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# Chronology of KSC and KSC Related Events for 1985

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National Aeronautics and  
Space Administration  
**John F. Kennedy Space Center**

**NASA**

CHRONOLOGY OF  
KSC AND KSC-RELATED  
EVENTS FOR  
1985  
SELECTED  
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New World Services, Inc.  
ARCHIVIST

## FOREWORD

This chronology is published to fulfill requirements of KMI 2700.1 (as revised) to describe and document KSC's role in NASA programs.

Materials for this chronology were selected from a number of published sources. The document records KSC events of interest to historians and other researchers. Arrangement is by month; items are by date of the published sources. Actual date of the event may be indicated in parenthesis when the article itself does not make that information explicit.

Materials were researched and prepared for publication by Historian-Archivist Ken Nail, Jr., with the assistance of Elaine Liston, both of New World Services, Inc., EG&G subcontractor for KSC Library services.

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J. E. Pryor  
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## JANUARY 1985

**January 2:** Hughes Aircraft Co. selected Astrotech Space Operations Co.'s Titusville facility as the site for prelaunch processing of six Hughes satellites that will ride aloft in the space shuttle this year. Astrotech vice president and general manager Harold Zweighaum said the satellites will be prepared for four Hughes customers - Western Union, American Telephone & Telegraph Co., Mexico and AUSSAT TTY Ltd., an Australian concern. Each satellite will be used for commercial communications, he added. [Hodges. TODAY, p. 14C, Jan. 3, 1985.]

**January 5:** The space shuttle Discovery began its seven-hour rollout to pad 39A at about 1:30 a.m. "Everything went smoothly," NASA spokesman Dick Young said in the afternoon. After locking Discovery onto its launch mounts at 8:31 a.m., workers surrounded the shuttle with the rotating service facility before attaching umbilical cords. Discovery is scheduled to be launched January 23. [Ash. TODAY, pp. 1A & 16A, Jan. 6, 1985.]

**January 6:** A practice shuttle countdown went smoothly as Kennedy Space Center workers continued to prepare the Discovery for its classified January 23 mission. "Everything is going fine; we are right on time," said KSC spokesman Hugh Harris. The five-member crew was expected to enter the shuttle at approximately 5:30 a.m. January 7 and conclude the simulated liftoff at 8 a.m. ["KSC Ready for Flight of Shuttle," TODAY, p. 6A, Jan. 7, 1985.]

**January 7:** The five-member Discovery crew and the shuttle itself successfully completed its dress rehearsal for the January 23 liftoff of its Defense Department mission. The terminal countdown demonstration test ended at 8:03 a.m. with a simulated ignition of Discovery's three main engines, said KSC spokesmen. The test had begun at 1:40 p.m. January 6. Flying aboard Discovery for Flight 51-C are mission commander Thomas Mattingly, shuttle co-pilot Loren Shriver, mission specialists Ellison Onizuka and James Buchli and payload specialist Gary Payton - all officers in various branches of the military. [Yacenda. TODAY, p. 8A, Jan. 8, 1985.]

**January 11:** Spaceport USA, formerly known as the Kennedy Space Center Visitors Information Center, invited some 800 people to attend the grand opening of its new \$13.5 million facilities. On hand for the occasion were Leonard Nimoy, famed as Mr. Spock in the "Star Trek" series, shuttle astronaut Robert Crippen, Florida Lt. Gov. Wayne Mixson, KSC Director Dick Smith and Harry Chambers, vice president and general manager of TW Services Inc. also attended the gala.

Highlight events of the evening were the appearance of Nimoy and the two films: "Flight of the Aurora" and the IMAX film, "Hail Columbia!" [Yacenda. TODAY, pp. 1A & 16A, Jan. 12, 1985.]

**January 14:** Pre-launch preparations for the January 23 liftoff of Discovery were back on track, as crews worked to make up time lost over the weekend due to the malfunctioning of a Master Events Controller. A matching Master Events Controller was taken from Challenger and KSC officials said the problem was resolved and there were not expected to be any delays in the scheduled liftoff.

Kennedy Space Center spokesman Rocky Raab said several problems affecting Challenger's thermal protection system have also been resolved, though that shuttle's February 20 launch could be delayed if the workers don't catch up to the schedule for reinstalling the delicate thermal tiles. [Yacenda. TODAY, p. 6A, Jan. 15, 1985.]

**January 15:** Kennedy Space Center officials sent NASA headquarters a proposed launch schedule for 1985 for expendable rockets:

- \* Feb. 14, an Atlas Centaur rocket is scheduled to carry an INTELSAT telecommunications satellite to orbit.
- \* Sometime in May, another Atlas Centaur is to lift a second INTELSAT.
- \* In late July or early August, a third Centaur will carry a third INTELSAT.
- \* On Oct. 17, a Delta will carry a GOES weather satellite to space for the National Oceanic and Atmospheric Administration.

\* In December, an Atlas Centaur is to loft a Navy FLTSATCOM navigation satellite.

The schedule supplements 12 shuttle launches planned for the year, all from KSC. [Yacenda. TODAY, p. 9A, Jan. 16, 1985.]

**January 16:** Ground workers preparing for Wednesday's launch of the Discovery have encountered more problems, but none should delay the mission, NASA officials said. Kennedy Space Center spokeswoman Andrea Shea said two damaged cables leading to launch pad 39A were uncovered during testing following the ordnance loading operations. Also, firing-room technicians decided to replace a computer buffer device that malfunctioned late on January 15, taking advantage of the down time caused by the need to replace the damaged cables, Shea said. Meanwhile, a sensitive test for minute gas leaks in the shuttle's engines was successfully completed with no problems uncovered in the test. [Yacenda. TODAY, p. 7A, Jan. 17, 1985.]

**January 17:** U. S. Senator Jake Garn (R-Utah) is scheduled to fly aboard the space shuttle Challenger's February 20 flight, NASA announced. Garn, a 10-year member of the appropriations subcommittee that oversees NASA's budget, will become the first civilian passenger in space. Debra Rahn, a spokeswoman for NASA's headquarters in Washington, D.C., said discussions are still under way with other crew members and trainers to determine an appropriate role for the senator. "There have been some discussions of carrying out life sciences experiments, but that's still up in the air," Rahn said. [Yacenda. TODAY, pp. 1A & 16A, Jan. 18, 1985.]

<> A small leak found in a fuel line aboard the shuttle Discovery slowed work at the pad but engineers were optimistic the ship would take off on time next week. The latest problem was found late in the night of January 16 when a test of the shuttle's fuel lines and other plumbing showed a small leak. Rocky Raab of NASA said the leak was traced to pipes entering the high-pressure hydrogen fuel pump of the No. 1 main engine. ["Tiny Fuel Leak Probably Won't Delay Shuttle," THE ORLANDO SENTINEL, p. C-3, Jan. 18, 1985.]

**January 20:** Four of the five astronauts who will fly the January 23 secret DOD mission arrived at Kennedy Space Center at 4:35 p.m.; The four - Mattingly, Buchli, Shriver, and Onizuka - skipped their usual arrival statements to reporters after flying to KSC from Houston. (Air Force Major Gary Payton arrived at KSC earlier without explanation from NASA.) The four crew members were greeted by family members and quickly driven to their KSC quarters, according to NASA spokesman Hugh Harris. [Dickerson. TODAY, pp. 1A & 12A, Jan. 21, 1985.]

**January 21:** The Merritt Island National Wildlife Refuge's administrative offices and visitor exhibits have moved into a new \$1.75 million complex bearing the names of two wildlife officers who died in 1981 while fighting a fire on the refuge. The Scott J. Maness-Beau W. Sauselein Administrative Visitors Facility opened to the public in late December after a construction period of nearly two years, according to Steve Gard, assistant refuge manager.

Maness and Sauselein died June 8, 1981, when the bulldozer they were using to dig firebreaks hit a tree stump, forcing the two to flee from a blaze on foot. Trapped by the fire, they were found alive - but severely burned. Both died a short time later. An official opening ceremony is planned for early summer when exhibits are completed, Gard said. The center is located on SR 402 about 3-1/2 miles east of Titusville, or a mile west of the old facility. [Lafferty. TODAY, pp. 1B & 3B, Jan. 21, 1985.]

<> Kennedy Space Center officials blamed the weather for freezing water lines at oceanside launch pad 39A and said the cold may have caused a main engine control computer aboard Discovery to malfunction. "We've never had to launch in cold weather like this," NASA spokesman Charles Redmond said. Despite the cold, the official countdown got under way on time at 4 a.m. The normal pre-launch sequence was varied for this secret DOD mission to obscure the flight's actual departure time, scheduled for sometime between 1:15 p.m. and 4:15 p.m. January 23. Military officials considered activating the countdown clock at nine minutes before liftoff.

Engineers continued to investigate the cause of the problem in the engine controller, a "black box" that interacts with Discovery's five main on-board flight computers to drive the craft's primary propulsion system. Pad workers were



scheduled to load super-cold liquid oxygen and liquid hydrogen into storage tanks on Discovery said NASA spokeswoman Lisa Malone. Officials refused to say when the fueling would take place. [Yacenda. TODAY, pp. 1A & 14A, Jan. 22, 1985. Fisher. THE ORLANDO SENTINEL, pp. C-1 & C-7, Jan. 22, 1985.]

**January 22:** The threat of ice forming on the space shuttle Discovery forced a 24-hour delay of the scheduled January 23 liftoff, NASA announced. Shortly before midnight (January 22), the space agency announced that "extreme weather conditions in the area are projected to cause icing conditions on the external tank" and said the launch would be rescheduled for the afternoon of January 24.

The cold weather already was responsible for some launch problems. Freezing temperatures burst water valves and pipes in the launch pad fire extinguishing system during the night January 21. Hazardous pad operations, such as filling the shuttle's external fuel tank, could not be conducted without an operational fire-extinguishing system on the pad. Other than weather-related difficulties, no other significant problems had occurred. [Yacenda. TODAY, pp. 1A & 14A, Jan. 23, 1985.]

**January 23:** A handful of demonstrators, including a Darth Vader look-alike, picketed outside Kennedy Space Center to protest what they called the militarization of space.

Orlando resident Bruce Gagnon, state coordinator of the coalition, said, "I'm very proud of the space program in its peaceful civilian applications. That's why we haven't been here for other launches. We're here now because this is the beginning of the 'Star Wars' [Strategic Defense Initiative] offensive." Orlando resident Becky Acuna, who wore the Darth Vader costume, said she believes most passers-by made "a clear connection" between the fictional symbol of evil and what she said is the evil inherent in military control of space. [Bumpus-Hooper. THE ORLANDO SENTINEL, p. A-14, Jan. 24, 1985.]

**January 24:** NASA officials have ordered TW Services Inc. to halt showings of "Flight of the Aurora" at Kennedy Space Center's Spaceport USA until technical problems in the multimedia presentation are worked out. NASA officials

decided to take the multimedia presentation "off-line until we get it fine-tuned," said Chuck Hollinshead, director of Public Affairs at KSC; the film had its last showing January 16.

"It's an awfully complex show and we kind of rushed to get it ready for the grand opening," Hollinshead said, citing problems with distorted colors and groups of slides not showing up on the screen during the 30-minute presentation. "The show never got the long run it needed to get all the bugs out," said George Meguiar, manager of Advertising and Public Relations for TW Services, which operates Spaceport USA on a contract from KSC. [Lafferty. TODAY, p. 1B, Jan. 25, 1985.]

<> America's first manned military space flight got under way at 2:50 p.m., carrying five crew members and, presumably, a satellite into orbit. The exact departure time for the Discovery remained secret until nine minutes before liftoff from Pad 39A.

"We did not have unexpected holds," was the most Shuttle Management Director Tom Utsman would say about the launch schedule. "There wasn't a problem as far as meeting our customer's needs." NASA Launch and Landing Director Bob Sieck said several small problems cropped up during the last portion of the countdown but none were "show stoppers." Those problems included a malfunctioning auxiliary power unit vent, officials said.

Utsman said the warmer weather eliminated any possibility of icing problems on the outside of the shuttle's external fuel tank - a concern that forced the scrubbing a day earlier. "We had small, very small ice coverage that was melting and we didn't have anything out of the ordinary for a winter launch," Utsman said.

Visibility was the clearest yet for any of the shuttle's 15 departures. The craft could be seen more than 4-1/2 minutes. By the time the rocket's flame disappeared, Discovery was 150 miles downrange and 50 miles up. [Yacenda. TODAY, pp. 1A & 16A, Jan. 25, 1985.]

<> Nine people gathered in a semicircle and joined hands as Discovery roared into clear skies at 2:50 p.m. with its Defense Department cargo. "I think it's a very historic day in the same vein as Nagasaki and Hiroshima," said John Linnehan, an "inactive" Catholic priest who belongs to Immanuel House Peace Community in St. Petersburg. "I feel the only way we can react to what's happening here is to symbolically turn our backs on it and pray God will forgive us for contaminating outer space," said Linnehan. "We have an arms race here (on Earth) and now we're taking it into space."

Brothers Steve and Randy Gardner (both of Merritt Island) spray painted a slogan on a sheet that read, "Spy in the sky beats speakin' Russian." A cheer went up from the crowd when the brothers displayed it atop their truck. Steve Gardner, 28, pointed to the protesters and said, "I didn't think about doing this until we saw those guys. I had to make a little rebuttal." [Lafferty. TODAY, p. 16A, Jan. 25, 1985.]

**January 26:** Holloway Corp. (Titusville, FL) won a \$132,677 NASA contract for modifications to the Operations and Checkout Building for payload test and integration at the Kennedy Space Center. The contract includes modifications of a coolant control room and addition of new power panels and receptacles. [Kassak. TODAY, p. 8C, Jan. 26, 1985.]

**January 27:** Discovery made a picture-perfect landing at 4:23 p.m. at KSC's Runway 15 - about three miles from where the shuttle lifted off January 24. "She sure looks clean," said KSC spokesman Dick Young. The mission was the third shortest of the 15 shuttle flights. The shortest mission - two days, six hours and 13 minutes - was flown by Columbia in November 1981. Discovery has made both of the shuttle program's landings at KSC. The DOD mission just completed lasted three days, one hour, 33 minutes and 27 seconds.

After Sunday's landing, Air Force officials said no new information would be released about the military aspect of the mission. "The Air Force does not plan on (saying) anything more," said Captain Miles Wiley, an Air Force spokesman at Johnson Space Center in Houston, Texas. NASA spokesman Hugh Harris said much the same thing. He said the normal post-flight news briefing was cancelled because shuttle program chief Jesse W. Moore, who normally conducts the briefing, was in Washington, D.C.

About 8:30 p.m., KSC workers began towing Discovery to the Orbital Processing Facility, where the vehicle would be readied for its next mission. [Perez. TODAY, pp. 1A & 12A, Jan. 28, 1985.]

<> Four private planes flew into the restricted airspace surrounding Kennedy Space Center - one just five minutes before Discovery touched down, Air Force officials said. The three other violations were reported 30 minutes or more before the shuttle landed, they said. At least two of the planes were identified by government aircraft and their pilots face fines, suspension of flying privileges or both. [Herlihy. TODAY, p. 3A, Jan. 28, 1985.]

**January 28:** Discovery returned from its three-day mission in great shape, said KSC spokesman Jim Ball. "It really is in excellent condition compared to other missions," he said. Only about 12 heat-protection tiles were damaged during the flight - roughly one-third the number normally damaged. Ball also said technicians will examine why a device on the orbiter's wing recorded a higher-than-normal pressure reading before the launch.

Discovery's mission ended a day earlier than planned due to an unfavorable weather forecast for the KSC landing site today. Major Ron Hinkle, an Air Force spokesman at JSC in Houston, said weather factors were considered for the landing date, but, in keeping with secrecy surrounding the mission, refused to say if it ended early.

After a delay due to the breakdown of a cooling unit on the runway, the orbiter was towed to its hangar by 1 a.m., Ball said. [Perez. TODAY, pp. 1A & 14A, Jan. 29, 1985.]

**January 30:** Ground was broken at Kennedy Space Center for a \$25 million facility to assemble and refurbish the twin solid rocket boosters that propel space shuttles into space. Booster Production Co., formed January 1 as an outgrowth of United Space Boosters Inc., will build and occupy the new Solid Rocket Booster Assembly and Refurbishment Facility under contract from NASA. The company will put an additional \$22 million worth of equipment and capital into the facility, said George Murphy, Booster Production executive vice president.

Construction on the 42-acre site about a mile south of the Vehicle Assembly Building is expected to be complete by August 1986. The construction contract is separate from the five-year \$274 million contract USBI received from NASA in August to manufacture, assemble, test and deliver 84 sets of the twin rocket boosters. USBI also is required under the contract to refurbish boosters after each flight.  
[Lafferty. TODAY, p. 18C, Jan. 31, 1985.]

## FEBRUARY 1985

**February 2:** Dr. Carlos Blazquez (PT-TPO-A) is currently engaged in remote sensing research concerning the impact of stress upon plants, i.e., internal leaf structure changes. Also working toward the development of this remote sensing technique is Dr. George Edwards of the University of Florida's agricultural research center in Lake Alfred, Florida. ["IR Can Spy Plant Stress Before Eyes Do," SCIENCE NEWS, p. 70, Feb. 2, 1985.]

<> Scientific Systems Services Inc. (Melbourne, FL) won a \$1.5 million contract to provide software for the space shuttle launch processing system at Kennedy Space Center. Under the one-year contract from Martin Marietta Aerospace in Denver, SSS will design and develop enhancements that ensure the software for the various launch functions is compatible with upgraded computer equipment that Martin Marietta is supplying. [Kassak. TODAY, p. 8C, Feb. 2, 1985.]

**February 3:** NASA and the Air Force have embarked on a multi-million-dollar program to improve weather forecasting and to increase the chances of local orbiter landings. The two-year, \$2.7 million Meteorological Systems Modernization Program will create "a unique forecasting facility that doesn't exist anywhere else in the world," said Ray Cerrato, chairman of the program for Kennedy Space Center.

Scheduled for completion in May, 1986, officials hope the new equipment will better forecast rain, lightning, wind, visibility and other factors that, unless prepared for, can delay a launch, landing or preparation of a shuttle. To reduce the chance of error, advanced computers have been installed at the Air Force's Cape Canaveral Forecast Facility and devices to measure short-range, local weather conditions have been installed throughout NASA-and Air Force-owned land. [Lafferty. TODAY, pp. 1B & 3B, Feb. 3, 1985.]

**February 5:** David Boland Inc. (Titusville, FL) won a \$3 million NASA contract for site preparation and construction of a two-story addition to the existing Deep Space Instrumentation Facility (DSIF). Radio frequency shielding

will be part of the structure to be built at Cape Canaveral Air Force Station. Under the contract, Boland will build phase one of the new addition to the DSIF which will house the Centaur Payload Operations Control Center. [Kassak. TODAY, p. 16C, Feb. 6, 1985.]

<> Rep. Bill Nelson (D-Fla.), whose district includes Kennedy Space Center, was elected as the new chairman of the Subcommittee on Space Science & Applications of the House Science & Technology Committee, which is responsible for authorizing the space portion of the NASA budget. ["Nelson Named as New Chairman of House Space Subcommittee," DEFENSE DAILY, p. 203, Feb. 6, 1985.]

**February 10:** The space shuttle Challenger is set for an 8:30 a.m. EST launch on March 3 and is targeted for a KSC landing at 9:22 a.m. EST on March 7, just ten hours before the Air Force launches an Atlas-Centaur from Cape Canaveral between 7:09 and 7:28 p.m. EST.

"We're still going on the seventh," Charles D. Gay, KSC Director of Expendable Vehicles Operation, said. "We worked it out with the (tracking) range Friday [February 8], and they can recycle all their resources. Everything fell in place."

Challenger was rolled from the Orbiter Processing Facility to the Vehicle Assembly Building at about 9:30 a.m. EST today. Work on the heat tiles was expected to continue in the VAB and at the launch pad. "We don't know of any other problems we have to solve," said NASA spokesman Hugh Harris. [Lunner. TODAY, p. 1A, Feb. 1, 1985.]

**February 11:** Playalinda Beach was closed today and was not expected to reopen until early May when a road paving project is complete, according to Canaveral National Seashore officials. Martin Paving Co. (Daytona Beach, FL) will begin work on a \$1.4 million contract to pave the five-mile road that runs parallel to the beach. The contract calls for building a two-lane road and moving parking areas next to the dunes so visitors can get to the beach without crossing the road. ["Playalinda Beach Closed Until May," TODAY, p. 1B, Feb. 11, 1985.]

**February 12:** Celestis Group (Melbourne, Florida) won initial government approval for their space burial service. The company plans to launch cremated human remains. News of the approval came to Celestis in a phone call from former astronaut Donald "Deke" Slayton, the man whose rocket they've hired for the job. Jennifer Dorn, director of the Department of Transportation's Commercial Space Transportation Office, announced that DOT had approved the mission plans of Slayton's Space Services of America. [Lunner. TODAY, pp. 1A & 16A, Feb. 13, 1985.]

