee of the Year for the Huntsville area. The committee also announced that the Marshall Center had earned a "Partnership Award." (Marshall Star, October 17, 1990)

October 12

The Marshall Center began rebaselining the Aeroassist Flight Experiment Project (AFE) after the Office of Aeronautics, Exploration, and Technology notified the Center that the FY91 AFE budget would be reduced by approximately fifty percent. (MSFC Space Systems Office Inputs for Draft Chronology of MSFC Events for 1990)

October 16

The last of the 12 optic blanks for the Advanced X-ray Astrophysics Facility was received from the Schott Glass Company in Germany. (MSFC Observatory Projects Office, Draft Chronology of Events for 1990)

October 16

The Program Development Directorate hosted a Space Transportation Week at MSFC October 16-19. Representatives from NASA Headquarters, other centers, the Department of Defense, the Department of Energy, and industry participated in four contractor study briefings and 10 splinter sessions. (See MSFC History Office Microfiche #2127, "Notable MSFC Events During 1990," October 22, 1990)

October 16

The Space Station Work Package 1 Quarterly Review with Boeing was held at Marshall. Work package progress, status, and plans were presented. (See MSFC History Office Microfiche #2127, "Notable MSFC Events During 1990," October 22, 1990)

October 23

The Astro-1 confidence test which exercised the major payload elements over a period of approximately 30 hours was successfully completed. No major problems were identified, and the science teams declared their instruments to be still flight-worthy. (See MSFC History Office Microfiche #2127, "Notable MSFC Events During 1990," October 29, 1991)

October 23

Members of the Advisory Committee on the Future of the U.S. Space Program visited the Marshall Center to discuss various aspects of program management, science and engineering activities, and future programs. (Marshall Star, October 24, 1990)

October 25

NASA's Office of Space Flight held a Management Council Meeting at the Marshall Center. Issues included resources, congressional matters, Space Shuttle and Space Station Freedom items, and other pertinent topics. The meeting was chaired by Associate Administrator William Lenoir. (Marshall Star, October 31, 1990)

October 25

The Associate Administrator for the Office of Aeronautics, Exploration, and Technology received a status review on the design maturity of the carrier/aerobrake coming out of the systems critical design review. The review also covered the status of design turnover from MSFC to McDonnell Space Systems Company for the carrier. (MSFC Space Systems Office Inputs for Draft Chronology of MSFC Events for 1990)

October 25

Green College Oxford President Sir Crispin Tickell, United Nations environmental representative Dr. Noel Brown, former Saturn V Manager Lee James, and singer-environmentalist Olivia Newton-John explored the role of the space program in promoting and protecting the environment in the fourth Dr. Wernher von Braun Exploration Forum. (Marshall Star, October 17, 1990)

October 26

More than 60 university officials representing 28 institutions of higher education from 22 states attended the second NASA/University Joint Venture (JOVE) Orientation Conference at the Marshall Center. The conference was held to inform non-involved members of the nation's university community about collaborative research opportunities in space science available with NASA. (Marshall Star, November 7, 1990)

October 26

MSFC Director Jack Lee announced the following appointments: Leslie B. Mix, Deputy Manager, Space Shuttle Main Engine Projects, and Glenn A. Dill, Manager, Stennis Space Center Resident Office, Space Shuttle Projects Office. (MSFC Management Announcement, October 26, 1990)

October 30

NASA cleared Columbia for flight after a successful fueling test. The agency also released a trouble-shooting team headed by Marshall's Robert Schwinghamer. ("NASA Clears Columbia for Flight," The Huntsville Times, October 31, 1990)

October 30

The first of three Space Shuttle Main Engines for NASA's newest orbiter, Endeavour, arrived at the Kennedy Space Center. It was the first piece of Endeavour's flight hardware to arrive at the Center. (NASA News Release, October 30, 1990)

October 30

The Astro-1 team participated in a STS-35 Joint Integrated Simulation. Participants included the crew, and mission control and MSFC representatives. (See MSFC History Office Microfiche #2127, "Notable MSFC Events During 1990," November 5, 1990)

During October

The Payload Projects Office was the first MSFC organization to achieve 100 percent participation in the Combined Federal Campaign for 1990. (Marshall Star, October 10, 1990)

During October

Four candidates for payload specialists positions for the United States Microgravity Laboratory-1 mission came to the Marshall Center for training. (Marshall Star, October 10, 1990)