**February 13:** Patrice Mion and Bill Sargent - students at the University of Florida - are part of a \$66,000 project at Kennedy Space Center; the project is designed to use the decomposing organic matter in KSC's marshes as an organic charcoal filter to dispose of the heavy metals produced by high tech industries and other sources, according to G. Ronnie Best, associate director of UF's Center for Wetlands. [Bailey. THE TRIBUNE, p. 2A, Feb. 13, 1985.]

**February 15:** Challenger's rollout to launch pad 39A was delayed 24 hours for the precautionary replacement of an electronic capacitor in one of the solid rocket booster-control units. Sources said the schedule preceding liftoff was tight and the double delay - due to the tiles and the capacitor's replacement - probably would result in one-day slip in the launch date. [Lunner. TODAY, pp. 1A & 16A, Feb. 16, 1985.]

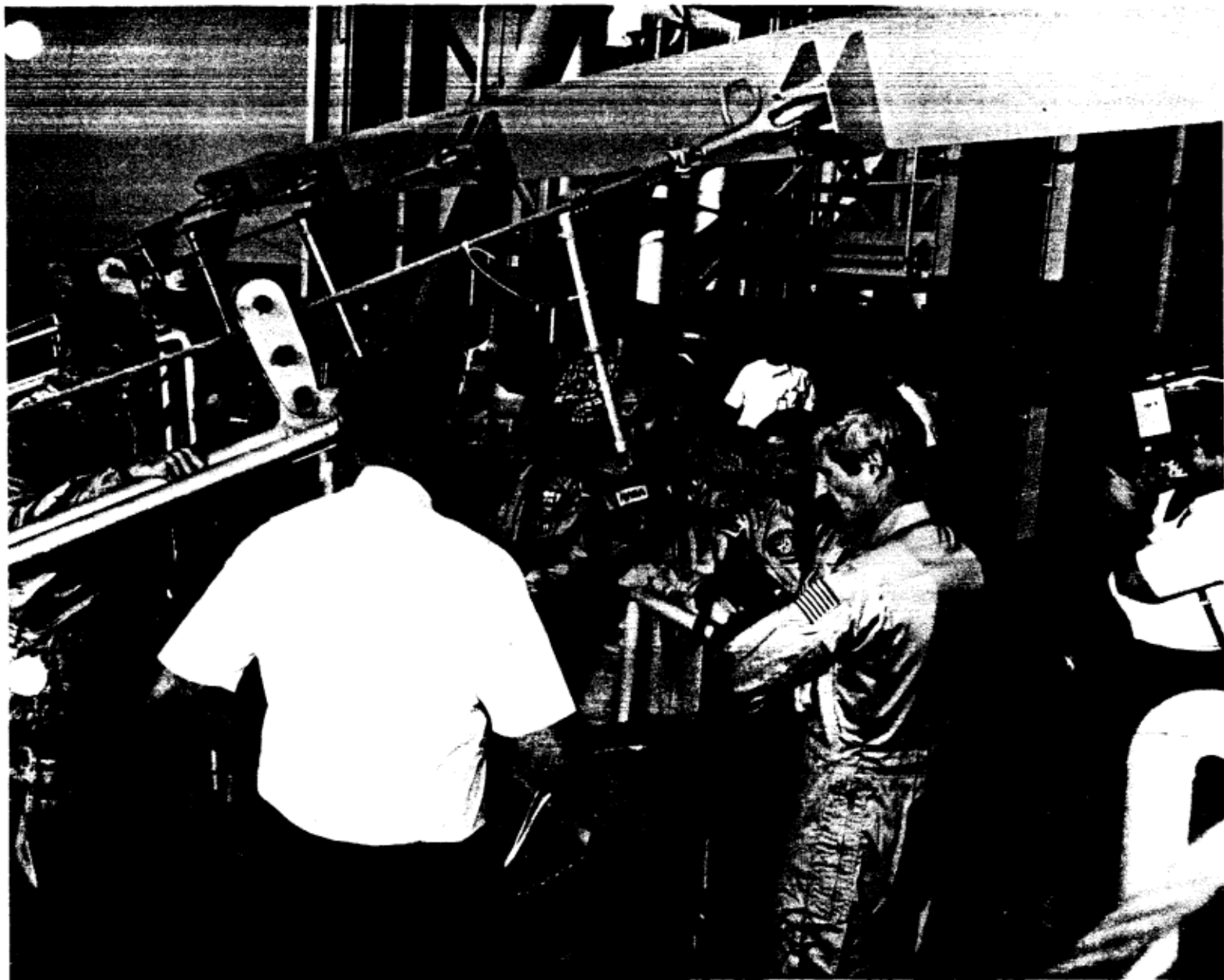
**February 16:** A mock countdown of March 3's space shuttle launch began following Challenger's successful rollout from the Vehicle Assembly Building to its pad at launch complex 39. Workers secured Challenger to the launch pad just after midnight. The loading of the shuttle's payload, which includes two satellites, began in the afternoon, according to KSC spokesman Dick Young.

Rollout began at about 6 p.m. EST February 15, and took more than five hours to cover the 3-1/2 mile distance, said Jim Ball, another space center spokesman. [Lafferty. TODAY, p. 16A, Feb. 16, 1985.]

<> Space shuttle missions cloaked in military secrecy are favored by a large majority of registered voters in every section of Florida, according to the latest Sunshine State



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The seven-member Challenger crew completed a successful countdown rehearsal February 17. When the mission was scrubbed March 5, most of the crew - including Sen. Jake Garn (R-Utah)- was reassigned to Discovery's mission 51-D which was launched on April 12, the anniversary of Columbia's first-ever shuttle launch in 1981.

Survey. The survey, conducted for TODAY, found that 72 percent of those polled favor military shuttle missions while 74 percent support keeping secret information such as launch and landing dates. Kennedy Space Center spokesman Dick Young said the favorable results show a "public acceptance" of the military's role in the space shuttle program. He said NASA "would very much welcome" the public's support. [Lafferty. TODAY, pp. 1A & 20A, Feb. 17, 1985.]

<> Kennedy Space Center awarded Costello Construction Company Inc. (Merritt Island, Florida) a \$74,350 contract to construct a storage building for the Launch Equipment Test Facility (LETF). According to the fixed price, set aside contract, the building must be completed within sixty days of notice to proceed. [Marth. NASA/KSC NEWS RELEASE No. 31-85, Feb. 16, 1985.]

**February 17:** The seven-member crew of the Challenger - including Utah Sen. Jake Garn - completed a successful countdown dress rehearsal at LC 39A at Kennedy Space Center. "We're ready to fly," said Mission Commander Karol Bobko, at a launch pad press conference held after the two-hour exercise ended right on schedule at 4 p.m. EST. A heavy press turnout for the conference was attributed to the presence in the crew of senator Garn, the first civilian observer in space. Referring to the baskets used in the launch pad evacuation procedures, Commander Bobko called them "the second most exciting ride you can take off the launch pad."

Asked how it felt to go through the launch procedures, Garn said, "I think we were all excited. This is the real thing." [Lunner. TODAY, p. 4A, Feb. 18, 1985.]

**February 19:** An Air Force "Jolly Green Giant" (CH-3E) helicopter was used to rid the VAB roof of an 80-foot mast that included a mechanism used to install lightning rods to protect spacecraft during electrical storms. The device was put atop the VAB during the Apollo-Soyuz project in 1972. NASA said the mast was now obsolete and posed a possible safety threat.

The gear was installed originally to help forestall any delays due to electrical storms at the time of the ASTP. "There was a short launch window on that (less than 10 minutes) and we had to rendezvous with the Russians. We didn't want any holdups," NASA spokesman Dick Young said. [Herlihy. TODAY, pp. 1B & 2B, Feb. 20, 1985.]

- <> KSC officials declined to clear Challenger for its expected March 3 launch; the officials had just attended a "launch readiness review" meeting. It was announced, however, that tile replacements are complete and that gap filler and quality verification work continues. [Lunner. TODAY, p. 16A, Feb. 20, 1985.]
  
- <> Kennedy Space Center awarded Doug Wilson Enterprises, Inc. (Cape Canaveral, FL) a \$98,439 contract for the construction of a Ground Support Equipment Storage Facility. Under the contract, Wilson Enterprises is responsible for the construction of a pre-engineered metal building located south of the OPF low bay on a concrete slab with reinforced concrete foundations; the contract also includes the preparation and utilities installation. The fixed price contract calls for Wilson Enterprises to complete all work on the facility within 200 days of notice to proceed. [Marth. NASA/KSC NEWS RELEASE No. 32-85, Feb. 19, 1985.]

**February 21:** NASA again delayed the next launch of the space shuttle, saying that Mission 51-E will depart Kennedy Space Center no earlier than 8:31 a.m. EST March 4. It also announced that the deployment of a telecommunication satellite via an Atlas-Centaur rocket has been postponed two weeks, to no earlier than 6:56 p.m. EST March 21.

Of the one-day delay in Challenger's departure, an official NASA statement said: "The additional time is required in the schedule to complete cargo integration and orbiter systems testing prior to launch." [Lunner. TODAY, pp. 1A & 12A, Feb. 22, 1985.]

**February 22:** NASA officials said that KSC teams can launch shuttles on both March 4 and March 19, but it will mean besting their own performance records to do it. To meet their tightest-ever launch turnaround deadlines, KSC officials have scheduled a launch pad preparation period of

less than four working days; this assumes that no unexpected problems will develop. Details were discussed at a morning KSC press conference featuring Launch Director Bob Sieck and Billy Childers, who coordinates activities.

"We've had schedules for over a year showing this turnaround," Childers said. "This is the first time we've tried it." Sieck said the biggest threat to the timetable is getting Challenger launched on time, at 8:31 a.m. EST, March 4. "There's no contingency time," Sieck said. "There are no non-work days. In fact, the last non-work day we observed here at Kennedy was New Year's Day." [Lunner. TODAY, pp. 1A & 12A, Feb. 23, 1985.]

**February 25:** A potential strike by Pan Am workers was not expected to disrupt shuttle launch operations, according to Hugh Harris, KSC's chief spokesman. About 10 of the 255 union members work with the Air Force unit that monitors weather for Kennedy Space Center.

"Pan Am has assured us that the jobs that would be left vacant will be performed by Pan Am management," said Lt. Col. Robert Nicholson, Jr. at Patrick Air Force Base.

Sam Casella, business agent for Teamsters Local 769, said negotiations had been underway since September 1984 and the strike was expected to occur February 28 should Pan Am's contract offer not meet with union approval. [Lunner. TODAY, p. 1B, Feb. 26, 1985.]

**February 26:** Engineers at Kennedy Space Center have been trying to determine whether a small leak where super-cold hydrogen is fed to Challenger during liftoff could be a problem during the March 4 launch, KSC spokesmen said. The leak's severity is acceptable under NASA standards, but engineers at three space agency locations reassessed those standards to see if a serious problem existed, said Center spokesman Jim Ball.

The problem is with a seal where a 17-inch line leading from the external fuel tank enters the vehicle and pumps liquid hydrogen to its engines during the launch. [Lafferty. TODAY, p. 1A, Feb. 27, 1985.]

<> NASA, worried about its declining launch business, won a major turf battle by getting the Air Force to agree to book one-third of all space shuttle flights. In return, NASA will stop its opposition to an Air Force plan to develop and build 10 single-use rockets to be used in competition with the shuttle, for two satellite launches a year, NASA Administrator James Beggs said. ["NASA, Air Force Reach Deal on Shuttle Use," THE ORLANDO SENTINEL, p. A-6, Feb. 27, 1985.]

**February 27:** A faulty battery cell found aboard a \$100 million Tracking and Data Relay Satellite forced NASA to postpone space shuttle Challenger's launch three days, till March 7. The delay was announced after routine tests revealed the cell was not holding a charge, said Kennedy Space Center spokesman Jim Ball. The problem can be fixed while the shuttle is on the pad, but the cargo bay doors must be reopened, he said.

Challenger's postponement also will push back the launch of Discovery from March 19 to March 22, said KSC spokesman Dick Young. The turnaround time between the two launches - 15 days - is the quickest ever scheduled between shuttle flights. [Lafferty. TODAY, p. 1A, Feb. 28, 1985.]

**February 28:** Two Lockheed Space Operations Co. employees were suspended from their jobs after Kennedy Space Center security officials spotted them loading government property into their automobiles, KSC spokesman Dick Young said. The men weren't arrested but charges were expected to be filed with the State Attorney's Office next week, Young said.

Security officials reported seizing \$400 worth of computer supplies and other items February 27 as well as a loaded weapon found in one of the automobiles. The men were detained early on the morning of the 27th outside KSC's central supply facility in the industrial area, Young said. ["Lockheed Workers Suspended From Jobs," TODAY, p. 1B, Mar. 1, 1985.]

<> Bettie Yates (Rockledge, FL) was awarded \$425,000 in damages after a federal jury decided a NASA subcontractor was partly to blame for her son's death in a fall from a Kennedy Space Center launch pad, officials said. After deliberating for a day and a half, the jury ordered North Florida Steel to pay

damages, ruling that company officials were partly to blame for the May 5, 1981, accident in which 23-year-old Anthony Hill died.

Hill, a former construction worker with Wilholt International Corp., fell 110 feet while installing a handrail on the catwalk of launch pad 39B. An investigation revealed that a grating beneath Hill's feet had given way before the fall. [Ash. TODAY, p. 1B, Mar. 1, 1985.]

## MARCH 1985

**March 1:** A threatened strike by Pan Am World Services workers began and ended the same day after Pan Am obtained a court order forbidding one of its unions from honoring another union's picket lines. [Lunner. TODAY, pp. 1A & 16A, Mar. 6, 1985.]

**March 3:** Technicians began unloading two satellites from Challenger this morning in preparation for its March 5 rollback to the Vehicle Assembly Building, a Kennedy Space Center spokesman said. While the faulty TDRS satellite is repaired, a Canadian satellite aboard Challenger will be removed and placed aboard Discovery which is to replace Challenger on the pad and to be launched, barring further difficulties, in late March or early April. The satellite shuffle was decided upon by NASA officials after tests located a problem on a Tracking and Data Relay Satellite already in orbit. Tests indicated its sister TDRS aboard Challenger could have the same problem which centers on a device used to encode classified information the Department of Defense will use on military shuttle missions flown out of KSC and Vandenberg Air Force Base in California. Modifications to the TDRS were expected to take several weeks. [Lafferty. TODAY, pp. 1A & 16A, Mar. 3, 1985.]

**March 4:** Bacteria may one day be a vital part of the Shuttle Transportation System, suggests an 18-month study at the Kennedy Space Center on Merritt Island, Florida. Scientists at Kennedy are studying the feasibility of using a photosynthetic bacterium, Rhodospseudomonas, to covert solar energy into the hydrogen necessary to get the space shuttle off the ground.

With a goal of 24 shuttle flights a year, scientists are hoping to lessen reliance on non-renewable hydrogen sources, such as natural gas or coal. Richard Strayer and David Baska of the Bionetics Corporation, a KSC contractor, report that although their hydrogen production has exceeded published reports, it still isn't competitive with non-renewable sources. Strayer and Baska present their findings today at a meeting of the American Society for Microbiology in Las Vegas. [Healy and Findlay. USA TODAY, p. 4D, Mar. 4, 1985.]

<> The White House told the Air Force and NASA to begin a study leading to joint development of a bigger and more powerful space shuttle for the 21st century. In a major policy change, the Reagan administration wants the Air Force to share with NASA the cost of designing and acquiring the "second-generation" shuttle. The \$10 billion cost of developing the shuttles now used was borne by NASA, though the Air Force is to use it a third of the time. An administration source said, "We think this is the way to make space transportation cost-effective in the future." ["Air Force Will Help Develop Next Shuttle," THE ORLANDO SENTINEL, p. A-7, Mar. 5, 1985.]

<> NASA's shuttle mission planners met but did not decide whether to reassign the crew of Challenger's cancelled flight, including Sen. Jake Garn, to the next flight of Discovery. A decision is expected within the week. "There is just no idea which way to go" because so many factors are involved, including payload weight, astronaut training, customer schedules and launch preparation, said NASA spokesman Charles Redmond. He said Challenger might be launched a few days before April 30, the date now scheduled for the shuttle to carry Spacelab in its cargo bay on a mission of scientific experiments. The agency then would hope to resume the regular schedule for the rest of the year. Garn's and French payload specialist Patrick Baudry's chances of being chosen for Discovery's mission are enhanced because results of their space medical work would help Spacelab's crew members. [Fisher. THE ORLANDO SENTINEL, p. A-7, Mar. 5, 1985.]

**March 5:** Greer Electric Co. Inc. (Rockledge, FL) was awarded a \$213,980 contract for the installation of a lighting systems at Launch Complex 39B. The contract calls for Greer to replace four existing floodlight poles with 47-foot-high light poles and install lighting systems on those new poles and on an additional 30-foot pole. [Kassak. TODAY, p. 16C, Mar. 6, 1985.]

<> The space shuttle Challenger rolled back to the Vehicle Assembly Building from pad 39A, two days before it was supposed to have been launched. Its mission was scrubbed because of a defect in a satellite it was supposed to carry. Challenger covered the three-mile trip in more than six hours. ["Earth-Bound Orbiter," TODAY, p. 1A, Mar. 6, 1985.]



<> Rockwell International established a \$2.5 million orbiter components service center in Cape Canaveral which could add 100 local jobs within a year, city officials said. The facility, at 8600 Astronaut Boulevard, will be used to troubleshoot and repair a variety of mechanical parts and electronic systems used by the shuttle, according to Ron Tulino, manager of the facility. Such repairs now are done by the manufacturer, frequently at distant factories. Tulino said, "We are being asked right now to do some related repairs on the turnaround on this vehicle (Challenger), because we are here." [Lunner. TODAY, p. 1A, Mar. 6, 1985.]

**March 6:** A vigilante who takes offense at bad driving habits has been slashing tires at Kennedy Space Center. The culprit used a tool to break the valve stem of two tires on two cars during the past month, according to KSC spokesman Dick Young. His 2-by-2-1/2 inch calling card is "a little note left on the windshield chastising them for their bad driving habits," Young said. The card, a copy of a typed note, is signed, "Ye old valve cutter."

Young said six cases of tire slashings have been reported at KSC during the past month - two of them the work of the "valve cutter" and the other four the work of more traditional vandals. KSC security is investigating the incidents, Young said. ["Tire Slasher Targets 'Bad Drivers'," TODAY, p. 1B, Mar. 7, 1985.]

<> Most of the astronauts - including Sen. Jake Garn - who were to have flown on the scrubbed Challenger mission were assigned to Discovery's next mission. The crew will include mission commander Karol J. Bobko, pilot Donald E. Williams, mission specialists M. Rhea Seddon, Jeffrey A. Hoffman, and S. David Griggs, and payload specialists Charles D. Walker and Garn. Crew members bumped from Discovery will be assigned to a future flight, NASA said. No specific launch date has been determined for Discovery's next flight, but it is expected to be late March or early April.

The space agency said it took crew training, future mission dates and individual assignment requirements into consideration when it chose the new Discovery crew. "In the case of Jake Garn, NASA cited the busy congressional schedule and Garn's direct involvement in experiments to be conducted on this flight," A NASA news release said. [Lunner. TODAY, p. 5A, Mar. 7, 1985.]

<> Hughes Aircraft Co. has placed its proposed Titusville satellite-assembly plant on hold for at least a year, citing a decline in the communications satellite business, a spokesman said. The delay means the \$160 million plant on U. S. Highway 1 near Kennedy Space Center will be redesigned and may not be occupied until 1990, more than three years later than originally announced. [Fisher. THE ORLANDO SENTINEL, pp. B-1 & B-2, Mar. 7, 1985.]

**March 7:** Wind gusts of up to 25 knots delayed the scheduled removal of a satellite from the launch pad at Kennedy Space Center, but other preparations for the next shuttle mission went well, NASA officials said. Discovery was expected to be rolled over from the Orbiter Processing Facility to the Vehicle Assembly Building at noon on March 8. ["Winds Delay Satellite Work," TODAY, p. 8A, Mar. 8, 1985.]

**March 8:** A 2,500-pound work platform fell and crashed into the side of space shuttle Discovery at Kennedy Space Center, putting a worker in the hospital with a broken leg and grounding the orbiter. The accident was expected to delay Discovery's launch from the targeted March 28 date into early April, said NASA official Charles Redmond.

"I just heard a bang and I looked up, and the bucket fell down on top of me," said injured Lockheed worker Gary Sutherland, 35, a resident of Port St. John. "It caught me before I could do anything." Sutherland was listed in stable condition at Jess Parrish Memorial Hospital in Titusville; his injuries included two breaks in his left leg and a bruised shoulder.

The falling platform grazed Sutherland's shoulder, knocked him onto the catwalk he had been standing on, bounced off the catwalk's 45-degree-angle chain supports and careened into Discovery's left cargo bay door, according to various KSC sources. Photographs of the shuttle damage show two holes about 3 feet apart, each about 5 inches long.

Following a preliminary inspection by a special accident review board, a NASA statement said that one of the buckets above Discovery had been retracted and stowed, but broke loose when the rolling bridge was moved.

Teams from Johnson Space Center, Rockwell International's California shuttle factory and other engineer and design experts were expected to arrive later in the night [March 8] to begin assessing the damage. NASA said it would not release any further information about the accident until its six-man review board, chaired by KSC Cargo Projects Director John Neilon, issues its findings. NASA spokesman could not estimate when the board might be concluding its investigation. [Lunner. TODAY, pp. 1A & 18A, Mar. 9, 1985.]

**March 9:** Technicians began opening the Discovery's cargo bay doors in an attempt to analyze damage caused when a work platform crashed into the orbiter on the morning of March 8. A subsequent delay in the launch of the shuttle, could be anywhere from four to 10 days, said NASA spokesman Charles Redmond.

Meanwhile, an investigation board met throughout the day to begin an assessment of the accident and will begin interviewing witnesses March 11, according to a spokeswoman. No details of the board's findings will be released until the investigation is complete, officials said. It's not known how long the probe will take.

An interior view of the cargo bay door is expected to reveal whether radiators that dissipate heat during shuttle missions were damaged by the 2,500-pound platform, said KSC spokesman Dick Young. The investigation board will attempt to find out why the platform fell, looking into design, construction, operation and maintenance. Young said it's not known whether the cargo bay door will be repaired or replaced, or whether Discovery could be replaced by Challenger. [Lafferty. TODAY, pp. 1A & 20A, Mar. 10, 1985.]

**March 11:** NASA officials are considering giving the next shuttle launch date back to the Challenger after Discovery was damaged by a falling platform last week, a NASA spokesman said. A team of engineers investigating the mishap will determine March 12 how long repairs will take, which will help NASA officials decide which orbiter will make the flight, said NASA spokesman Hugh Harris. ["Challenger May Replace Discovery for Mission," TODAY, p. 6A, Mar. 12, 1985.]

**March 12:** Jim Ball, KSC spokesman, easily won election to a seat on the Titusville city council. Ball, who carried ten of the thirteen precincts, garnered a total of 3,379 votes to 2,407 for his opponent Rick Anderau. Both men were newcomers to elective politics. [Lafferty. TODAY, pp. 1B & 3B, Mar. 13, 1985.]

<> Repairs to a damaged Discovery have begun at Kennedy Space Center, where NASA expects to launch the patched-up shuttle by mid-April, officials said. "We are going to fly Discovery," said Hugh Harris, chief KSC spokesman. He said NASA officials, who reportedly considered using Challenger instead, determined that the time needed to switch cargo connections in the shuttles would be excessive. Two foot-square patches of the material used in building the cargo doors are expected to arrive today (March 13) from Rockwell International's Tulsa, Oklahoma, factory, Harris said. The patching is expected to take about ten days. After that, new thermal blanketing must be installed, and the door re-tested before Discovery can be rolled from its hangar in the Orbiter Processing Facility into the VAB.

"A launch date for Discovery will not be chosen until a day or two after the orbiter has moved to the VAB and mated with its external tank and booster set," said a NASA spokeswoman. NASA hopes to announce an updated schedule of flights and cargoes for the next six months when it releases Discovery's timetable. [Lunner. TODAY, p. 1A, Mar. 13, 1985.]

**March 14:** George W. Walter, pioneer member of Donald D. Buchanan's team of design engineers, died at Wuesthoff Memorial Hospital in Rockledge, Florida, following a serious illness. Walter, along with the other members of his team, created launch pedestals, hold-down and support mechanisms, blast deflectors and umbilical towers for America's earliest Redstone rockets. During the design phase of KSC, Buchanan and Walter traveled to Washington to fight for the idea of a giant tractor crawler to move rocket assemblies to the pad. Walter's evaluation of the crawler-transporter design was upheld by an independent consultant firm.

As head of the structural section, Walter had responsibility for all the launch towers, heavy steel structures, launch pad foundations and deflector systems.

Walter, a resident of Merritt Island, Florida, is survived by Yvonne, his wife of 44 years, three sons, a brother, two sisters and three grandchildren. [Backman. TODAY, pp. 1B & 3B, Mar. 15, 1985.]

**March 15:** The holes in Discovery's cargo door have been plugged and repairs should be completed by the night of March 16, NASA officials said. "They have installed the patches," said NASA spokesman Dick Young. "They will be installing additional plates inside and outside to make sure the patches stay in place. It may be ready for rollover to the VAB by next weekend." [Lunner. TODAY, pp. 1A & 16A, Mar. 16, 1985.]

**March 19:** NASA planners chose April 12, the fourth anniversary of the shuttle program's first launch, as the target date for the next flight of Discovery, sources said. Repairs to Discovery continued on schedule and point toward the April date. KSC spokesman Dick Young, however, insisted that no official date had been determined. "It's an assessment date, and it's subject to change," Young said. An assessment date, he explained, is one which NASA planners would like to meet; the firm launch date will be announced when Discovery has moved into the VAB and been mated with its external tank and boosters. Rollover is expected to occur March 23. [Lunner. TODAY, p. 1A, Mar. 20, 1985.]

<> Four minutes and 38 seconds from liftoff, the launch of an Atlas-Centaur rocket from Cape Canaveral Air Force Station was delayed by an on-board computer problem; an hour later the launch was scrubbed. "We don't seem to be coming up with much here," said the voice of Charles Gay, launch director, monitored at the press observation site. "Let's go ahead and terminate and come back up another day." NASA officials laid the cause of the scrub to a synchronization problem in a flight control computer. The computer was receiving different data from its ground and vehicle sources, and so ordered the countdown stopped, NASA officials said. Sources at the launch site said the new launch date could be as early as March 20. [Lunner. TODAY, p. 4A, Mar. 20, 1985.]

**March 20:** Inadequate maintenance combined with mechanical fatigue probably caused the March 8 industrial accident that punched two holes in the Discovery at Kennedy Space Center,

NASA officials said. Official results of the investigation are not due until April 4, but Charles Redmond, a NASA spokesman in Washington, D.C., discussed preliminary findings, saying, "We've checked out all the other (work buckets) and cleared them. Preliminary indications are that it needs more frequent inspections than what we've given it. It's probably a case where the machine itself was within specifications, but we should have done something that we didn't." Redmond said further that, "after 15 flights and an awful lot of extra tile work, we're beginning to see 'life fatigue' on some of this equipment." [Lunner. TODAY, p. 1A, Mar. 21, 1985.]

**March 21:** Bad weather delayed the scheduled launch of an Atlas-Centaur rocket from Cape Canaveral Air Force Station, but NASA officials said they plan to fly the twice-delayed mission March 22, weather permitting.

In shuttle news, NASA officials said repairs to the Discovery were proceeding on schedule. [Lunner. TODAY, p. 11A, Mar. 22, 1985.]

**March 22:** After two delays in one week, a \$41 million Intelsat communications satellite was launched into space at 6:55 p.m. EST from Cape Canaveral Air Force Station atop an Atlas-Centaur rocket. NASA's George Diller described the liftoff as "flawless. It was one of the prettiest Atlas-Centaur launches we've seen in a long, long time," he said. [Lunner. TODAY, p. 9A, Mar. 23, 1985.]

<> Edwin "Buzz" Aldrin, the second man to set foot on the moon during Apollo 11's mission, was inducted as a Gen. Jimmy Doolittle fellow in ceremonies sponsored by the Cape Canaveral Chapter of the Air Force Association. The general led bombing raids on Tokyo during World War II. A crowd of 325 was on hand at the Crossway Inn in Cocoa Beach to receive Aldrin, the former Gemini and Apollo astronaut and now professor at the University of North Dakota.

Aldrin thanked those involved with his induction and spoke about the importance of education. He is the first astronaut with a doctorate of philosophy. "I think that education paved the way for the opportunities that later came my way by being in the right place at the right time," Aldrin said. [Lunner. TODAY, pp. 1A & 20A, Mar. 23, 1985.]

**March 23:** Discovery was successfully moved from its processing hangar to the Vehicle Assembly Building and officials predicted that it would journey to its launch pad March 28. Shuttle workers, meanwhile, finished replacing heat-resisting blankets on one of Discovery's cargo bay doors, completing repairs to two punctures in the door that occurred in an accident March 8. KSC spokesman Jim Ball also said that as a precautionary measure, a 17-inch seal where hydrogen flows into Discovery had been replaced. A tentative launch date of April 12 was set. ["Shuttle Discovery Ready to Roll Out This Week, NASA Officials Predict," TODAY, p. 9A, Mar. 24, 1985.]

**March 25:** Frank A. Kennedy Inc. (Cape Canaveral, FL) won a \$97,235 NASA contract to replace an air handling unit in Hangar N at Cape Canaveral Air Force Station and to install additional lighting fixtures in the low bay area of the Vehicle Assembly Building at the Kennedy Space Center. [Kassak. TODAY, p. 14C, Mar. 25, 1985.]

<> Top executives from companies belonging to the American Stock Exchange toured the Kennedy Space Center, hoping to learn more about the possibilities of commercialization in space. "I think as (the space program) goes on, the degree of risk and apprehension of potential customers will decrease," said Wallace W. Both, board chairman and president of Ducommun Inc., which manufactures a significant portion of the shuttle's external fuel tanks.

Isaac T. Gillam, NASA's assistant administrator for commercial programs, told the executives that the space agency is trying to make it easier for U. S. corporations to do business in space. "The program is outlined to take advantage of what we do best, what you do best and what (the universities) do best," Gillam said. "What we're trying to do is get an edge for U. S. industry." [Perez. TODAY, p. 16C, Mar. 26, 1985.]

<> NASA can survive at 1985 spending levels and still build a fifth space shuttle, said Rep. Bill Nelson, D-Melbourne, FL, chairman of a House space sciences subcommittee. "If we (in Congress) are ever able to make a serious attempt at reduction of the federal deficit," he said, "and sooner or later (we're) going to have to...then NASA's going to have to take its part of the belt-tightening as well. "I've already had the staff looking at how we would reorganize our

priorities should it be a freeze at fiscal year '85 levels." Nelson, speaking to the Cape Canaveral Press Club in Cocoa, said his subcommittee is looking for financial answers to such questions as: "How we continue on with the space station, the science experiments, and so forth? How we can still keep the option of keeping the fifth orbiter alive? [Lunner. TODAY, p. 9A, Mar. 26, 1985.]

**March 27:** NASA announced that the next shuttle launch at KSC would occur April 12 and that it would feature elements of two missions scrubbed earlier this year. Flight Director Randy Stone indicated that the upcoming liftoff has two launch windows - from 8:04 to 8:18 a.m. and from 8:45 to 9 a.m. Additionally, the announced date is also the fourth anniversary of the first shuttle flight. Landing at KSC was scheduled for April 17, at about 8:14 a.m. [Lunner. TODAY, pp. 1A & 16A, Mar. 28, 1985.]

**March 29:** President Reagan, in a speech to the National Space Club, named the members of the long-awaited National Commission on Space; notable among the 14 members were Thomas O. Paine, former NASA administrator; Brig. Gen. Charles E. "Chuck" Yeager; Neil A. Armstrong; shuttle astronaut Kathryn D. Sullivan and former U. N. ambassador Jeane J. Kirkpatrick. ["Reagan Names Space Commission," SCIENCE, p. 161, April 12, 1985.]

**March 30:** Shuttle flight and ground crews completed an 18-hour mock countdown, prompting NASA to announce that Discovery appears set for its April 12 liftoff. Senator Jake Garn and the rest of the seven-member crew were aboard the orbiter before dawn preparing for a mock 8 a.m. launch, said NASA spokesman Hugh Harris.

After the rehearsal, Garn said he was anxious to go into space. He disregarded critics and cartoonists who poked fun at the planned experiments. "I haven't been concerned about publicity," he said. And later, Garn autographed copies of the comic strip "Doonesbury" with the signature: "Barfin" Jake Garn. "If everything had gone perfectly, I couldn't have seen...the whole process," he said.

Following the successful mock liftoff, the crew observed two satellites being loaded into Discovery's cargo bay, said Leslie Vock, NASA spokeswoman. [Herlihy. TODAY, pp. 1A & 16A, Mar. 31, 1985.]



## APRIL 1985

**April 1:** Twenty-five years ago today, weather forecasting was revolutionized when photographs showing Earth's weather patterns were broadcast from space. TIROS-1 - the Television Infrared Observation Satellite built by RCA Astro-Electronics - was launched from Cape Canaveral. It was the forerunner of today's advanced spacecraft that provide a wide range of sophisticated weather data and serve as search-and-rescue aids for ships and aircraft in distress. [Lunner. TODAY, p. 5A, Apr. 2, 1985.]

<> National Oceanic and Atmospheric Administration (NOAA) administrator Anthony Calio and NASA deputy administrator for space science and applications Samuel W. Keller worked out a framework in which NOAA would use the space shuttle to launch its next three polar-orbiting weather satellites - known as NOAA K, L, and M - instead of using cheaper, refurbished Titan II ICBM's being offered by the Air Force. In return, NASA would make up the roughly \$90 million price difference stemming from modifications required to launch the satellites from the shuttle. ["NASA, NOAA Make A Deal," SCIENCE, p. 309, Apr. 19, 1985.]

**April 2:** The falling platform which damaged the Discovery in March fell because of a design defect caused a cable linkage on an overhead crane system to break. According to sources who asked not to be identified, a notice that warned of defective operation had been posted on the crane system, but it was small and might have fallen off. The sources said that NASA's investigative board found that the design defect caused a linkage in one cable gradually to weaken and break, dropping the 2,500-pound metal platform and injuring a worker's leg before colliding with one of Discovery's two cargo bay doors on March 8. [Associated Press. "Report Blames Cable for Shuttle Damage," THE ORLANDO SENTINEL, p. 1D, Apr. 3, 1985.]

<> American Business Interiors (Melbourne, FL) won a contract from USBI Booster Production Co. Inc. (Titusville, FL) for the planning and interior design of office areas at its new solid rocket production facility at Kennedy Space Center. Jeanne Kenaston is the project manager and Susan Freeland director of design. [Kassak. TODAY, p. 16C, Apr. 3, 1985.]

<> James Beggs, NASA Administrator, advised members of Kennedy Space Center management to "tighten things up" in the wake of two March delays of space shuttle missions, reported AVIATION WEEK & SPACE TECHNOLOGY's April 1 issue this week. "While there are excuses in both cases, I consider them just that, and I told (the managers) that I was not going to tolerate it - they are all on notice," said Beggs. The article said the accident was expected to lead to changes in KSC's work safety procedures. NASA's investigation of the accident has not yet released its report to the public and KSC's chief spokesman Hugh Harris said "We will not talk about an investigation until the final report is made." Harris said the official report was originally scheduled for release April 4 but is now expected at a later date.

The magazine also quoted Beggs characterizing the Discovery accident as "a serious breach" of NASA work procedures. "I do not think this represents a serious problem with discipline or motivation and desire by either NASA or contractor employees," Beggs said. "They still exhibit enthusiasm, and the morale is high. But as a consequence of this accident we will have to tighten things up." [Lunner. TODAY, pp. 1A & 16A, Apr. 3, 1985.]

**April 3:** The House of Representatives ordered the 1986 budget for NASA frozen at current spending levels. Rep. Bruce Morrison (D-Conn.), who led the effort, said, "The time to institute a freeze on spending is now." Melbourne, Florida, Democrat, Bill Nelson tried to stop the freeze by urging members not to "whack away" at individual budgets but wait until later in the session when a freeze could be applied across the board." Congressman Nelson is the chairman of a House space sciences subcommittee.

NASA spokesman Hugh Harris did not know how the proposed freeze would effect current space projects. Kennedy Space Center Director Richard Smith was flying to Washington to attend budget hearings, Harris said. [Mecham. TODAY, pp. 1A & 16A, Apr. 4, 1985.]

**April 4:** Preparations for Spacelab 3 to fly aboard Challenger proceeded smoothly toward its April 29 launch, said Kennedy Space Center officials. Spacelab 3 Cargo Manager Eldon Raley led reporters through the Orbiter Processing Facility, offering them an unusually closeup view into the cargo bay as technicians performed final work on the large laboratory.

Heat tile problems, which pushed Challenger off the launch schedule, have been solved, Raley said. A chemical reaction between materials used to attach tiles to the orbiter caused the tiles to loosen, and thousands of them have been replaced. [Lunner. TODAY, p. 9A, Apr. 5, 1985.]

**April 5:** NASA released an ambitious launch schedule projecting 41 missions in 33 months, including a flight by an American schoolteacher next January, the first Christmas trip in more than a decade and missions with astronauts from nine foreign countries. The manifest lists nine more flights this year, 15 in 1986 and 17 in 1987. ["NASA Sets A Full Load of Launches," TODAY, pp. 1A & 18A, Apr. 6, 1985.]

**April 8:** Three technicians were slightly burned when part of an electrical circuit exploded on a space shuttle launch pad under construction. The accident occurred about 1-1/2 miles from complex 39A, where preparations continued for April 12's launch of Discovery. Officials said they did not know the cause of the accident.

The three employees of McDonnell Douglas Technical Services Co. were able to walk to a van, officials said. J. D. Powell was treated at the Kennedy Space Center medical facility and returned to work, and E. B. Mills and G. T. Day were taken by ambulance to a hospital in Titusville, where they were treated and sent home. [AP. "Launch Pad Blast Hurts 3 Workers," THE ORLANDO SENTINEL, p. B-1, Apr. 9, 1985.]

**April 9:** McDonnell Douglas Technical Services Co., Kennedy Space Center Division, won a NASA award for the study of the Space Station's impact on the Kennedy Space Center. The 12-month study will examine manpower facilities, services and equipment necessary for the support of an eight-person orbiting space platform. NASA will use the results to allocate more efficiently resources for the Space Station's future design phases. [Kassak. TODAY, p. 16C, Apr. 10, 1985.]

<> "There has never been a crew that was better prepared to go - or was more anxious to go," smiled Utah Senator Jake Garn (R), NASA's first in-flight congressional observer. "The only problem is that Friday (April 12) isn't tomorrow."

Garn, along, with the five other Discovery crew members arrived at KSC in T-38 jets and the Shuttle Training Aircraft, the Grumman Gulfstream II. Mission Commander Karol Bobko introduced his crew and each spoke briefly. Bobko and Garn will be accompanied on STS-51-D by Dr. Rhea Seddon-Gibson, Charles Walker, and mission specialists David Griggs and Jeffrey Hoffman. [Lunner. TODAY, p. 5A, Apr. 10, 1985.]

**April 10:** Processing of Discovery for its April 12 morning launch continued without a hitch at Kennedy Space Center, with weather conditions the sole concern remaining, NASA officials reported. "We don't launch in the rain," KSC spokesman Jim Ball said. Launch pad 39A was cleared of workers from about 6 p.m. to about 2 a.m. April 11 to allow loading of super-cold liquid oxygen and hydrogen into the orbiter's fuel cell storage tanks. In the VAB, workers joined Challenger, with Spacelab 3 inside its cargo bay, to its external tank and solid rocket boosters. Challenger is scheduled for rollout to 39A on April 15 in preparation for its expected April 29 launch. [Lunner. TODAY, p. 11A, Apr. 11, 1985.]

**April 11:** A tiny leak in the Continuous Flow Electrophoresis System, the McDonnell Douglas drug processing experiment was discovered early in the morning. For a time during the day, NASA thought the leak might result in the cancellation of the experiment and the removal of astronaut Charles Walker, who is to operate the CFES equipment. Shortly after 3 p.m., McDonnell Douglas spokeswoman Susan Flowers received word that a faulty gasket had been fixed.

"We're going to fly," she said. "Charlie will fly and everybody's happy. We're back on track." [Lunner. TODAY, pp. 1A & 20A, Apr. 12, 1985.]

<> Three Brevard County firms have been awarded about \$1 million to study the impact of space station development at Kennedy Space Center, NASA officials announced. The studies are designed to determine how elements of the station and payloads for it will be processed for launch. Also, in-orbit maintenance systems for the proposed space station will be evaluated.

McDonnell Douglas Technical Services Co. at Kennedy Space Center has been awarded a \$434,563 contract to analyze ground processing operations. Harris Corp. won a \$298,254 contract to assess the space station's mission requirements and associated payload launch-site operations. Boeing Aerospace Co. of Cape Canaveral was awarded a \$260,000 contract to study space station maintenance operations. [Lunner. TODAY, p. 8A, Apr. 12, 1985.]

**April 12:** With only 55 seconds to spare, Discovery (STS-51-D) lifted off Pad 39A at 8:59:05 a.m. and remained visible to the naked eye for only about 45 seconds before it entered dense cloud cover at about 15,000 feet. The last-minute launch drama was due to touch-and-go weather conditions that threatened to damage the shuttle as it lifted into space. NASA officials said that no safety rules were violated by the launch into the cloud cover. Once approved for liftoff, the shuttle performed flawlessly, according to two KSC officials who conducted a press briefing an hour after launch.

There were no private aircraft in violation of NASA's launch-day airspace area, launch director Bob Sieck said, but a cargo ship of unknown registry steamed too close to the solid rocket booster recovery area about 120 miles off shore, he said. The stray ship was in the recovery area about 10 minutes before continuing northward, Sieck added. Since the launch already was awaiting better weather, [the ship] did not contribute to the delay, he said. [Lunner. TODAY, pp. 1A & 16A, Apr. 15, 1985.]