November 1

The MSFC Emergency Operation Center and Emergency Warning System were extensively upgraded in 1990. (MSFC Institutional and Program Support Directorate Inputs for MSFC 1990 Annual Chronology of Events)

November 2

MSFC's Dr. Donald Frazier served on the committee hearing the first PhD thesis defense at the Alabama A&M University Physics Department. The thesis title was "Nonlinear Optical Properties of Organic Materials," and the presenter was Hossen Ahmed Abdeldayem. The research equipment and direction arising from this work were a direct result of NASA-HBCU (Historically Black Colleges and Universities) funding from grant NAG8-107. (See MSFC History Office Microfiche #2127, "Notable MSFC Events During 1990," December 11, 1990)

November 7

NASA officials met in Washington to outline plans to comply with a congressionally mandated 90-day reconfiguration of Space Station Freedom. ("NASA Sets Ground Rules for Station," Huntsville Times, November 8, 1990)

November 13

The Tethered Satellite System (TSS) satellite arrived at Kennedy Space Center from Italy. The satellite was developed by Aeritalia, Torino, Italy, under contract to the Italian Space Agency. Plans called for the satellite to undergo further testing and then be integrated with the TSS deployer and scientific instrumentation for a planned flight in 1992. (MSFC Space Systems Office Inputs for Draft Chronology of MSFC Events for 1990)

November 13

Research and Technology Day was held at the Marshall Center to recognize exemplary achievements in scientific and engineering research, and in technology development. (Marshall Star, November 14, 1990)

November 13

The initial subsystem of an automated MSFC Local Area Network (LAN) management system was implemented. The system was designed to provide online capability to: manage and assign Transmission Control Protocol/Internet Protocol addresses, gather and report LAN traffic statistics, and gather and report LAN response time statistics. (MSFC Institutional and Program Support Directorate Inputs for MSFC 1990 Annual Chronology of Events)

November 13

The Aerospace Safety Advisory Panel reviewed the status of the Advanced Solid Rocket Motor and Advanced Solid Rocket Booster projects in a meeting at MSFC on November 13-14. (See MSFC History Office Microfiche #2127, "Notable MSFC Events During 1990," November 19, 1991)

November 14

The Marshall Center completed a 10-hour joint integrated simulation of the Astro-1 Spacelab mission. The simulation involved mission and payload controllers, flight crew members, the Mission Control Center in Houston, and Marshall's Spacelab Mission Operations Control Center. (MSFC Daily Planet, November 15, 1990)

November 15

STS-38, Space Shuttle Atlantis, was launched at 5:48 p.m. on a Department of Defense mission. (Kennedy Space Center, Spaceport News, January 11, 1991)

November 19

Fine grinding was completed and the first of 11 polishing cycles began on the hyperboloid mirror (H1) for the Advanced X-ray Astrophysics Facility. (MSFC Observatory Projects Office, Draft Chronology of Events for 1990)

November 21

The Marshall Star reported that in an effort to encourage students' interest in math and science, the McDonnell Douglas Corporation had announced that it would join in the corporate sponsorship of the Project LASER (Learning About Science Engineering and Research) Mobile Teacher Resource Center. (Marshall Star, November 21, 1990)

November 26

MSFC Director Jack Lee announced that the development phase of the Small Expendable Deployer System (SEDS) was nearing completion under the direction of the Program Development Directorate, and that he was transferring management responsibility for SEDS to the Space Systems Projects Office. Lee also noted that a decision had been made to proceed with two SEDS flights as secondary payloads on future Air Force missions. "This constitutes a major milestone in which Program Development was provided the opportunity to be responsible for the development of a small flight project subsequent to its definition," Lee said. Jim Harrison was appointed Project Manager. ("Small Expendable Deployer System (SEDS) Responsibilities," T.J. Lee to Distribution, November 26, 1990; MSFC Space Systems Office Inputs for Draft Chronology of MSFC Events for 1990)

November 27

The Hubble Space Telescope Optical Systems Failure Report was released at a press conference at NASA Headquarters. (The Hubble Space Telescope Optical Systems Failure Report)

November 27-28

Representatives from the MSFC Technology Utilization Office were among more than 2,500 persons who attended "Technology 2000" in Washington D.C. from November 27-28. This first major industrial conference and exposition spotlighted NASA technology and technology transfer. Marshall involvement also included an MSFC exhibit and seven papers presented by MSFC scientists and engineers. (MSFC Institutional and Program Support Directorate Inputs for MSFC 1990 Annual Chronology of Events)