**April 13:** The space shuttle Atlantis arrived at Kennedy Space Center atop its Boeing 747 carrier to join the space shuttle fleet. Atlantis, the fourth shuttle, was flown from Edwards AFB, California, with a one-day delay due to bad weather at Ellington Field near Houston, Texas, the 747's refueling stop. ["Space Shuttle Arrives at the Cape," DEFENSE DAILY, p. 257, Apr. 16, 1985.]

**April 15:** Challenger began its slow trek to pad 39A at 12:19 this morning in preparation for its launch at noon on April 29. [Dickerson. TODAY, p. 7A, Apr. 15, 1985.]

<> Marvin Jones, former commander of the Eastern Space and Missile Center in Brevard County, has been named to a major management position at Kennedy Space Center, NASA officials announced. KSC Director Richard Smith hired Jones as director of safety, reliability, quality assurance and protective services. [Lunner. TODAY, p. 4A, Apr. 16, 1985.]

April 16: NASA awarded McDonnell Douglas Technical Services Co. (Titusville, Florida) a \$62 million contract extension for its support services related to the Spacelab project at Kennedy Space Center. The cost-plus-award fee contract provides for the continued operation and processing of the Spacelab flight hardware. [Kassak. TODAY, p. 16C, Apr. 17, 1985.]

April 18: Harris Corp.'s Government Aerospace Systems Division was awarded two preliminary design and definition contracts for NASA's manned space station program, the company announced. A member of the Rockwell International space station team, Harris will receive about \$2.1 million for the design of the station's communications and tracking system. [Hodges. TODAY, p. 16C, Apr. 19, 1985.]

<> Commander Robert Overmyer and the six crewmen of the scheduled April 29 Spacelab 3 mission aboard Challenger completed a simulated launch countdown test at about noon. "We're ready to go," Overmyer said immediately after the practice session. "It was as slick as a whistle today. I hope the real count goes as well as this did." The crew tried unsuccessfully to radio their counterparts aboard Discovery as it passed overhead on the last full day of its mission. [Lunner. TODAY, p. 13A, Apr. 19, 1985.]

<> Dave Dickenson was selected to be LSOC's director of Orbiter Processing Facility Operations replacing Harry Bowman who moved to the staff of the LSOC Director of Operations. ["Dave Dickenson Selected Director of OPF Operations," STAR GAZER, p. 1, Apr. 18, 1985.]

April 19: The space shuttle Discovery (STS 51-D) limped home to Kennedy Space Center at 8:55 a.m. EST, sustaining a tire blowout, lost tires and a foot square gash in one of its

wings, NASA officials said. "We were getting close to having two flat tires," said shuttle mechanical systems manager Ken Colley, during a post-landing briefing. All of Discovery's tires were damaged beyond reuse, he said. One lost 13 of its 16 layers of rubber, another nine of its 16 layers, said Colley.

During runway inspection, KSC teams discovered 123 impact marks - far more than usual - on Discovery's tiles. They also found a "dinner-plate-sized" hole where the left wing and its outboard elevon meet. One entire tile and pieces of three others were missing, and heat that built up after the tiles loosened burned a hole into the honeycomb interior of the elevon structure, Colley said. He and Launch Director Bob Sieck said it appeared likely that the tile loosened during the ascent phase of the mission, allowing super-heated air to melt the elevon's lower aluminum skin during re-entry. [Lunner. TODAY, pp. 1A & 16A, Apr. 20, 1985.]

<> Top officials from the People's Republic of China, which plans to begin launching satellites from the space shuttle in 1988, viewed their first shuttle landing at KSC. The Chinese delegation was headed by Dr. Son Jian, minister and chairman of China's State Science and Technology Commission. Speaking through an interpreter, Song, aged 53, said his country has a strong interest in television broadcast satellites and satellites capable of surveying and mapping the earth. [Lafferty. TODAY, p. 3A, Apr. 20, 1985.]

**April 23:** America must plan to establish a habitat on Mars within the next 25 years or risk Soviet domination of space, said Dr. Harrison H. Schmitt, former Apollo 17 astronaut and U. S. Senator and now an aerospace consultant. He described his vision of space exploration in a speech presented at a banquet at the Patrick Air Force Base Officers Club during the opening day of the 22nd annual Space Congress. [Herlihy. TODAY, p. 2B, Apr. 24, 1985.]

<> Rockwell International officially opened its space shuttle components service facility in Cape Canaveral, signaling another step toward making space flight a commercial business, said Florida congressmen Bill Nelson and Don Fuqua.

"Even though Rockwell is no longer the space shuttle operator, we're still deeply involved with the shuttle program at Kennedy Space Center," said Al Martin, head of Rockwell's shuttle program division. [Hodges. TODAY, p. 16C, Apr. 24, 1985.]

<> Because of an unusually weighty cargo, NASA officials decided to end the upcoming shuttle mission at Edwards Air Force Base in California instead of Kennedy Space Center; the change in landing sites will not affect the April 29 noon launch of Challenger and Spacelab 3.

NASA officials also said that Discovery is expected to be repaired in plenty of time for its next mission, June 12. The brakes will be replaced, said spokesman Jim Mizell. "We're not doing anything to Challenger based on that (Discovery landing damage)," he said.

He said the hole in Discovery probably occurred after one tile - a tile that had flown an earlier mission successfully - was either partially de-bonded from the aluminum elevon at liftoff or became loose during Discovery's ascent, allowing superheated air to flow beneath the protection system.

"At that point, it was like a blowtorch on the aluminum and it just burned a hole in there," Mizell said. [Lunner. TODAY, pp. 1A & 14A, Apr. 24, 1985.]

**April 24:** Americans should be colonizing the moon and traveling to Mars today - not just launching shuttles into space, said acclaimed science fiction author Ray Bradbury to an audience of more than 400 at a luncheon at the 22nd annual Space Congress in Cocoa Beach. He said the United States has not gone far enough in space exploration. "I wish the Russians would do something fabulous on the moon tomorrow," Bradbury said. "We would be out there like that!"

Bradbury said he is disappointed that the space program has not been more heavily touted. He wants to put together a light-and-sound show on the Apollo launch pad "and blast the hell out of people. You have the most exciting stage in the world right here in Cape Canaveral and you're not doing anything with it," Bradbury said. "The Vehicle Assembly



Building is the greatest cathedral in the world. I burst into tears when I walked inside. How come you're so blind to your own potential?" [Skolnick. TODAY, p. 2B, Apr. 25, 1985.]

**April 26:** Six crewmembers of Challenger's seven-man team arrived at KSC at 5:25 p.m. EST, just hours after the countdown for the April 29 launch began. Those arriving were Pilot Frederick Gregory, mission specialists Norman Thagard, William Thornton and Don Lind and payload specialists Taylor Wang and Lodewijk van den Berg; [Mission Commander Robert Overmyer arrived the following day].

Workers spent most of the day continuing to ready Challenger for its flight; the 55-hour countdown, complete with several built-in holds, began at noon. [Lafferty. TODAY, pp. 1A & 20A, Apr. 27, 1985.]

<> NASA's Kennedy Space Center held a briefing concerning the possible award of a contract for a study to define the concept of a Space Operations Technology/Support Research Center that would assist in the development of commercially viable space projects. ["KSC Evaluating Commercial Space Support Center," DEFENSE DAILY, p. 332, Apr. 29, 1985.]

**April 28:** A confident panel of NASA experts pronounced Challenger, on its Spacelab cargo and two satellites "go for launch," praising the processing team who readied the shuttle for flight only ten days after Discovery's recent landing. They said that they had expanded today's launch window to 2:39 p.m. EST from noon. Jess Moore, NASA shuttle chief, said: "We're showing the thumbs-up sign now."

The launch forecast is "excellent," said Air Force Capt. Art Thomas; he was delivering his last shuttle weather forecast before taking a new assignment in Spain. NASA determined that the 9-volt household-type batteries needed to assist in the liftoff of two privately developed satellites from the cargo bay would be reliable. [Lunner. TODAY, pp. 1A & 10A, Apr. 29, 1985.]

**April 29:** The space shuttle Challenger rocketed from Kennedy Space Center at 12:02 p.m.; a computer glitch briefly delayed - approximately two minutes - the launch but didn't keep NASA from setting a record. Challenger was launched only 17 days after Discovery started its last mission April 12. The previous shortest turnaround was 34 days.

"We feel very, very proud," said Thomas Utsman, KSC shuttle operations director. "We felt that everybody really pitched in and started in that countdown 17 days ago. The facilities fellows at the pad were able to clean it up in near-record time. The vehicle processing troops did an excellent job. It culminated in a very, very nominal launch." [Lunner. TODAY, pp. 1A & 12A, Apr. 30, 1985.]

## MAY 1985

**May 1:** Kennedy Space Center Director Richard Smith challenged area business leaders to "spread the word" about the opportunities that await companies which pursue ventures in space. Speaking to a capacity crowd at Royal Oak Country Club in Titusville for the annual Industry Appreciation Luncheon, Smith said North Brevard will prosper from activity in space, providing that private enterprise knows what business potential exists there.

"This area has one heck of a lot going for it, but we must be aggressive and we've got to work," Smith said. Part of the task amounts to promoting space as a business tool. "The general public can spread that word a lot better than we (NASA) can." [Hodges. TODAY, p. 20C, May 2, 1985.]

<> Experiments assembled in West Germany arrived at Kennedy Space Center for flight aboard the next Spacelab mission - the first manned spaceflight whose primary mission will not be directed by the United States or the Soviet Union. Mission Control for Spacelab D-1 activity during the October, 1985, flight will be from the German Space Operations Center in the town of Oberpfaffenhofen, near Munich.

"I consider the cooperation of Europe - in particular between the United States and the Federal Republic of Germany - as an especially good example of cooperation between partners," said Dr. Albert Probst, parliamentary state secretary of West Germany's Ministry of Research and Technology, who spoke to NASA officials at KSC. [Lafferty. TODAY, p. 11A, May 2, 1985.]

<> Payload racks for the Spacelab D1 mission were delivered to Kennedy Space Center from Bremen, West Germany, by a USAF Lockheed C-5A and will be processed for an October 16 launch in the orbiter Columbia. The D1 mission is a dedicated German flight, and the payload was integrated and checked out by MBB/ERNO in Bremen. It consists of experiments in the disciplines of botany, biology, life sciences, medicine, materials boundary layer effects and navigation. ["Payload Rack Delivery," AVIATION WEEK & SPACE TECHNOLOGY, p. 21, May 6, 1985.]

**May 3:** Three Lockheed Corp. executives in charge of the shuttle-processing program at Kennedy Space Center were removed from their positions and assigned to other positions within California-based Lockheed. The three were Albert Schroter, president of Lockheed Space Operations Co., John Denson, executive vice president and deputy program manager, and Ron Peterson, vice president and director of operations. The main cause of the job changes was a soon-to-be-released NASA report which partly blames Lockheed for the March accident in which a 2,500-pound "cherry picker" work bucket fell from its stowed position, knocking an employee to the ground and punching two holes in the shuttle Discovery's insulation on the left cargo bay door. The NASA investigation, according to Tom Utsman, director of shuttle management and operation for the space agency, is expected to conclude that the work platform was poorly designed by NASA. But Lockheed erred by using the platform after one of its structural supports was broken, Utsman said. "There was some misuse of equipment; it shouldn't have been in service."

The new executives are E. Douglas Sargent, David Owen and David Dickenson. Sargent, the new president, had been at Lockheed headquarters in Sunnyvale, California. Owen and Dickenson held management positions with Lockheed's Space Operations Co. in Titusville. [Stein. THE ORLANDO SENTINEL, pp. C-1 & C-3, May 7, 1985.]

**May 6:** Challenger's successful landing at Edwards Air Force Base in California's desert does not change NASA's plans to use KSC as its primary landing site, said Jesse Moore, head of the NASA shuttle program. "I don't want anyone to draw a conclusion...that all flights of the shuttle program will go to (Edwards)," Moore said. "The runways here certainly offer us a lot of additional margin. Our objective is to land as many flights as we possibly can back at Kennedy Space Center," Moore said. He also said that stress gauges attached to Challenger's landing gear should provide NASA with the data it needs to deal with the KSC-type landing conditions." Challenger was expected to return to KSC from California on May 11. [Lunner. TODAY, pp. 1A & 12A, May 7, 1985.]

**May 7:** Challenger appeared to weather its recently completed weeklong mission without any serious complications. Examination of Challenger's tires, brakes and heat-resistant tiles have uncovered only minor damage to the orbiter following its May 6 touchdown at Edwards Air Force Base in California.

A piece of thermal blanket loosened and curled up from Challenger's right orbital maneuvering pod and at least 50 tiles were damaged, NASA spokesmen said. [Lafferty. TODAY, p. 7A, May 8, 1985.]

**May 8:** "The assessment date (for Discovery's next launch) now is the 14th, but we still have a very strong chance of making the official June 12 launch date if everything goes as planned," said Debbie Marth, Kennedy Space Center spokeswoman. "The assessment dates are mobile; they move back and forth." Discovery's rollout to the launch pad is planned for May 30, Marth said. The June liftoff will be the fifth for Discovery and the 18th flight of the shuttle program, she said. [Dickerson. TODAY, p. 9A, May 9, 1985.]

**May 11:** Challenger returned to KSC atop its Boeing 747 carrier jet at 11:02 a.m. EDT, thirteen minutes ahead of schedule. That was preceded by a low pass over the runway and North Brevard by pilot Dick Scobee. Challenger joins Discovery and Atlantis at KSC. To make room for Challenger, the Atlantis was moved from one of two bays in the processing facility to the Vehicle Building said NASA spokesman George Diller. Discovery is housed in the other processing facility bay and is being repaired following brake, tile and wing damage sustained during its mission last month. [Lafferty. TODAY, p. 20A, May 12, 1985.]

**May 13:** NASA plans to increase private industry's utilization of the space shuttle by making it easier for paying customers to use the orbiter, John Neilon told a dinner meeting of the Brevard League of Municipalities in Melbourne Beach. "In many instances industry has the view that government is in the way. We're working to change that," said Neilon, who is director of cargo projects management at Kennedy Space Center. [Herlihy. TODAY, p. 3B, May 14, 1985.]

**May 14:** Costello Construction Co. Inc. (Merritt Island, FL) won a \$2 million NASA contract for the construction of Phase IIB of the Cargo Hazardous Servicing Facility at Kennedy Space Center. Costello will be responsible for the construction and utility installation of five support buildings, service and parking areas, and access roads in the industrial area. [Kassak. TODAY, p. 16C, May 15, 1985.]

**May 16:** A 200-pound steel I-beam was knocked from its mountings by a crane and crashed in Discovery's open cargo bay, but did not damage the shuttle's aluminum fuselage, NASA sources said. Results of an investigation into a similar accident which occurred March 8 are expected next week.

In the latest incident, the steel beam was mounted near the aft of the shuttle cargo bay, where it is used as part of a system to calibrate the orbiter's Ku-band communications system. "The beam was installed and it was in the raised position, so that when the overhead crane was moved, it hit the beam," said Jim Ball, NASA spokesman.

NASA and Lockheed Space Operations Co. officials said there the force of the crane hitting the beam broke two welds that hold the beam on its pedestal. When the beam fell, the platform broke its fall and its electrical cables helped stabilize it, Ball said.

The Spartan experiment platform, scheduled to be carried aboard the shuttle next month, was in Discovery's cargo bay when the accident occurred. It was in the front bay and not near the impact area, officials said. None of the other three satellites scheduled to go into space June 12 were in the bay when the accident happened, Ball said. Since no injuries or major damage was incurred, there will be no formal inquiry into the latest accident, he said. The incident is not expected to affect Discovery's processing timetable. [Lunner. TODAY, pp. 1A & 16A, May 17, 1985.]

<> Gary Sutherland, 35, of Port St. John, said he is ready to go back to work at Kennedy Space Center where he was injured by a falling work bucket on March 8. Sutherland, a Lockheed Space Operations Co. employee, sustained two breaks in his left leg and a bruised shoulder.

Sutherland said his employer and NASA have been helpful during his rehabilitation period. "I got a nice big picture from the astronauts; they all signed it for me," he said. "It didn't help my broken leg any, but it made me feel better." [Lunner. TODAY, p. 16A, May 17, 1985.]

**May 17:** Space Coast General Contractors Inc. (Cocoa, FL) won a \$43,960 NASA contract for the construction of a platform and a staircase for the Hangar L chamber in the industrial area

at Cape Canaveral Air Force Station. The refurbished chamber will contain a controlled environmental life support system to simulate conditions suitable for growing plant life in space. Researchers will monitor the effects of the controlled environment, and the data collected will be used in research necessary for long-duration space flight. [Kassak. TODAY, p. 8C, May 18, 1985.]

**May 22:** Kennedy Space Center workers expect to roll Discovery from its hangar to the Vehicle Assembly Building early on the morning of May 28. NASA said the June 12 launch window runs from 7:31 to 7:35 a.m.

At the VAB, Discovery will switch places with Atlantis, the newest NASA shuttle, which has been stored there since its arrival at KSC earlier this month. Atlantis is being outfitted for its first mission in September. Work also continues on Discovery's wing flap, damaged when a tile loosened during its last flight. This allowed superheated air to flow underneath protective tiles and burn through its aluminum skin. [Lunner. TODAY, p. 4A, May 23, 1985.]

**May 23:** A mechanical problem with two of the satellites Discovery is scheduled to deploy on its next mission has delayed the shuttle's launch date to no earlier than June 17, Kennedy Space Center officials said. Engineers at Hughes Aircraft Co., manufacturer of the satellite involved in the delay, discovered a potential problem with an antenna positioning mechanism during routine tests of similar spacecraft, said KSC spokeswoman Lisa Malone.

"This problem could affect the in-orbit performance of the AT&T Telstar 3D and Morelos satellites scheduled for launch aboard Discovery," Malone said. Morelos is the communications satellite being placed into orbit for the Mexican government. [Lunner. TODAY, pp. 1A & 20A, May 24, 1985.]

**May 28:** NASA officials indefinitely ruled out any shuttle landings at Kennedy Space Center. "We're not scheduled to go into KSC under any circumstances," Discovery Commander Daniel Brandenstein said, discussing NASA's decision to avoid a Florida landing at all costs until a shuttle brake problem is better understood.

NASA sources in Washington said the decision on using the virtually endless dry lake bed at Edwards Air Force Base in California is being made on a flight by flight basis, but may extend for the next five missions. The announcement that KSC won't be considered even as a bad weather backup site is unprecedented. [Lunner. TODAY, p. 1A, May 29, 1985.]



## JUNE 1985

**June 2:** NASA is considering sanding or painting part of the 15,000-foot Kennedy Space Center runway to prevent its rough concrete surface from damaging rear shuttle tires so badly that they can't be reused after a landing. Most landings at Edwards Air Force Base in California have been on the dirt lake bed rather than the concrete runway. To insure good traction, the concrete runway surface at KSC was roughened by brushing as it dried, and that is what may be causing excess tire wear. [Fisher. THE ORLANDO SENTINEL, pp. A-1 & A-4, Jun. 3, 1985.]

**June 3:** It will be at least October before Rockwell International engineers can redesign the shuttle's steering system and NASA is ready to resume KSC landings. Once the new system is in place, however, KSC landings are expected to become "99 percent routine," with or without crosswinds. The steering redesign is intended to reduce the stress put on the shuttle's braking system when the vehicle lands at Kennedy Space Center.

U.S. Rep. Bill Nelson (D-Melbourne, FL), head of a congressional committee that oversees NASA, said he agrees with its decision to avoid shuttle landings at KSC for the near future. "Until we get the brakes fixed, it's prudent to land at Edwards," he said in an interview from France, where he is attending the Paris Air Show. [Lunner. TODAY, pp. 1A & 12A, Jun. 4, 1985.]

<> Kennedy Space Center awarded Met-Con, Inc. (Cocoa, FL) a \$31,450 contract for the construction of robotic control housing to be used in robotics research and development. Met-Con must deliver and install a prefabricated indoor room to be used for robot control. ["Cocoa Firm Wins Contract for Robotic Control Housing," NASA/KSC NEWS RELEASE No. 98-85, Jun. 3, 1985.]

**June 4:** The seven-member crew for Discovery's June 17 mission arrived at Kennedy Space Center to watch the shuttle roll out to its launch pad. The six-man, one-woman crew consists of Cmdr. Daniel Brandenstein, Pilot J. O. Creighton; mission

specialists John Fabian, Steven Nagel and Shannon Lucid; and payload specialists Patrick Baudry (France) and Prince Sultan Al-Saud (Saudi Arabia). [Lunner. TODAY, p. 4A, Jun. 5, 1985.]

<> NASA spokesman Jim Ball said rollout was a day late because of a problem with a main events controller, designed to coordinate signals with the onboard computers. The small black box was replaced and the delay should not affect the launch date, he said. ["Shuttle Discovery Rolls Out to Pad for June 17 Liftoff," THE TRIBUNE, p. 4A, Jun. 5, 1985.]

**June 5:** John McCullough, Lockheed Space Operation Co.'s director of quality assurance at Kennedy Space Center, has been "reassigned to a staff position in the safety, reliability and quality assurance directorate," said Lockheed spokesman John Williams. Neither Lockheed nor NASA officials commented on the reasons for the move which followed a pair of major accidents inside the shuttle hangar, a poor contract performance fee from NASA and the replacement of Lockheed's top local managers a month ago. [Lunner. TODAY, p. 4A, Jun. 6, 1985.]

**June 6:** The seven astronauts who will fly the June 17 shuttle mission aboard Discovery went through a countdown rehearsal and their commander Dan Brandenstein said "we hope to leave a big streak in the sky in about a week." The crew, which includes a Saudi Arabian prince, climbed into the cabin of the shuttle for the final two hours of the test, running through procedures for launch day.

"We had a dry countdown that went perfectly," Brandenstein told reporters after the practice was completed. "I very much wish we could have launched today," said Sultan Salman Al-Saud, one of two foreigners flying on the international crew. "We have 11 days to go. It seems like 11 years." The other foreign astronaut is Patrick Baudry, a French military pilot who will conduct medical experiments. ["Astronauts Rehearse for Discovery Mission," THE ORLANDO SENTINEL, p. A-8, Jun. 7, 1985.]

**June 8:** Specialty Maintenance and Construction Inc. (Lakeland, FL) won a \$2.4 million NASA contract for an addition to the Test Group Support Facility at Cape Canaveral Air Force Station. [Kassak. TODAY, p. 14C, Jun. 10, 1985.]

**June 14:** The seven crew members of Discovery's STS 51-G mission landed on the KSC runway shortly after 1:00 p.m. declaring themselves fit and ready for the June 17 liftoff. At their landing field press conference the weather became the main topic of interest.

Daniel Brandenstein, mission commander, said the crew was "trained and ready to go if the weather would cooperate." Payload specialist Sultan Salman Al-Saud, who will be the first Arabian in space, offered a solution for better weather on launch day. Speaking in both English and Arabic, he said he wanted to exchange the rain along the Space Coast for the sunny weather of his native Saudi Arabia. French payload specialist Patrick Baudry said he knows he is the envy of many of his fellow Frenchmen. "I'm glad the first Frenchman into space is me," he said.

The other crew members are Steven Nagel, John Fabian, Shannon Lucid and John Creighton. [Jennings. TODAY, pp. 1A & 16A, Jun. 15, 1985.]

**June 16:** A group of aspiring astronauts and planetologists visited Kennedy Space Center as part of the Space Challenge Program. The seven elementary school students from the Denver-Boulder, Colorado, area were sponsored by the Aerospace System Division of Ball Corporation. The group was invited to view the launch of STS 51-G on the 17th and tour Epcot in Orlando the next day. [Kurth. TODAY, p. 1B, Jun. 17, 1985.]

**June 17:** Discovery lifted off on time at 7:33 a.m., despite a lightning strike which hit the support structure of the launch pad at 6:10 p.m. the previous evening and only a cautiously optimistic weather forecast for launch morning.

NASA's list of VIP guests for the launch included: ambassadors from Chile, France, and Mexico; Jacques Louis Lions, head of the French Space Agency, Gen. Bernard Capillon, head of the French Air Force; three Mexican astronauts and other officials; Charles Z. Wick, director of the U.S. Information Agency; and Gene Roddenberry, creator of the "Star Trek" TV series. [Lunner. TODAY, p. 1A, Jun. 17, 1985.]

<> KSC Public Affairs information officer Mark Hess has been selected to succeed Bill O'Donnell in Washington, D.C., as public affairs officer for the space station. "Rocky" Raab leaves KSC next month for Ogden, Utah, to become public relations manager for Morton-Thiokol's rocket booster division. Raab will be on hand at KSC for future shuttle launches, however. [Salamon. TODAY, p. 1B, Jun. 18, 1985.]

<> STS 51-G's launch was attended by 120 foreign news personnel, up from the usual 25 to 50. Most of the increase was in journalists from Mexico, Saudi Arabia and France.

Payload Specialist Al Bassam Abdulmatsen, Saudi Arabia's backup for Prince Sultan Salman Al-Saud, watched the launch from KSC. "This is one of the greatest moments," Abdulmatsen said. "He (Al-Saud) is the first Moslem to travel into space."

Nearly 30 Saudi Arabian princes and an Arab sheik also were among the VIPs at KSC for the launch. Also on hand were ambassadors from Chile, Mexico, France and Saudi Arabia.

Moments before liftoff, Christina D'Herrerra, a special guest from Mexico, read a poem in Spanish entitled "Mexican Star" to a capacity crowd at the VIP center. [Kurth. TODAY, pp. 1B & 3B, Jun. 18, 1985.]

<> NASA announced it has hired EG&G to determine the need and design of an experiment preparation laboratory proposed for Kennedy Space Center. The value of the contract was withheld by EG&G personnel, but it is a "modest" amount, said Lori Statmore, an EG&G spokeswoman. The facility, if built, is expected to be self-supporting, run by a private contractor and open to all businesses with experiments planned for shuttle flights, a company spokesman said. Also included in the study is the development of a NASA-sponsored symposium on space commercialization, to be held this fall. More work on the contract is expected to follow the symposium, Statmore said. [Dickerson. TODAY, p. 2B, Jun. 18, 1985.]

<> The launch of Discovery was threatened temporarily by an isolated power outage that cut Kennedy Space Center's regular supply of nitrogen gas for about an hour starting at

3:32 a.m. The nitrogen, used during shuttle fueling for fire prevention, is pumped to the launch pad from NASA's gas facility just south of KSC on SR 3.

Florida Power & Light Co. spokesman Jim Rentz said that a line break occurred on Pine Island Road near the Indian River, possibly as a result of high winds from Sunday's thunderstorms. "We don't know what caused it, but one of the crossarms broke and one of the lines came down," Rentz said. "That's the only station that serves the Cape that requires manual switching." The utility had to send a crew to the site to repair the damage.

KSC Shuttle Manager Tom Utsman and Launch Director Bob Sieck said pad crews retained pressure in the system by activating three backup compressors and diverting gas from lines used by Cape Canaveral Air Force Station. [Lunner. TODAY, pp. 1A & 10A, Jun. 18, 1985.]

**June 18:** The twentieth anniversary of the first Titan 3C launch was celebrated by a gathering of Air Force and space industry scientists at Cape Canaveral Air Force Station. Lt. Gen. Forrest McCartney described the 127-foot, 700-ton rocket as a key "building block of space" that helped expand a vital military communications satellite network.

The Titan 3C's first launch 20 years ago was from Complex 40 and included a dummy satellite and between 1965 and 1982 it launched more than 80 military and NASA satellites into space. The Titan 3C was replaced by the 34D Titan boosters currently in use. The newest generation of the Titans are known as "complementary launch vehicles" designed to be used sometimes instead of the shuttle but not to compete with it, officials said. [Herlihy. TODAY, p. 1B, Jun. 19, 1985.]

<> As Discovery orbited overhead, Kennedy Space Center workers prepared for two more launches this month and next. NASA rescheduled the liftoff of an unmanned Atlas-Centaur rocket with an Intelsat communications satellite aboard to June 29.

The next shuttle launch will be Challenger's Spacelab 2 mission, now targeted for July 12 at 4:30 p.m.; there is a 75 minute launch window. Spacelab is already installed in Challenger's cargo bay and tests on its connections to the

shuttle's systems are complete. It will be moved to the VAB on June 23 for connection of the solid rocket boosters and rollout to LC 39 is expected to occur June 27. [Lunner. TODAY, p. 14A, Jun. 19, 1985.]

<> On June 18, 1983, astronaut Sally Ride became America's first woman in space as she and four colleagues blasted off aboard the space shuttle Challenger. ["Today in History," TODAY, Section A; last page, Jun. 18, 1985.]

**June 20:** Lockheed Space Operations Co. work practices at Kennedy Space Center ignored NASA and other federal safety rules and led to a \$200,000 accident March 8 that injured a worker and grounded Discovery for several weeks, a NASA report concluded. The 89-page report is highly critical of Lockheed's procedures in the Orbiter Processing Facility, and makes 11 key findings, observations and recommendations.

The committee recommended that Lockheed form safety committees, revise its operating procedures involving the cranes and platforms, redesign its "danger" tags that are attached to inoperable equipment, redesign the hoist system, improve maintenance, improve communications between workers and managers. The report was drafted by an investigating committee headed by John Neilon, KSC cargo management chief. [Lunner. TODAY, p. 5A, Jun. 21, 1985.]

<> A rubber-like material found in Challenger's liquid hydrogen system earlier this month has NASA officials wondering where it came from and workers racing to clean it up. Jim Harrington, NASA's flow director for the shuttle program, said he hopes the material can be cleaned out of Challenger by June 21 so it can make its June 23 rollover to the Vehicle Assembly Building.

The black, crumbling material was discovered in early June when workers were checking a valve that connects the orbiter with the external tank, according to Warren Wiley, NASA's chief of the Main Propulsion and Fuel Cell Branch. Puzzling NASA officials is that the substance they've found apparently is foreign to the shuttle program, Wiley said. They are investigating whether it comes from KSC contractors or manufacturers, he said. [Lafferty. TODAY, p. 5A, Jun. 21, 1985.]

**June 24:** Discovery landed in a crosswind at Edwards Air Force Base at 9:12 a.m. Pacific time, burying its left wheel six inches into the soft desert runway. That landing was similar to April's shuttle landing at KSC when the brake locked.

NASA associate administrator Jess Moore said the wheel-dragging may have been due to the soft, wet conditions of the desert lake bed, but he conceded that the brake may have locked up as it did during the previous Kennedy landing. Pending a new series of brake tests conducted at the B. F. Goodrich facility in Troy, Ohio, the next KSC landing is expected to occur in November.

Concerning the just completed Discovery mission (51-G), Moore said, "I would have to say that this is one of the most successful missions of the shuttle program. This was particularly rewarding from the standpoint that essentially 100 percent of our objectives were accomplished and we had a number of very significant operations on board." [Lunner. TODAY, pp. 1A & 14A, Jun. 25, 1985.]

<> Kennedy Space Center will be assigned sustaining engineering for space shuttle systems in a gradual shift of responsibilities from Johnson Space Center. The change, which will assign hardware engineering to the site of its operational use, involves such systems as brakes, toilets, thermal tiles and other components that require continuing engineering monitoring and updates. The Johnson center has had sustaining engineering responsibility since the shuttle program began. ["Industry Observer," AVIATION WEEK & SPACE TECHNOLOGY, p. 13, Jun. 24, 1985.]

**June 25:** Discovery's brakes worked fine when it landed at Edwards Air Force Base in California on June 24, NASA officials said; they further indicated that the shuttle was expected to return to Kennedy Space Center on June 29.

"Officials reported that overall, it was a very smooth mission," said Les Reinertsen, NASA spokesman. "The space shuttle main engines have been inspected and are in excellent condition. An inspection of the brakes revealed that they are in very good condition, as well as the tires. There were no brake anomalies (problems) reported for this landing."

A softening of the desert runway by recent rains was the official explanation for Discovery's wheels having sunk into the runway.

"Officials estimate that about 60 or 70 tiles will have to be replaced," Reinertsen said. "The areas with the most tile damage are the belly and the chine area near the main engine. The damage is believed to have occurred during ascent." [Lunner. TODAY, p. 11A, Jun. 26, 1985.]

**June 26:** NASA and Spaceport USA officials decided to give the 30-minute multimedia production titled "Flight of the Aurora" another chance, five months after it was canceled for "fine-tuning," according to Chuck Hollinshead, KSC public affairs director.

"We're just showing it to occasional viewers to get some reaction," Hollinshead said. "We want to see if people think it's too long, too short, too technical, things like that."

The \$200,000 production was pulled five days after it premiered. Since then, improvements were made in the production's timing and to its cameras while the basic format was kept the same, Hollinshead said, though he added it's likely more changes will be necessary. [Lafferty. TODAY, p. 1B, Jun. 27, 1985.]

**June 29:** NASA successfully launched an Atlas-Centaur rocket and INTELSAT VA payload with just minutes to spare and amidst dark clouds and thunderstorms. The launch came at 8:44 p.m. - 16 minutes before the last of three launch windows would have expired. The launch had been originally scheduled to occur at 6:58 p.m. [Lafferty. TODAY, p. 14A, Jun. 30, 1985.]

<> Challenger moved on its crawler transporter from the Vehicle Assembly Building to Launch Complex 39A early this morning. The three-mile trip began at 4:22 a.m. and was completed about six hours later, a NASA spokeswoman said.



The shuttle Discovery which had arrived at KSC on the 28th was moved today from the runway to the Orbiter Processing Facility to be prepared for its August 24th flight. [Lafferty. TODAY, p. 14A, Jun. 30, 1985.]

## JULY 1985

**July 2:** Launch preparation employees will work this Independence Day to avoid any delay in the planned July 12 launch of Challenger, Kennedy Space Center spokesmen said. July 4 was to be a holiday for workers, but a slowdown in preparing Challenger prompted the need for an extra workday, spokesman George Diller said. A day was lost when Challenger's rollover from the Orbiter Processing Facility to the Vehicle Assembly Building was delayed so workers could clean up a substance contaminating the orbiter's hydrogen system.

At a press conference following the "smooth" launch countdown demonstration, Mission Commander Gordon Fullerton said different members of the crew would drink both Coke and Pepsi from each company's new beverage dispensing systems to see how well the cans work. Other crewmembers include: payload specialists Loren Acton and John-David Bartoe, mission specialists Story Musgrave, Anthony England and Karl Henize and pilot Roy Bridges. [Lafferty. TODAY, p. 4A, Jul. 3, 1985.]

**July 4:** The same substance that protects Kennedy Space Center rocket gantries from corrosion will protect the inside of America's symbol of freedom, the Statue of Liberty, which is undergoing two years of refurbishing in New York City Harbor.

Known as IC-Zinc 531, the product was developed at NASA's Goddard Space Flight Center in Maryland by NASA scientist John Schutt, who began working on his anti-corrosive primer coating in 1968, NASA officials said. [Lafferty. TODAY Special Supplement, p. 28, Jul. 4, 1985.]

<> Challenger's solid rocket boosters were tested as crews worked through Independence Day to avoid delaying a launch scheduled for July 12, NASA officials said. In the morning, workers completed loading liquid propellant.

One of the time-consuming problems encountered was a rubber substance contaminating Challenger's liquid hydrogen system; workers had to remove and clean portions of the system. [Lafferty. TODAY, p. 13A, Jul. 5, 1985.]

**July 5:** Costello Construction Co. Inc. (Merritt Island, FL) won a \$238,000 NASA contract for the Missile Research Test Facility at Cape Canaveral Air Force Station. The complex will be used for testing and inspection of solid rocket motors. [Kassak. TODAY, p. 8C, Jul. 6, 1985.]

**July 7:** "All the experiments are ready to go," said Jim Ball, a Kennedy Space Center spokesman, speaking of those experiments slated to be carried aboard Challenger when the shuttle program's 19th mission is launched July 12. [Jean. THE ORLANDO SENTINEL, pp. A-1 & A-4, Jul. 8, 1985.]

**July 9:** Frank A. Kennedy Inc. (Cape Canaveral, FL) won a \$223,532 NASA contract for modifications to the logistics room and machine shop in the Operations and Checkout Building at Kennedy Space Center. The O & C facility includes administrative offices, checkout laboratories for Spacelab and astronauts' quarters. [Kassak. TODAY, p. 14C, Jul. 10, 1985.]

<> Challenger's Mission 51-F crew arrived at KSC at 4:45 p.m. aboard four T-38 jet trainers and a Shuttle Training Aircraft. Smiling and relaxed, crew members greeted families and then briefly posed for photographers.

"This crew is really ready to go," said Gordon Fullerton, the commander. "We're ready to do it on the first try, if possible." KSC officials say they do not foresee any problems with July 12's scheduled 4:30 p.m. liftoff. [Lunner. TODAY, p. 13A, Jul. 10, 1985.]

**July 10:** NASA and Air Force safety officials expressed concern that Challenger's "scheduled launch window - 75 minutes beginning at 4:30 p.m. [July 12] - will clash with prime 'weekend pilot' flying time and jeopardize the launch area. The launch will be the program's only late afternoon launch, said NASA spokesman Jim Mizell. "And that's just to meet the requirements of the scientific payload - we don't necessarily like to launch then." [Herlihy. TODAY, p. 2B, Jul. 11, 1985.]

**July 11:** Overcast skies and a 40 percent chance of thunderstorms were predicted for launch afternoon - July 12 - with winds from the south at 5 to 10 mph, according to National Weather Service spokesman Bob Chase at Daytona Beach, Florida. ["Skies Cloudy for Launch," TODAY, p. 1B, Jul. 12, 1985.]

<> Lt. Scott Funk, Air Force weather forecaster, said a "very good weather picture" was shaping up, and that Challenger should be able to wait out a fast-passing shower if one develops. The forecast is for a 40 percent chance of rain.

"All systems look good," for the 4:30 launch of Mission 51-F, said Jesse Moore, NASA shuttle boss. "We're expecting some excellent science return from this mission." He said a two-hour extension of launch time could be stretched to three by sacrificing some science requirements. [Fisher and Jean. THE ORLANDO SENTINEL, pp. A-1 & A-6, Jul. 12, 1985.]

**July 12:** Challenger's 51F mission was canceled just three seconds from launch when a valve in one of its three main engines malfunctioned. The failed valve helps direct cold liquid hydrogen used by shuttles both as fuel and coolant through a tangle of tubing inside a main engine. The valve was about in the middle of its useful life, having been fired a total of seven times and flown on three earlier missions.

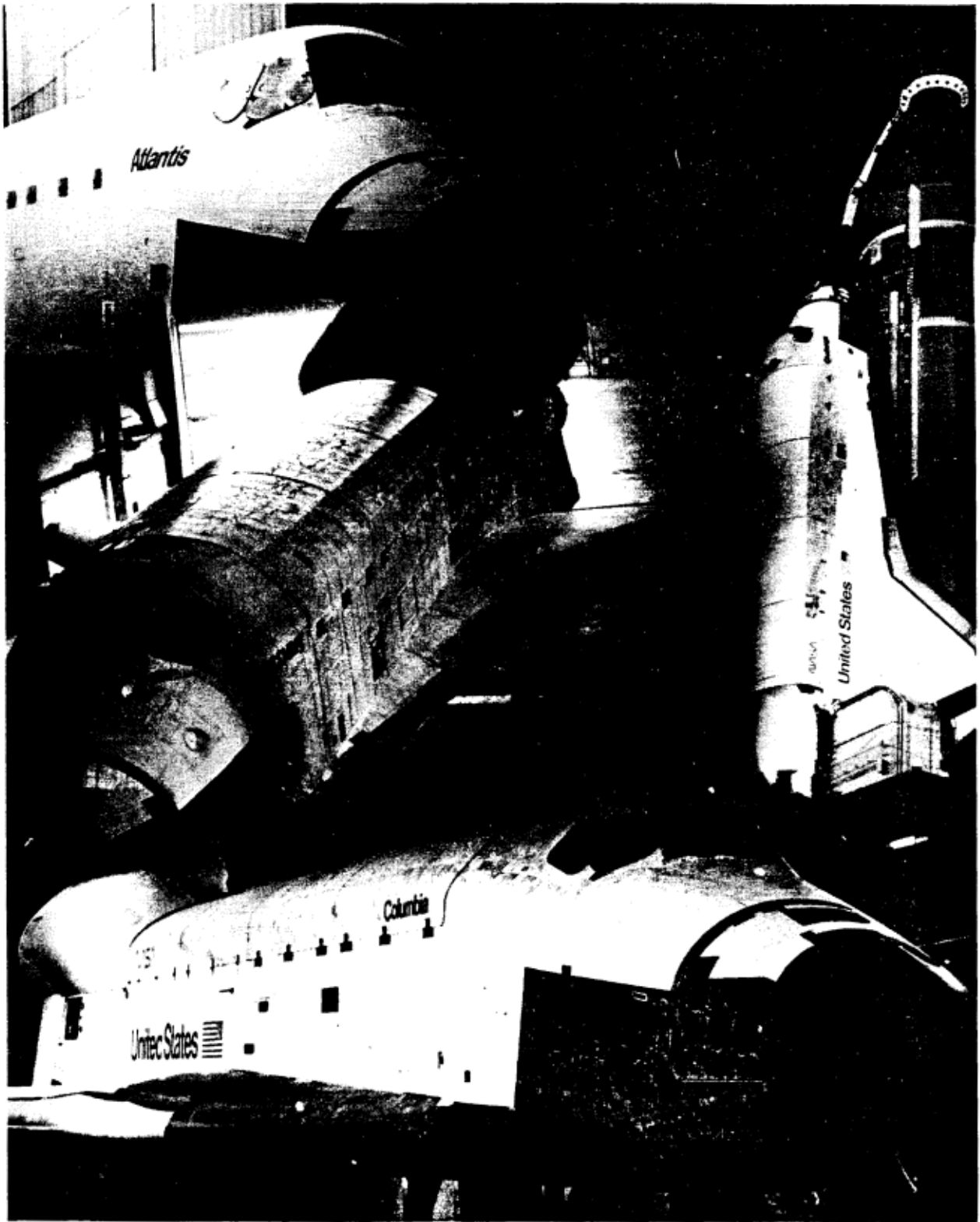
The stuck valve was expected to mean a delay of from one week to two months in the launch of the Spacelab 2 mission, KSC officials said following the launch abort.