November 28

The Inertial Upper Stage (IUS) Quarterly Review was held at MSFC. (MSFC Space Systems Office Inputs for Draft Chronology of MSFC Events for 1990)

During November

A highly specialized furnace, MEPHISTO, built in France for materials processing research, underwent two weeks of testing at Teledyne Brown Engineering's Huntsville Facility. The furnace will be part of the payloads planned for the United States Microgravity Payload series of missions. (Marshall Star, November 25, 1990)

December 2

The Marshall Center's Spacelab Mission Operations Control Center officially began operations when Mission Specialist Robert Parker reported, "Huntsville, this is Astro" following the launch of the STS-35 Astro-1 Spacelab mission. (Marshall Star, December 5, 1990)

December 2

James N. Strickland was appointed Deputy Director, Systems Analysis and Integration Laboratory; Harvey Golden was appointed Deputy Director, Mission Operations Laboratory; and Grady S. Jobe was appointed Deputy Director, Information and Electronic Systems Laboratory. (MSFC Management Announcement, December 19, 1990)

December 2

Dr. Lennard Fisk, NASA Associate Administrator for Space Science and Applications, was interviewed by Marshall's Frank Six of the University Affairs Office as part of the Marshall-produced program entitled "Today in Space," which aired at various intervals during the Astro-1 mission. The production was the first of its kind to originate from NASA and MSFC. (Marshall Star, December 12, 1990)

December 5

The MSFC Technology Utilization Office sponsored a booth at the Tennessee Governor's Conference on Economic Development December 5-7. (See MSFC History Office Microfiche #2127, "Notable MSFC Events During 1990," December 11, 1990)

December 6

The Marshall Center unveiled a new, 80-foot-long, permanent display at the Huntsville International Airport. The display depicted Huntsville's leading role in America's past, present, and future space endeavors. (Marshall Star, December 19, 1990)

December 6

Explorer Post 2001 was organized in conjunction with the Boy Scouts of America's local council. The post was organized to provide members with hands-on experience with NASA scientists and engineers in order to stimulate interest in space, science, and engineering. (Marshall Star, December 12, 1990)

December 7

STS-35 science crew members taught a science lesson from orbit and answered questions from students at Marshall Space Flight Center in Huntsville, Alabama, and Goddard Space Flight Center in Greenbelt, Maryland, as part of a pilot educational program called Space Classroom-Assignment: The Stars. Twelve students visiting the Marshall Center participated in a supplemental lesson taught in the Spacelab Mission Operations Control Center. The students spent the next two days visiting MSFC laboratories, Space Camp, and experiencing hands-on science activities at the Marshall Discovery Lab. (MSFC News Release, December 6, 1990)

December 10

MSFC Director Jack Lee announced the following key personnel appointments: Keith B. Coates was appointed Chief Engineer, Advanced Solid Rocket Motor (ASRM) Project; John S. Chapman, was appointed Deputy, ASRM Project; Craig E. Sumner was appointed Deputy Manager, External Tank Project Office. (MSFC Management Announcement, December 10, 1990)

December 10

The Advisory Committee on the Future of the U.S. Space Program issued an advance copy of its Summary and Principal Recommendations. A portion of the report included the following: "Briefly stated the Committee believes that NASA and only NASA, realistically possesses the essential critical mass of knowledge and expertise upon which the nation's civil space program can be sustained -- and that the task at hand is therefore for NASA to focus on making the self-improvements that gird this responsibility." (Advance Copy of the Summary and Principal Recommendations of the Advisory Committee on the Future of the U.S. Space Program, December 10, 1990)

December 11

A static test of a Space Shuttle Solid Rocket Motor, designated Technical Evaluation Motor Number 7, took place at Thiokol Corporation Space Operations Test Facility near Brigham City, Utah. (Marshall Star, December 19, 1990)

December 30

Harold R. Coldwater was appointed Manager, Upper Stage Projects Office, Space Systems Projects Office. (MSFC Space Systems Office Inputs for Draft Chronology of MSFC Events for 1990)

During 1990

The Marshall Center accounted for 148 tech briefs published in the monthly NASA Tech Briefs magazine. This was the second highest record of tech brief publications for the year. During 1990, 255 tech briefs were attributed to the Jet Propulsion Laboratory. (MSFC Institutional and Program Support Directorate Inputs for MSFC 1990 Annual Chronology of Events)

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