The engines had been running for almost four seconds when the shutdown signal was sent. Launch pad fire-control systems responded immediately to the command, dousing Challenger's tail section with tons of water. Some 500,000 gallons in volatile fuel did not ignite.

Commander Gordon Fullerton and his six colleagues were out of the shuttle within 40 minutes of the shutdown. "I remember from my last flight, the feeling was familiar as the main engines started to light: an increase in the noise level and a definite shaking of the whole vehicle," Fullerton said during a post-abort news conference. "I was expecting to feel the big bang of the SRBs about four seconds after that first shaking started.



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All four orbiters - Columbia, Challenger, Discovery and Atlantis - are currently on site at Kennedy Space Center and the shuttle fleet is complete, though not so neatly housed as implied in this specially created photograph.

Kennedy Space Center, NASA's Washington, D.C., headquarters, Johnson Space Center in Houston and Marshall Space Flight Center in Huntsville, Alabama.

But, Diller added, "It would be highly speculative to guess what they (NASA officials) will decide. There are so many ways they can play that, we just have to wait." The decision will be based on "logistical considerations" to accommodate all the different payload customers, Diller said.

Space agency officials have said that if Challenger's aborted mission can't be rescheduled soon, the scientific mission may have to be put off until the first of the year, when a second launch pad will be available at KSC. [Kurth. TODAY, p. 1A, Jul. 15, 1985.]

<> The space shuttle Columbia returned to KSC atop a Boeing 747 jet at 7:23 p.m. and was to remain at the landing strip overnight as technicians began the 12-hour task of separating the two vehicles, NASA said. The piggybacked shuttle took an unexpected tour of coastal Brevard when its NASA pilot decided to fly briefly along the beach before landing, NASA spokesman George Diller said. "We got some calls from people wondering what they saw...fly by. That was a grand tour at the pilot's discretion," he said.

All four orbiters are now at KSC, with Challenger still on the pad after the last-minute abort on July 12; Discovery and Atlantis are housed in the processing facility, said NASA spokesman Jim Ball. "It's really no problem," [having all four orbiters on site] Diller said. "It's just a matter of where everything comes to rest...a matter of moving a few things around." [Herlihy. TODAY, p. 5A, Jul. 15, 1985.]

**July 15:** Workers replaced a rocket engine valve actuator believed to be the cause of Challenger's launch abort July 12. The actuator, built by Hydraulic Research Textron (Valencia, California) controls hydrogen used to cool the No. 2 engine. It has redundant controls and one control system failed, eliminating a fail-safe backup and causing the rocket engine computer to halt the launch. NASA also plans to replace the computer. ["NASA Replaces Suspect Engine Valve Actuator in Challenger," DEFENSE DAILY, p. 76, Jul. 16, 1985.]

**July 16:** Workers have begun servicing the grounded Challenger's main engines as if they had recently flown. NASA managers have decided to replace the faulty valve, main engine controller and possibly some wiring, despite tests earlier in the week showing that the original controller and its wiring were in working order.

"You're talking about a full seven days of turnaround on the main engines and main propulsion system, which doesn't include a helium signature test," said Jim Ball, NASA spokesman. The helium test involves pumping helium gas through the entire fuel system as a final check for leakage, he said.

NASA said that payload managers would take advantage of the delay to repair one Spacelab experiment that developed an oil leak and service others which contain perishable containers. [Lunner. TODAY, p. 7A, Jul. 17, 1985.]

**July 17:** "The Dream Is Alive," an IMAX film that gives viewers a "window seat" on a space shuttle flight, premieres July 21 at 11:30 a.m. at Kennedy Space Center's Spaceport USA. The 37-minute movie replaces "Hail Columbia!" and is 13 minutes longer and will cost 75 cents more to see, Spaceport USA spokesman George Maguiar said.

Narrated by Walter Cronkite, the \$3.6 million film was produced and directed by Graeme Ferguson, the Canadian inventor of the IMAX system. It was made with the cooperation of NASA and the Smithsonian Institution's National Air and Space Museum and was funded by the Lockheed Corp. as a public service. [Lunner. TODAY, pp. 1B & 3B, Jul. 18, 1985.]

<> Columbia suffered damage to about 2,500 of its tiles - more tile damage than any shuttle has incurred in space - after the Boeing 747 transport plane carrying it to Kennedy Space Center flew through a brief rain shower July 14 on the Omaha-KSC leg of its trip from California. Approximately 300 to 400 of the tiles are damaged seriously enough to replace. No estimate of a dollar amount or repair time for the damaged tiles was immediately available but the damage was not expected to disturb NASA's mission schedule, since Columbia isn't scheduled to fly until the end of the year.



Dick Barton, a Rockwell spokesman, explained that tiles are designed to resist heat, not objects. "It isn't a question of thermal dynamics," he said. "A raindrop in the atmosphere has a certain amount of mass...When you hit it at 250 miles per hour, it becomes a projectile." [Lunner. TODAY, p. 1A, Jul. 18, 1985.]

**July 19:** The computer that communicates with the Spacelab experiments in Challenger's cargo bay refuses to activate and NASA may fly the mission using a backup unit, officials said. "The experiment computer failed to power up," said KSC spokesman Jim Ball. "They're going to be doing some troubleshooting of it over the weekend. There's a general feeling that the other two computers can take over." [Lunner. TODAY, p. 5A, Jul. 20, 1985.]

<> Sharon McAuliffe, a 36-year-old social studies teacher from Concord, New Hampshire, was named by NASA to be the first private citizen to fly aboard the space shuttle. McAuliffe's backup will be Barbara Morgan, 33 and an elementary teacher from McCall, Idaho.

McAuliffe's project for the projected January 22, 1986, Challenger flight is to keep a journal like the pioneer travelers of the Conestoga wagon days. "I want to demystify NASA and space flight," she said. [Mecham. TODAY, pp. 1A & 12A, Jul. 20, 1985.]

**July 20:** President Reagan handed a group of American entrepreneurs a setback by ruling that a French rocket marketing firm [Arianespace] does not have a predatory pricing policy. The ruling allows the space shuttle competitor Ariane to be advertised and marketed in the United States. Ariane's primary non-shuttle competitor has been Transpace Carriers, Inc. which now markets the U.S. Delta rocket. [Mecham. TODAY, p. 12A, Jul. 21, 1985.]

**July 22:** Kennedy Space Center someday may be linked by "bullet train" to Miami, Tampa, and Orlando. Malcolm Kirschenbaum, a Cocoa Beach developer and attorney and member of the Florida High-Speed Rail Commission, said. "From everything I've seen, we have a very good chance to fit into that (bullet train) grid. We are viewed as a very logical site for a high-speed rail station," mainly because of Kennedy Space Center.

He advised Brevard chambers of commerce to team up with the state and federal government, NASA and local industries to bring a bullet train station to the county. The idea has been endorsed by the Brevard County Commission which agreed to provide statistics and planning information to the task force. [Crook. TODAY, p. 1B, Jul. 23, 1985.]

<> NASA managers decided to launch Challenger and its Spacelab 2 payload at 3:23 p.m., July 29, and run its experiments with a backup computer. The 3:23 p.m. launch time can be adjusted to avoid bad weather, said Kennedy Space Center spokesman George Diller. [Lunner. TODAY, p. 4A, Jul. 23, 1985.]

July 25: A two-week investigation into marijuana cultivation on Kennedy Space Center property resulted in the arrests of three men accused of growing a total of 670 plants in North Brevard, said law enforcement officials.

The Florida Department of Law Enforcement, the U.S. Fish and Wildlife Service, the Brevard County Sheriff's Department and KSC security cooperated in the investigation as part of a statewide crackdown on marijuana sales, said Brevard sheriff's department spokeswoman Meredith Hepburn. Officials said more arrests are pending. ["KSC Pot Probe Yields 3 Arrests," TODAY, p. 1B, Jul. 26, 1985.]

<> The second-generation space shuttle [or shuttle-II] to be defined by NASA and the Air Force should be designed to take-off and land at commercial airports, according to Rep. Robert S. Walker (R-Pa.), ranking Republican on the House Space Subcommittee. ["Walker Says Shuttle-II Should Be Able to Land at Airports," DEFENSE DAILY, p. 134, Jul. 25, 1985.]

<> NASA and the U.S. Air Force both told Congress that \$2.2 billion should not be appropriated to purchase a fifth space shuttle. In turn, they were accused by Rep. Bill Nelson (D-Mel.) of helping make "decisions by negligence" for America's future in space.

Shuttle program director for NASA, Jesse Moore, said that if the country were not facing "austere budget situations," he would opt for a fifth orbiter. But, he added, NASA's

priorities are for building the \$8 billion space station. ["5th Shuttle Not Needed, NASA Says," TODAY, p. 1A, Jul. 26, 1985.]

**July 26:** The Kennedy Space Center branch of McDonnell Douglas Technical Services Co. was awarded a \$4 million contract to process and integrate Department of Defense payloads in the shuttle program, a company spokesman said. ["Air Force Awards \$4 Million Contract," TODAY, p. 1B, Jul. 27, 1985.]

<> Despite a persistent problem with ground equipment, NASA decided to begin the countdown of the shuttle Challenger on schedule at 9 a.m. July 27. Managers planned to try conducting hydraulic tests on shuttle control systems during the countdown rather than delay the flight, said KSC spokesman Jim Ball. Under normal circumstances, he said, the hydraulic systems would have been tested before the start of the countdown, but workers July 25th discovered air in the hydraulic fluid used to conduct the tests. [Lafferty. TODAY, p. 1A, Jul. 27, 1985.]

<> Kennedy Space Center Director Richard Smith said that beginning later this year, contracts for shuttle launch-support services and "thermal protection system manufacturing" will be transferred from Johnson Space Center in Texas to KSC. Also, beginning in 1986, KSC will take over responsibility for refurbishing and procuring spare parts and will assume additional engineering responsibilities.

Hugh Harris, KSC's chief of public information, said: "A lot of the decision-making that is done will be consolidated here. It's a changing philosophy of the way you do business in the shuttle program." He said the changes may mean eight to 12 new NASA positions at KSC over a two-year period.

In the management shuffle at KSC, Thomas Utsman was appointed deputy director for the space center, replacing George Page who retired last year. Utsman, a Cocoa Beach resident, currently serves as the director of Shuttle Management and Operations, an office being divided into two new organizations.

A new engineering organization will be directed by Horace Lamberth, a Satellite Beach resident who has been in charge of shuttle engineering since last year before the organization was formed. An operations organization will be directed by Titusville resident Robert Sieck, who will manage day-to-day shuttle processing and support. [Lafferty. TODAY, pp. 1A & 16A, Jul. 27, 1985.]

**July 27:** Challenger's seven-member crew, including two persons who devised some of the mission experiments, arrived at Kennedy Space Center about noon to begin their last-minute preparations. The crew includes commander Gordon Fullerton, pilot Roy Bridges, solar physicists Loren Acton and John-David Bartoe, geophysicist Anthony England, astronomer Karl Henize and physician Story Musgrave. [Fisher. THE ORLANDO SENTINEL, pp. B-1 & B-7, Jul. 28, 1985.]

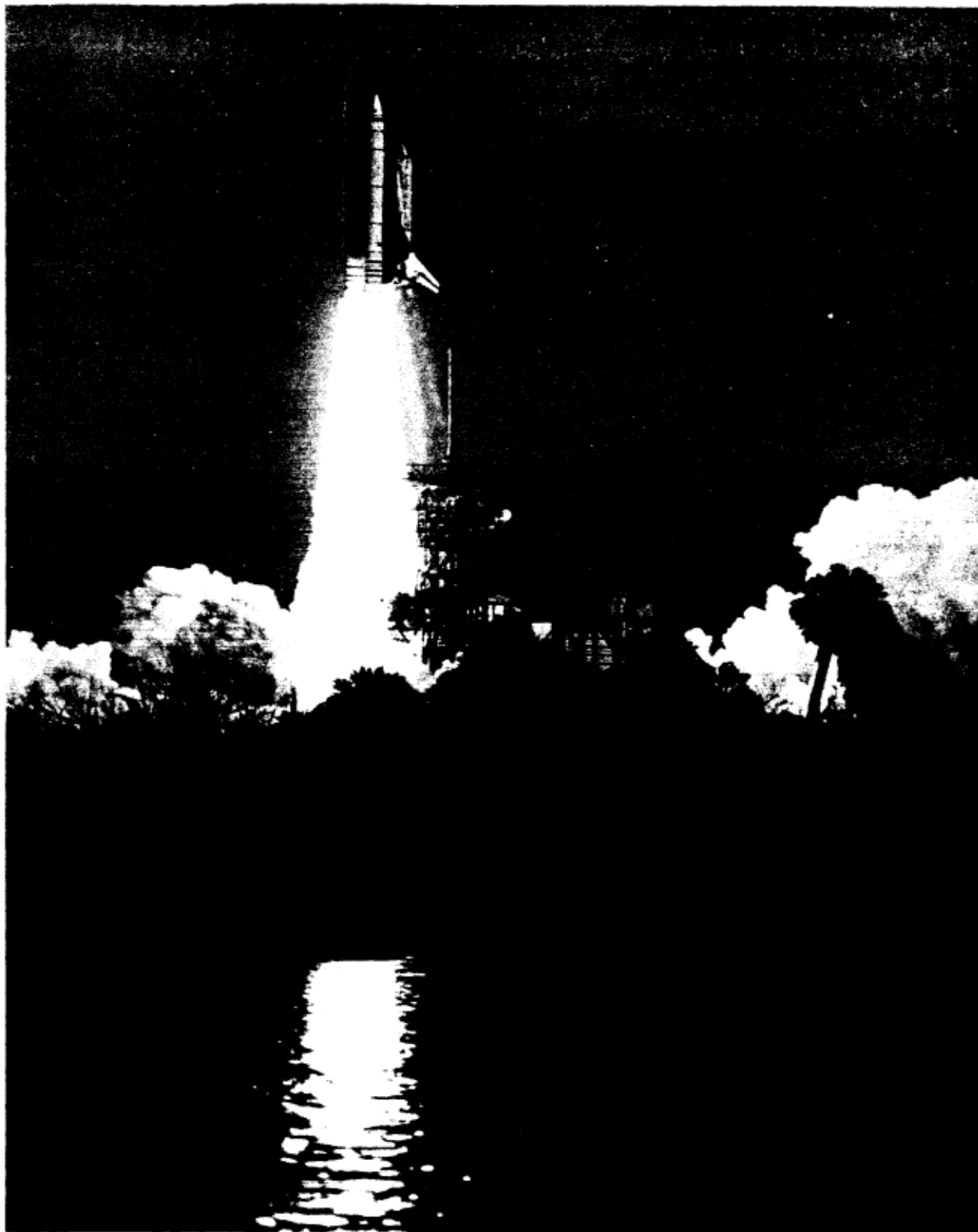
**July 28:** "We've got a green light for launch," said shuttle chief Jesse Moore during a briefing held at Kennedy Space Center. [Early the next day, KSC spokesman Jim Mizell confirmed that launch preparations were running on schedule.]

"We've gone through the system very carefully and exercised all the components we were concerned about," Moore said at the press conference. "We've got the engines in good shape and ready to fly. We have not, however, found anything that we can precisely lay our finger on as being the absolute cause [of the July 12 abort]. We suspect it's some type of contamination," Moore said, noting that a microscopic-sized piece of material can foul a sensitive shuttle fuel valve. [Lunner. TODAY, pp. 1A & 10A, Jul. 29, 1985.]

<> As the countdown toward the scheduled July 29 launch of Challenger continued smoothly, space agency officials said they might alter countdown procedures to avoid the type of last second problems that forced the postponement of this mission two weeks ago. "We want to minimize the chances of a needless shutdown," said Jess Moore, head of NASA's shuttle program. "There may be a way to soften up some of our criteria."

The possibility of new procedures is said to reflect growing confidence in the nation's fleet of space shuttles as well as concern about rising competition from abroad.

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Challenger's 51-F mission, which featured Spacelab 2 as its primary payload, was launched ninety minutes late at 5:00 p.m. on July 29.

New procedures being considered for the countdown include increasing the amount of time allowed for the shuttle's computers to verify the correct functioning of engine valves and broadening the criteria under which they are meant to operate. [Broad. THE NEW YORK TIMES, Jul. 29, 1985.]

**July 29:** Challenger lifted off more than ninety minutes late and limped into an emergency orbit on two engines - the first "abort to orbit" in the history of the shuttle program. "The crew was never in any danger," said Chuck Hollinshead, director of Kennedy Space Center public affairs. "The system worked as it's supposed to."

Jesse Moore, who heads NASA's shuttle program, told a post-launch press conference that sensors aboard Challenger signalled its No. 1 engine was overheating, and a computer automatically shut it down 5 minutes and 45 seconds into the flight. He said it was too early to tell whether the sensor or the engine was at fault.

When the first engine shut down four minutes early, Challenger's computers ordered the remaining pair to burn an extra 20 seconds until the fuel in the external tank was exhausted.

The combined power of the twin solid rocket boosters and the two functioning main engines boosted the shuttle beyond the Earth's atmosphere, but only to about 170 miles high - some 70 miles short of its planned initial orbit.

Later in the evening, Johnson Space Center in Houston reported that the crew, using the shuttle's smaller Orbiter Maneuvering System motors, would adjust Challenger's orbit into a path about 200 miles above Earth.

The mission was originally scheduled to lift off at 3:23 p.m. but was delayed to 5 p.m. by a software glitch in the guidance system of a solid rocket booster. STS 51F, planned for ten years and scheduled to last a week, will land at Edwards Air Force Base, California; NASA is using this California landing strip until late in 1985, when a redesigned orbiter steering system will be installed. [Lunner. TODAY, pp.1A & 14A, Jul. 30, 1985.]

<> Fear and confusion about the "abort to orbit" performance of Challenger was apparently limited to the general public. "I was never really concerned about the astronauts safety or ability to achieve orbit," said NASA spokesman Jim Ball, who watched the launch from the KSC control room. "There was certainly no indication (of fear or concern) from the astronauts to the ground crew from the comments I heard. They (the astronauts) have practiced just about every situation anybody can think of."

Ball, however, said he was "concerned that the shuttle might have other problems" when one engine shut down. "If there were other problems, I was afraid that might result in an abort overseas at a contingency site in Spain," he said. "But the other two engines did continue to perform and were able to make up for some of the energy loss." [Sellers. TODAY, pp. 1A & 14A, Jul. 30, 1985.]

**July 30:** Computer sensors aboard Challenger - not engine troubles - probably caused STS 51F's emergency "abort to orbit," NASA concluded. The sensors triggered an engine shutdown that resulted in Challenger squeaking into space only 33 seconds beyond the point at which it would have been forced to land in Spain. NASA engineers, interpreting information obtained during the launch, have singled out the sensors, thin wires that monitor critical engine temperature.

"Until such time as this is confirmed by an examination of the engine and its various systems and the cause of the shutdown is fully understood, NASA will not launch another mission," a statement from spokesman Charles Redmond said. "We do not anticipate at this time, however, that there will be any resultant delay in the next mission." The next mission, aboard shuttle Discovery, is expected to be launched August 24. [Lunner. TODAY, pp. 1A & 20A, Jul. 31, 1985.]

## AUGUST 1985

**August 6:** As Challenger's wheels touched down at Edwards Air Force Base in California, Kennedy Space Center workers prepared Discovery on the launch pad for its August 24 liftoff, set for 8:51 a.m. Discovery's preparations are on schedule pending resolution of the engine sensor problems which developed during Challenger's liftoff on July 29. [Lunner. TODAY, p. 4A, Aug. 7, 1985.]

**August 7:** Kennedy Space Center offices will all be linked to a central computer soon, when a \$15.3 million integrated, computerized data management system is installed. The cost-plus award fee contract was awarded to Computer Sciences Corp., Systems Division (Vienna, Virginia), a firm which already has some computer systems in place at KSC. The Virginia company won a competition with Harris Corp. (Melbourne, FL). The pact is for one year, with four one-year extensions available. ["Harris Misses KSC Contract," TODAY, p. 20C, Aug. 8, 1985.]

<> Discovery's five-man crew arrived at Kennedy Space Center to take part in a dress rehearsal countdown for their August 24 launch. The mock countdown, ending with a simulated liftoff at 8 a.m. August 9, puts the launch crew, flight crew and other mission managers through their paces as if an actual launch were under way.

The crew includes Commander Joe Engle, Pilot Richard Covey, and mission specialists James Van Hoften, John Lounge and William Fisher. [Lunner. TODAY, p. 1A, Aug. 8, 1985.]

**August 8:** Preliminary inspection of Challenger's engines supports NASA's theory that a faulty sensor - not actual engine overheating - caused the shuttle to lose power during its July 29 liftoff, the agency said. Technicians at Edwards Air Force Base, California, used a flexible fiber-optics device called a borescope to peer inside Engine One, the powerplant that shut down 5 minutes and 45 seconds into the ascent of the Spacelab 2 mission which ended August 6.



If, as expected, the manufacturer confirms NASA's theory, redesigned sensors that have been under development for the past 18 months will be installed in Discovery in time for the August 24 launch. [Lunner. TODAY, p. 13A, Aug. 9, 1985.]

**August 10:** During the processing cycle, the launch pad lightning mast received a strike during a storm. No one was injured but the command and telemetry system on a Payload Assist Module was believed affected by the strike. The PAM is attached to the American Satellite Co. ASC-1 communications spacecraft, and the system erroneously reacted as if it had received a command. ["Rocketdyne Installs New Heat Sensors in Shuttle Main Engines," AVIATION WEEK & SPACE TECHNOLOGY, p. 20, Aug. 19, 1985.]

**August 11:** Challenger arrived home at KSC aboard its 747 carrier at 12:36 p.m. The sensors and main engines will be inspected to determine why the engine failed, a NASA spokesman said. Challenger will be refurbished in coming weeks and prepared for the Oct. 30 mission.

Meanwhile Discovery is on the launch pad and its five-man crew is preparing for an August 24 launch at 9:10 a.m. During the eight-day mission, the crew is scheduled to deploy three communications satellites and attempt to rescue a fourth that was deployed in April but failed to activate.

Orbiter Atlantis is also at KSC and will be moved to the VAB early Aug. 12 to be prepared for a Sept. 19 launch. [Dickerson. TODAY, p. 1A, Aug. 12, 1985.]

**August 12:** Failure of platinum temperature sensors the size of a human hair caused Challenger's engines to malfunction last month, but a solution has been found, the engine's manufacturer - Rocketdyne - said. "We have taken the three sensors out, and we have made our prediction based on our analysis," said Dominick Sanchini, head of production for Rocketdyne, a division of Rockwell International.

"It indeed was an actual case where all three failed, as we had projected," Sanchini said. He said the \$3,500 sensors act like circuit breakers in home wiring, ordering the engines to shut down when excessive heat is detected. He

said a new production process has greatly improved the sensors and that Rocketdyne wants the new ones to fly on Discovery's August 24 mission. [Lunner. TODAY, p. 1A, Aug. 13, 1985.]

**August 13:** Rollout ceremonies for the first shuttle/Centaur upper stage were conducted at General Dynamics Convair Division facilities in San Diego, California, prior to the start of acceptance testing. The liquid propellant upper stage is scheduled to be delivered to Florida September 4. The widebody stage is to be used for the Galileo planetary mission, to be launched from the space shuttle in May 1986. ["Convair Div. Rolls Out Shuttle/Convair Upper Stage," [photo cutline], AVIATION WEEK & SPACE TECHNOLOGY, p. 25, Aug. 19, 1985.]

<> Kennedy Space Center awarded Harris Corp. Government Information Systems Division (Melbourne, Florida) a space station study contract valued at \$298,254. Under the contract, Harris will assess the space station's evolving mission requirements and associated payload launch site operations and develop computer-generated models for launch site processing of the station's resupply module, station payloads and overall station processing. The contract also calls for evaluation of potential applications of artificial intelligence in processing activities. Harris will deliver software, demonstrate an expert system and perform analyses. ["Harris Government Systems Sector in Space Station Study Contract," AEROSPACE DAILY, pp. 234-235, Aug. 13, 1985.]

**August 14:** "We knew what was happening long before we saw it on gauges," said Story Musgrave, a physician and pilot on the recently concluded flight of the shuttle. Challenger, carrying a crew of seven and \$78 million in Spacelab 2 experiments, lost power in one engine 5 minutes and 45 seconds after liftoff from KSC July 29.

"The drama level jumped considerably at that point," Commander Gordon Fullerton remarked. "We were somewhat tense for the rest of the ascent," Pilot Roy Bridges said later. "I don't think it's fair to say we were frightened at all, but we were tense, and we did know the ground was watching some other problems in the engines when they called us and told us to inhibit the automatic engine shutdown system."

Having lost a large amount of fuel that would have been used to make electrical energy, the crew entered a "maximum conservation mode." "I spent a lot of time going around turning out the lights, just like I do at home after the kids," Fullerton said. He added that the flight ranged from deep lows and great highs, and from total frustration to unbridled jubilation. [Lunner. TODAY, pp. 1A & 20A, Aug. 15, 1985.]

**August 16:** Temperature sensors tougher than those blamed for the recent premature shutdown of a space shuttle engine were scheduled to be installed aboard the shuttle Discovery, NASA officials said. The sensors are a "ruggedized" version of those that caused the shutdown.

Workers will also reopen Discovery's cargo bay doors August 18 to reposition a camera fixed on the shuttle's robot arm so it won't rub against a sun shield. Discovery's countdown is slated to begin at 3 a.m. August 22.

In the Vehicle Assembly Building at KSC, the shuttle fleet's newest addition, Atlantis, was mated with an external tank and twin solid rocket boosters in preparation for its August 27 rollout to its launch pad. Its main engines will be test fired on September 9 and its first launch is scheduled for September 19. [Lafferty. TODAY, p. 12A, Aug. 17, 1985.]

**August 17:** The launch of Atlantis has been delayed two weeks - from September 19 to September 30. Its planned August 27 rollout from the VAB has not been affected by the launch delay. The newly rescheduled mission is sponsored by the Department of Defense and includes a crew composed of Commander Karol J. Bobko, Pilot Ronald J. Grabe, and Mission Specialists David C. Hilmers and Robert L. Stewart. [Lafferty. TODAY, pp. 1A & 20A, Aug. 18, 1985.]

**August 19:** Engineers at Kennedy Space Center expect shuttle orbiters to begin landing at the center again next January or February at the earliest after the orbiters are fitted with improved nosegear steering capability and the modification is demonstrated during Edwards AFB, California, landings. Nose wheel steering improvements were accelerated for the orbiters after damage to the brakes and tires of Discovery in a crosswind landing at Kennedy in April. ["Industry Observer," AVIATION WEEK & SPACE TECHNOLOGY, p. 13, Aug. 19, 1985.]

**August 20:** Kennedy Space Center awarded PRC Systems Services Co. (Cocoa Beach, FL) a \$6.8 million contract for engineering services to support Department of Defense and space shuttle cargo operations at KSC, Cape Canaveral Air Force Station and Vandenberg Air Force Base, California. The contract initiates additional work and services under a contract that began in October 1983. The latest award brings the total value of PRC's contract to \$53.8 million. ["Capsules," TODAY, p. 16C, Aug. 21, 1985.]

<> U. S. Rep. Bill Nelson announced that he has accepted an invitation from the Soviet Union to visit the country's space-related facilities in October. The Melbourne Democrat, who is chairman of the House Space Science and Applications Subcommittee, said the purpose of the trip is to express good will and gain knowledge of the Soviet space program.

The invitation was extended to all members of the subcommittee, a NASA official, a high-ranking U. S. Air Force official and the three United States astronauts who 10 years ago participated in a joint mission (Apollo Soyuz Test Project) with Soviet cosmonauts, he said. [Sellers. TODAY, p. 14A, Aug. 21, 1985.]

**August 21:** Discovery's five-member crew flew through thunder and lightning to arrive on time at Kennedy Space Center's shuttle runway. A light rain started just after their arrival from Houston. The astronauts hugged their wives, then gave brief statements to a small group of photographers and a reporter gathered to greet them.

"We've all waited a long time to do this, and as soon as the rain stops, we'll be ready to go out and do good work," said mission specialist Bill Fisher, whose parents live in Winter Park. "We're ready to go," said Cmdr. Joe Engle, an Air Force colonel who commanded STS-2, the second flight of Columbia. "I'm glad we're getting the bad weather out of the way today." [Lunner. TODAY, pp. 1A & 20A, Aug. 22, 1985.]

<> A bit of Orange County history and some souvenirs for Central Florida are scheduled to be on board Discovery when the vehicle and its satellite repair crew leaves for a eight-day space call. Astronaut Bill Fisher, whose parents

live in Winter Park, selected the local items as part of his personal kit for the flight. Included are an American flag intended for the city of Winter Park, several small city of Orlando flags, a photo of old Orlando from the Orange County Historical Museum and several family mementoes. [Fisher. THE ORLANDO SENTINEL, Aug. 22, 1985.]

**August 22:** The countdown clock for the launch of Discovery on August 24 began at 3 a.m. today; later in the morning commander Joe Engle and pilot Richard Covey performed exercises in a Gulfstream shuttle training jet, while Winter Park, Florida's Bill Fisher and mission specialists James "Ox" van Hoften and John Lounge flew in T-38 jets. The flights serve as shuttle landing practice and help astronauts get used to the motion of spaceflight.

Launch day's forecast calls for partly cloudy skies with good visibility and said NASA spokesman George Diller, should be "well within the parameters to launch." [Fisher. THE ORLANDO SENTINEL, p. 1B, Aug. 23, 1985.]

**August 24:** A woman was injured late today after running a gate at Kennedy Space Center and then smashing into a KSC security guard's vehicle, a spokeswoman said. "Apparently she sustained some injuries. The extent of it is not know. She was taken to Jess Parrish (Memorial Hospital)," KSC spokeswoman Andrea Shea said shortly after midnight. Shea said the woman rammed Gate 3 on the NASA Causeway and "got as far as the Visitors Information Center." ["The Space Coast," TODAY, p. 1B, Aug. 25, 1985.]

<> Chancy tropical weather conditions forced postponement of the launch of Discovery and workers prepared for a second try for 7:57 a.m. the following day. [The second attempt on the 25th was scrubbed due to computer problems according to Launch Director Bob Sieck.] Saturday's initial launch effort was scrubbed at the last minute after storm clouds over the launch complex became "too dynamic to call," according to Sieck. The rains poured at noon and a lightning bolt cut power for 30 minutes. The commercial container ship "TLF Frank" caused a problem by attempting to enter the danger zone beneath the shuttle's flight path. It failed to respond to radio messages, so a helicopter was dispatched from nearby Patrick Air Force Base; the helicopter hovered above the ship, eventually dropping an advisory message in a plastic pouch. [Lunner. TODAY, p.1A, Aug. 25, 1985.]

**August 25:** Discovery's five-man crew spent another 2-1/2 frustrating hours this morning strapped into flight seats that never left Kennedy Space Center's launch pad - this time because of computer problems. The launch attempt was rescheduled for 7:02 a.m. August 27.

"The team was pretty discouraged," Launch Director Bob Sieck said after the second scrubbing. "But they'll get a day of rest, which they well deserve." He blamed the launch delay on computer problems but said marginal weather conditions probably would have grounded the flight anyway.

An August 26 attempt was ruled out by safety considerations surrounding fuel operations, Sieck said. Each time the shuttle's massive external tank is loaded and drained of its 500,000 gallons of volatile propellant, engine ducts may weaken from the temperature stress.

While damaged engine ducts could present a new set of problems, bad weather may cancel the flight again on the 27th Sieck warned. NASA engineers have allowed a 43-minute launch window for the third attempt, but there is a 30 percent chance of scattered showers and 15 percent chance of thunderstorms. [Lunner. FLORIDA TODAY, p. 1A, Aug. 26, 1985.]

**August 26:** NASA officials gave technicians the go-ahead late today to begin loading fuels aboard Discovery, which was set to lift off at 7:05 a.m. August 27. Air Force forecasters said they expected cloudy skies but good visibility, improving chances for the launch. They predicted thundershowers offshore. The launch window was expected to extend from 6:55 a.m. to 7:49 a.m. ["A Break in the Weather - Crew Aims for Today," THE ORLANDO SENTINEL, p. 1A, Aug. 27, 1985.]

**August 27:** Discovery's main engines ignited at 6:58 a.m. while rain covered much of Central Florida including near the launch complex. But Launch Director Bob Sieck, faced with up to \$500,000 in daily delay costs, gave the word: "Go." He said launch safety guidelines were "pushed" but not broken. Discovery's first launch attempt was scrubbed on August 24 due to the weather and the second attempt, the next day, was scrubbed because of computer problems. [Lunner. FLORIDA TODAY, p. 1A, Aug. 28, 1985.]

<> When the countdown clock neared zero, veteran astronaut John Young reported improving conditions from his weather plane, and forecasters saw a gap in the rain clouds. "We bet...that we would be able to thread the proverbial needle and get through a break in the [34-minute] launch window available to us," said launch director Bob Sieck. [Fisher. THE ORLANDO SENTINEL, pp. A-1 & A-4, Aug. 28, 1985.]

**August 29:** Atlantis rolled out to Launch Complex 39A for the first time and preparations began for a final engine test. With Hurricane Elena out of the way, KSC managers started the 3.5 mile trip from the Vehicle Assembly Building to the launch site at 11:41 p.m., beginning a journey that required six hours to complete. The nature of Atlantis' first mission is classified military information. ["Atlantis Hits Pad," FLORIDA TODAY, p. 3A, Aug. 30, 1985.]

<> Challenger is now in the Orbiter Processing Facility undergoing refurbishment and cargo integration tests; it is scheduled for a December mission which will include the deployment of two satellites. ["Shuttle Flightline," FLORIDA TODAY, p. 6A, Aug. 30, 1985.]

**August 30:** In August, the automatic checkout team from United Space Boosters Inc. completed in 3-1/2 hours a testing process that required 11 months when it was first tried in 1979. "People and machines have matured to the point that production speed is increasing," said Joseph Lessey, manager of test operations. [Harrison. FLORIDA TODAY, p. 6A, Sep. 26, 1985.]

**August 31:** Two tornadoes ripped across Kennedy Space Center, trapping a guard 195 feet high on the launch pad but somehow sparing the shuttle Atlantis. The winds were powerful enough to roll a 15-ton platform 100 feet and to bend four steel posts into 90-degree contortions. There were no injuries, but three vehicles sustained broken windows and an unoccupied semi-trailer was overturned, KSC spokesman Hugh Harris said.

One tornado was spotted approaching from the west and a second from the south of the launch pads at about 2:20 p.m. Most of the workers preparing Atlantis for its final engine test took shelter in the mobile launch platform. But an

EG&G guard at the 195-foot level of the launch tower complex was unable to leave his post when the high winds slammed his door shut. The pressure prevented him from escaping. When the winds died down, the door was opened and the unidentified guard, shaken but unhurt, was helped to the ground. [Lunner. FLORIDA TODAY, p. 1A, Sep. 1, 1985.]



## SEPTEMBER 1985

**September 3:** Commander Joe Engle piloted Discovery (STS 51-I) through a strong headwind to a pinpoint landing at 9:15 a.m. EDT on a dry lake bed at Edwards Air Force Base, California. Discovery was reported to be in good condition.

Shuttle Director Jesse Moore proclaimed the 20th mission, which earned the space agency \$50 million in revenue, "near perfect." Moore said the fleet should remain on schedule to launch four more flights this year. [Mecham. FLORIDA TODAY, p. 1A, Sep. 4, 1985.]

**September 4:** Six aerospace companies, including one from West Germany, are lining up to bid for the job of processing payloads for the space shuttle program under a contract that could be worth \$750 million. The six companies will begin observing shuttle cargo operations at Kennedy Space Center this week. Each company is expected to send an observation team to learn the business in preparation for submitting a formal bid sometime next year.

The six companies chosen by NASA are Boeing Co., General Electric Co., Grumman Aerospace Corp., Hughes Aircraft Co., MBB/ERNO and McDonnell Douglas Corp.

"They're going to be able to observe the procedures and techniques," NASA spokesman Dick Young said. "This is kind of an explanatory thing. The request for proposals will probably go out very late this year or early next year." [Smart. THE ORLANDO SENTINEL, pp. C-1 & C-2, Sep. 5, 1985.]

<> Kennedy Space Center will open its gates to its employees and their families Sept. 21, in its first open house since 1982. The general public will not be allowed. [Lunner. FLORIDA TODAY, p. 8A, Sep. 5, 1985.]

**September 5:** David Severance, a supervisor at the KSC Printing and Micro-graphics Department of EG&G, recently won \$16,000 for suggesting a way to save about 8 million sheets of paper - about \$128,000 worth - from a report Lockheed prints every

three months. Under the New Smyrna Beach resident's plan, only corrections will be printed every quarter, with the total rewrite of the 45,000-page document rescheduled once a year. ["EG&G's Severance Has a Better Idea," FLORIDA TODAY, Sep. 5, 1985.]

<> High winds gusting across California's Mojave Desert hampered Discovery's return preparations, but NASA still expects the shuttle to return to Kennedy Space Center September 8. "The high winds out here remain a nuisance," NASA spokesman George Diller said from Edwards Air Force Base in California. Diller, a KSC employee, is assigned to Edwards until Discovery returns home.

"They have to move the tail cone from the hangar to the aft end of the orbiter," Diller explained. "Because it's light and hollow, if they move that out and a gust of wind gets in there - away she goes!" The tail cone is placed over the tail section of the shuttle, protecting its main engines and maneuvering rockets during the cross-country ferry flight, and it adds stability to the modified Boeing 747 that carries it.

Noting that NASA has only one of the 36-foot-long, 26-foot-wide tail cones, Diller said processing teams will not work with the aerodynamic cone if winds exceed 20 miles per hour. For two days, winds have been gusting to 25 mph at Edwards. [Lunner. FLORIDA TODAY, p. 7A, Sep. 6, 1985.]

**September 6:** U.S. Rep. Bill Nelson of Melbourne, who heads a committee which reviews NASA's budget, was formally invited by the space agency to fly aboard the shuttle. A specific flight date has not been selected, but NASA Administrator James Beggs told Nelson that he will not fly before January when New Hampshire high school teacher Christa McAuliffe flies aboard the orbiter. [Nelson's flight opportunity was subsequently advanced to Dec. 18, 1985, STS 61-C].

Nelson reacted with "extreme joy and at the same time deep humility," at the invitation, he said at a news conference in Melbourne, Florida. The shuttle launch pad at Kennedy Space Center is just three miles from where his grandparents homesteaded in 1917, he said. [Fisher and Rasche. THE ORLANDO SENTINEL, pp. A-1 & A-10, Sep. 7, 1985. Booth. FLORIDA TODAY, p. 1A, Dec. 16, 1985.]

**September 8:** Discovery returned to Kennedy Space Center at 11:26 a.m. atop its specially designed Boeing 747 carrier, completing the last leg of STS 51-I, "It's been described by folks at Edwards [Air Force Base, CA] as looking the cleanest one's been seen yet," KSC Public Affairs Officer Dick Young said.

The next shuttle launch is scheduled to be the maiden voyage of Atlantis (51-J), which will go on a classified military mission for the Defense Department Oct. 3. The exact time of liftoff is classified but is scheduled to be between 2:20 and 5:20 p.m. The orbiter is already on the launch pad and KSC officials have scheduled a 22-second engine-firing test Sept. 12. [Haj. FLORIDA TODAY, P. 3A, Sep. 9, 1985.]

**September 11:** Kennedy Space Center awarded International Safety Instruments, Inc. (Lawrenceville, Ga.) a \$247,758 contract to provide self-contained breathing units for emergency use by Spaceport workers. The breathing apparatus furnishes a 10-minute supply of oxygen for life support in an emergency situation. The contract initially calls for 1785 units, with a provision for up to 500 more. The units will be manufactured at International Safety Instruments, Inc. The fixed-price, indefinite-quantity contract, was one set aside for award to small businesses. [Shea-King. NASA/KSC RELEASE No. 187-85, Sep. 11, 1985.]

<> Kennedy Space Center extended an existing contract with Planning Research Corporation (PRC) Systems Services Co. (Cocoa Beach, Florida); the extension adds \$12,421,841, bringing the total contract value to \$66,187,413. The agreement calls for PRC to provide engineering services for the Directorate of Engineering Development at Kennedy Space Center and at Vandenberg Air Force Base, California. [Shea-King. NASA/KSC RELEASE No. 186-85, Sep. 11, 1985.]

<> NASA's Kennedy Space Center awarded Intergraph Corporation (Huntsville, Al) a \$1,350,346 contract to provide computer-aided design, drafting and documentation functions. Intergraph will provide an on-line interactive graphic system capable of handling design, analysis and documentation tasks at Marshall Space Flight Center in Huntsville as well as at KSC. The contract, awarded August 29, 1985, calls for a 16-month period of performance. [Shea-King. NASA/KSC RELEASE No. 188-85, Sep. 11, 1985.]

**September 12:** Atlantis (STS-51-J) spewed flames, smoke and thunderous noise from its three huge main engines this morning, but didn't rise an inch above its Kennedy Space Center launch pad - which was exactly what was supposed to happen. Moments later, KSC spokesman Jim Ball pronounced the engine test firing of NASA's fourth shuttle a success. "All preliminary indications would be that we had a completely successful test...", Ball said. "There were no indications of any problems whatsoever."

The 11 a.m. firing went off right on schedule. The 22-second ignition left a huge white cloud of steam looming in the warm sunny skies over the launch complex. KSC teams immediately began preparing Atlantis for September 16's dress rehearsal launch in which the crew and launch team will participate. [Lunner. FLORIDA TODAY, p. 14A, Sep. 13, 1985.]

**September 13:** NASA expects each shuttle "to last well over 100 flights and they will probably wind up lasting much more than the 100 flights" for which they were designed, NASA space flight chief Jesse Moore told a congressional military subcommittee in closed-door session.

"I fully expect it to last well into the next century," he said. Moore noted that the 100-flight goal was planned without a major overhaul. "With such overhaul or major inspection, the orbiter could be useful well beyond" the 100 flight mark. ["Orbiters to Fly More Than 100 Times - Moore," DEFENSE DAILY, p. 61, Sep. 13, 1985.]

**September 16:** A crew of five military astronauts completed the dress rehearsal countdown for Atlantis's maiden flight (STS 51-J) at Kennedy Space Center without a hitch. "It was a perfect countdown," KSC spokeswoman Lisa Malone said hours afterward. "It went very well." The crew is led by Air Force Col. Karol Bobko. Its pilot is Ronald Grabe. There are two mission specialists, Robert Stewart and David Hilmer, and payload specialist, William Pailles. [Lunner. FLORIDA TODAY, p. 4A, Sep. 17, 1985.]

**September 18:** About 1-1/2 tons of tubular metal supports broke loose and fell nearly 100 feet down Kennedy Space Center's Launch Pad 39B this morning, causing some damage but no injuries, NASA officials said. "What caused three of the

five tubes in the telescoping assembly to break loose and fall is still under review," NASA spokesman Dick Young said. No cost estimate of damages was available, he said.

Pad 39B is being modified for its first shuttle launch, set for Jan. 22; it was last used during the July 15, 1975, launch of Apollo-Soyuz mission.

The tubes, a foot in diameter and 25 feet long, each weigh 1,000 pounds, Young said. They support a moveable platform workers cross to reach a room used to store satellites before they are placed aboard a shuttle. The tubes damaged a sheet metal structure near the bottom of the Rotating Service Structure that protects Orbital Maneuvering System engine pods, Young said. [Lunner. FLORIDA TODAY, p. 7A, Sep. 19, 1985.]

<> The deployment of an INTELSAT communications satellite - the final commercial flight of NASA's Atlas-Centaur program - is cleared for a September 26 liftoff from Cape Canaveral Air Force Station. "This whole thing has gone absolutely by the book," Kennedy Space Center spokesman George Diller said of the Atlas-Centaur preparations. "There's been no deviation in anything." Installation of the INTELSAT, built by Ford Aerospace, and testing of NASA's worldwide tracking network was completed this week. [Lunner. FLORIDA TODAY, p. 7A, Sep. 19, 1985.]

**September 19:** An accident investigation board appointed by KSC Director Dick Smith began its review of the circumstances surrounding an incident at Pad B at Launch Complex 39 on September 18 in which portions of a telescoping tube on a pad structure fell to the pad floor. The board is chaired by T. D. Greenfield, chief, Networks Engineering Division, Electronic Engineering Directorate. Members include James L. Joyner, Center Support Operations Directorate, and Emmitt A. Reynolds, Shuttle Engineering Directorate. Safety advisers are Jay Wortman and Robert A. Geron. Legal adviser is Douglas G. Hendriksen of the Chief Counsel's Office. [Young. NASA/KSC NEWS RELEASE No. 194-85, Sep. 19, 1985.]

**September 20:** Hughes Communication Systems Inc., which owns two lifeless LEASATs now orbiting in space, had decided not to launch another of the \$85 million satellites. Officials of

the California firm, which builds 70 percent of the world's communications satellites, asked NASA to remove LEASAT 5 from a December 20 shuttle payload. The earliest date for which the satellite could be rescheduled would be September 1986, said Marvin Mixon, a Hughes spokesman. [Lunner. FLORIDA TODAY, p. 4A, Sep. 21, 1985.]

- <> Enterprise, NASA's powerless prototype space shuttle, arrived at Kennedy Space Center at about 6:30 p.m. and was readied for display at KSC's open house the next day. The orbiter made the cross-country trip from Edwards Air Force Base, California, in one day rather than the usual two. Turbulent and rainy weather along the flight path delayed Enterprise's arrival. [Lunner. FLORIDA TODAY, p. 4A, Sep. 21, 1985.]

**September 21:** About 30,000 visitors took advantage of Kennedy Space Center's open house and were treated to a behind-the-scenes look at the workings of the space program. The open house - the first since 1982 - was limited to employees of NASA, its contractors and their families. Visitors were allowed to walk through the launch and control center and view Spacelab 2 and portions of the Spacelab 3 module.

On launch pad 39-A, visitors could see Atlantis being readied for its October 1 maiden voyage on a classified Department of Defense mission. Also on display at the open house: Enterprise, sitting piggyback atop the Boeing 747 carrier jet. A mock-up, the Enterprise will remain at KSC for an unspecified period before being housed permanently at the Smithsonian Institution in Washington, D.C. [Jennings. FLORIDA TODAY, p. 3A, Sep. 22, 1985.]

- <> 3-M Corp. is trying to figure out if workers at Kennedy Space Center could have damaged the wiring for an experiment on Discovery. The company thinks technicians replacing the orbiter's computer before launch in late August may have bumped wiring for the organic-crystal experiment below the computer. The experiment performed, but had to be modified and run on a backup electrical system. ["Aerospace," FLORIDA TODAY, p. 1F, Sep. 22, 1985.]



A highlight of KSC's Open House on September 21 was an opportunity to see the non-flying shuttle Enterprise next to an Apollo-era Saturn V. Both vehicles were located near the massive Vehicle Assembly Building.

**September 22:** Rep. Bill Nelson (D-Mel., FL) begins formal preparations for his future space shuttle mission with a trip to Johnson Space Center in Houston, where he will undergo the first of several medical exams by NASA doctors. ["Nelson Checks Out for Space Checkup," FLORIDA TODAY, p. 2A, Sep. 22, 1985.]

**September 23:** On LC-39A, shuttle Atlantis (STS 61-B) underwent a helium leak test today. Discovery (STS 51-I) remained in the OPF where its fuel cells were tested; the orbiter will be transferred to the VAB at midnight tomorrow. (STS 61-A) Spacelab-to-Challenger testing was underway in the OPF and Columbia (STS 61-C) continued to be refurbished in the VAB prior to its transfer to the OPF the morning of September 25. Enterprise remained at the Shuttle Landing Facility in preparation for a move to near the VAB where the test vehicle will be on public display. ["Shuttle Flightline," FLORIDA TODAY, p. 6A, Sep. 24, 1985.]

**September 26:** James Devault was chosen as Employee of the Month for Shuttle Management and Operations based on his significant contributions to the success of shuttle landings at Edwards AFB, California. He was also recognized for the assistance he provided at Vandenberg AFB, California, during the development of Vandenberg's shuttle launch facilities. Devault's work involves being responsible for radio communications systems at KSC and all ground communications systems at shuttle landing sites including Edwards AFB and overseas contingency landing sites. [Marth. NASA/KSC NEWS RELEASE No. 203-85, Sep. 26, 1985.]

<> Second-guessing Hurricane Gloria's travel plans, NASA expects to launch its last INTELSAT communications satellite tonight from Cape Canaveral Air Force Station. "Weather is our only concern," launch director Chuck Gay said the previous day. "The vehicle is ready. We have no problems that we're concerned about at this point. We have one small concern with the weather." [Lunner. FLORIDA TODAY, p. 7A, Sep. 26, 1985.]

<> Hurricane Gloria and a malfunctioning electronic component combined to scrub the launch of an Atlas-Centaur carrying an INTELSAT communications satellite. "The earliest we can go is [Sept. 27], but there is officially no time or date set," said KSC spokesman George Diller. "They want to fully understand what is amiss."



Diller said the electronic component handles data from several systems, including the fuel system and some flight control functions; it will be replaced. "A secondary consideration is the availability of the INTELSAT satellite control center in Washington, D.C., because of the hurricane," Diller added. "They were afraid they could get it up there but not be able to get in touch with it and lose control of it."

NASA has additional launch opportunities for the liftoff from Cape Canaveral Air Force Station every night between September 28 and October 17. [Lunner. FLORIDA TODAY, p. 7A, Sep. 27, 1985.]

**September 28:** An Atlas Centaur launch, originally set for September 26 was rescheduled for 7:36 p.m. tonight. The faulty data processing unit was replaced and the weather, relieved of the activities of Hurricane Gloria which made landfall in the northeast on the 27th, was expected to pose no problem for the evening launch. [Fisher. THE ORLANDO SENTINEL, p. 1D, Sep. 28, 1985.]

<> Under overcast skies, the Atlas-Centaur rocket carrying a multi-million dollar communications satellite lifted off at 7:36 p.m. from Launch Complex 36. Around 2 p.m., KSC officials were "guardedly optimistic" about the rocket's liftoff because of heavy thunderstorms and gusting winds. By early evening the skies cleared around the Cape Canaveral facility prompting a thumbs up sign for the launch. Countdown began at 10:21 a.m. and fueling of the rocket started at 6:10 p.m. KSC spokesmen said. [Jennings. FLORIDA TODAY, p. 3A, Sep. 29, 1985.]

**September 30:** NASA awarded two Titusville firms a total of \$1.7 million for three contracts related to space shuttle operations. Holloway Corp. will receive \$716,470 to construct two buildings at Kennedy Space Center. BAMSI Inc. will receive \$950,812 for an operations contract at Vandenberg Air Force Base, California.

Holloway is to build a \$420,000, pre-engineered metal storage and maintenance facility for the payload canister transporter. The contract includes plumbing and electrical installation for the building, to be located south of the headquarters building in KSC's industrial area. The second

Holloway contract covers the construction of a \$296,470, pre-engineered metal communications facility at KSC. The facility will be part of the communications network of audio-visual capabilities, including teleconferencing, at all NASA centers. [FLORIDA TODAY staff and Wire Reports, "Briefcase," p. 16C, Oct. 1, 1985.]

<> The five crew members of the shuttle Atlantis (51-J) arrived at Kennedy Space Center at 4 p.m. and talked only about the weather, setting a tone of secrecy for the defense mission that begins October 3. Air Force Col. Karol Bobko, the mission commander, said he hoped for good weather, but none of the crew members made any mention of the details about their shuttle flight. The other crew members are Air Force Lt. Ronald Grabe as pilot; and Marine Major David Hilmers, Army Col. Robert Steward and Air Force Major William Pailles. [Fisher. THE ORLANDO SENTINEL, p. 1B, Oct. 1, 1985.]

## OCTOBER 1985

**October 1:** Playalinda Beach will be closed for more than 200 days next year when NASA begins using a launch pad closer to the beach, the space agency predicts. "It's going to be a big bite out of next year, there's no doubt about it," said Chuck Hollinshead, public affairs director for Kennedy Space Center. He also warned that if the launch pad now used is closed for modifications, flights may be shifted to the new pad, which would close Playalinda even more. [Lafferty. FLORIDA TODAY, p. 1A, Oct. 2, 1985.]

<> The countdown for the launch of Atlantis (STS 51-J) began while KSC workers solved a problem of air in the solid rocket booster hydraulic lines by purging them. The weather forecast for the October 3 launch was described as acceptable by NASA officials. Mission commander Karol Bobko and pilot Ronald Grabe spent part of the day practicing landings in the Shuttle Training Aircraft and a NASA T-38 jet trainer. Other crew members reviewed flight plans and performed routine pre-launch activities. The exact schedule of launch activities for the maiden launch of Atlantis is a Department of Defense secret. [Lunner. FLORIDA TODAY, p. 11A, Oct. 2, 1985.]

**October 2:** Weather permitting, NASA's newest space shuttle Atlantis will make its debut October 3. The forecast from Air Force weather officer Lt. Scott Funk was iffy. "We expect rain showers and isolated thunderstorms," Funk said during a pre-launch briefing at Kennedy Space Center. "It's going to be a real time call." [Lunner. FLORIDA TODAY, p. 1A, Oct. 3, 1985.]

**October 3:** "We had a successful countdown leading to a launch within the prescribed launch period," said NASA about Atlantis's maiden launch (51-J) which came at about 11:15 a.m. KSC spokesmen were operating under strict Department of Defense secrecy rules.

Nearly five hours after launch, Mission Control in Houston broadcast a one-sentence update: "On the maiden voyage of Atlantis, the crew is doing well, and all systems on board

the orbiter are performing satisfactorily." NASA plans no further statements until 24 hours before landing, at which time touchdown plans will be revealed.

Atlantis became the first shuttle ever to begin its first mission without delay, and its flawless performance took place before a sparse audience of 182 news media representatives - half the turnout for recent launches. "Atlantis has set a new record for on-time performance," said NASA's Charles Redmond. [Lunner. FLORIDA TODAY, pp. 1A & 2A, Oct. 4, 1985.]

**October 4:** Rep. Bill Nelson (D-Melbourne) will join six astronauts on a five-day spaceflight aboard the shuttle Columbia in late December, NASA officials announced. The space agency said that Nelson will participate in some life sciences studies during the mission. The congressman is expected to report for astronaut training in early December.

NASA spokesman Charles Redmond said that when the December crew slot opened, the agency assigned Nelson because it suited his schedule and his presence would not interfere with activities planned for the mission.

U.S. Rep. Don Fuqua (D-Altha) a critic of Republican Senator Jake Garn's flight has said that Garn's flight was unnecessary. He also didn't like the idea of Nelson's flight, but the two congressmen reached an agreement that Fuqua wouldn't publicly criticize his colleague's space journey. [Fisher. THE ORLANDO SENTINEL, pp. A-1 & A-14, Oct. 5, 1985.]

**October 6:** The Atlantis will end its four-day secret mission October 7, with a 1 p.m. landing in California at Edwards Air Force Base, the Air Force announced. The announcement came as promised 24 hours before the scheduled landing. Air Force officials said the shuttle's systems "continue to perform satisfactorily." The announcement broke a news blackout since Atlantis began its first mission (51-J) from Kennedy Space Center. [Lafferty. FLORIDA TODAY, p. 1A, Oct. 7, 1985.]

**October 7:** Atlantis was reported in "excellent" shape and the crew was in good spirits following the orbiter's 1 p.m. EDT landing. "Of course I can't say anything about our mission," said Cmdr. Karol Bobko, an Air Force colonel, "but I can say that the Atlantis performed superbly. I've flown Challenger, Atlantis and Discovery now, and I think NASA really has quite a fleet of orbiters and we have a great national asset."

Even an inquiry about the shuttle's routine de-orbit rocket burn to return to Earth was met with an "it's classified" from shuttle director Jesse Moore. With a grin, he said, "We've been delighted with the (news) coverage of this mission," [Mecham. FLORIDA TODAY, p. 1A, Oct. 8, 1985.]

**October 10:** Rep. Bill Nelson (D-Melb.) and an entourage of high-ranking American space officials head for Sweden and the Soviet Union tonight, seeking a working relationship in space with the Soviet Union. "The purpose of our trip," Nelson said in Washington, "is to open the door to the possibility of civilian cooperation between the United States and the Soviet Union."

Among Nelson's group are seven congressmen, former astronauts Tom Stafford and Deke Slayton (members of the final Apollo mission that linked up with a Soviet Salyut spacecraft in 1975); a Department of State representative; Jess Moore, head of NASA's shuttle program; and Thomas Paine and Marcia Smith, of the National Commission on Space. [Lunner. FLORIDA TODAY, p. 1A, Oct. 10, 1985.]

<> Congressional members of the trip to the Soviet Union delayed their departure to take part in a vote on the national debt which was scheduled to occur at 11 a.m. Oct. 11. The flight should leave right afterward, an aide to Rep. Bill Nelson said. ["Soviet Trip Postponed For Debt Vote," FLORIDA TODAY, p. 3A, Oct. 11, 1985.]

**October 11:** The space shuttle Atlantis is expected to return to Kennedy Space Center from California today at 6 p.m.; the Atlantis aboard its 747 transport plane left Edwards Air Force Base in California shortly after 7 a.m. [Lunner. FLORIDA TODAY, p. 4A, Oct. 11, 1985.]

**October 14:** Orbiter Processing Facility Director Robert Bressette presented certificates of appreciation to almost two dozen members of the Lockheed Space Operations Co. Shuttle Processing Contract team. The team spotted contamination in a critical gaseous oxygen (GOX) control valve and replaced the entire system just prior to the launch of Discovery's Mission 51-I last month.

"Normally it takes about four weeks to [do the replacement.] It took these guys two weeks," said Deputy OPF Director Bruce Kowen. Among those receiving the certificates of appreciation were Robert Barrett, Stan Carver, Joe Coughlin, Mel Harmon, George Hofmann, Gene Jensen, Dick Noeske, Jack Weakland, Harry Prosser, Chip Galliano and Kenneth Morgan. [Lunner. FLORIDA TODAY, p. 5A, Oct. 15, 1985.]

<> McDonnell Douglas Corp.'s division that processes payloads for the space shuttle at Kennedy Space Center is getting additional management. George Faenza, former director of the KSC unit, has been appointed vice president and general manager of McDonnell Douglas Astronautics Co.'s KSC division. M. Dale Steffey, who had been director of the Huntsville, Ala., technical services unit, has been appointed vice president and deputy general manager of the KSC division. [Reed. THE ORLANDO SENTINEL, p. 1C, Oct. 15, 1985.]

**October 15:** Ceremonies at the Vandenberg Launch Site commemorated the transition of the new facility from an activation status to an operational mode. A press conference featuring Under Secretary of the Air Force, Edward C. Aldridge, was held at the Orbiter Maintenance and Checkout Facility. Aldridge, who is a payload specialist on 62-A (the first scheduled Vandenberg launch), was accompanied by the rest of the crew: Mission Commander, Capt. Bob Crippen, USN; Pilot, Lt. Col. Guy Gardner, USAF; Mission Specialists, Cmdr. Dale A. Gardner, USN; Col. Richard Mullane, USAF; and Maj. Jerry Ross, USAF; and payload specialist, Maj. John Waterson, USAF. [Lindeke. STAR GAZER, p. 1, Oct. 17, 1985.]

**October 16:** A delegation of U.S. congressmen and aerospace officials received a definitive "nyet" [no] from Soviet President Andrei Gromyko on their proposal to renew superpower space cooperation. Gromyko told the group "the United States would have to back off of militarization of

space," before U.S.-Soviet space cooperation could be renewed, Nelson said. Gromyko's reference to space militarization of space refers to U.S. efforts through the Strategic Defense Initiative to match the Soviet Union's missile defense research and testing efforts which have been underway for several years. [Tinsley. FLORIDA TODAY, p. 1A, Oct. 17, 1985.]

<> NASA spokesman Dick Young said two problems developed in the 6-million-pound crawler-transporter causing it to stop half a mile from its destination on Pad 39A. An electrical malfunction occurred during the morning and a leak in a hydraulic line developed around midday. Both problems, the first NASA has encountered during a shuttle rollout to the pad, occurred in the system that keeps the billion-dollar cargo level as the transporter travels the 3-mile distance from the VAB to the pad. Repairs were made by 5:35 p.m. and the transporter reached the pad at 8:15 p.m., Young said. [Lunner. FLORIDA TODAY, p. 3A, Oct. 17, 1985.]

**October 17:** Dr. Anna Fisher, NASA astronaut, praised KSC workers in a talk delivered before the Women's Executive Council in Orlando. "I don't think people appreciate just how complex an operation it is," she said. One of the major problems at KSC, she said, is that "people are having to put in long, hard hours." [Lunner. FLORIDA TODAY, pp. 1B & 2B, Oct. 18, 1985.]

**October 18:** The mock launch countdown at Kennedy Space Center for liftoff of the shuttle Challenger went so well the eight crew members had a hard time keeping their thoughts earth-bound afterward.

"I wished it had been today," said Henry Hartsfield, the mission commander of the October 30 flight (STS 61-A). He said the test went smoothly except for an "anomaly" in the display panel; NASA said later that the problem would not affect the flight.

The mission - Spacelab D-1 - has the largest crew ever, five Americans and three Germans. Hartsfield and pilot Steven Nagel will fly the orbiter; the NASA mission specialists are Guion Bluford, Bonnie Dunbar and James Buchli. Payload specialist Reinhard Furrer and Ernst Messerschmid of Germany and Wubbo Ockels of the Netherlands will provide the international members of the crew.

The shuttle payload will be controlled from an operations center at Oberpfaffenhofen, Germany, near Munich. [Jennings. FLORIDA TODAY, p. 4A, Oct. 19, 1985.]

**October 21:** The military space shuttle Mission 51-J, using the new orbiter Atlantis, established a shuttle high-altitude record of 320 mi. (515 km.) shortly after launch of the secret flight from Kennedy Space Center on October 3. ["Military Shuttle Flight Sets Altitude Record," AVIATION WEEK & SPACE TECHNOLOGY, p. 26, Oct. 21, 1985.]

<> The space shuttle Challenger is at launch pad 39A and the onboard maneuvering systems propellants have been loaded prior to the noon October 30 liftoff. Atlantis, recently returned from Edwards Air Force Base, California, is in the Orbiter Processing Facility where its cargo bay is being reconfigured for its second mission, scheduled for launch on November 27.

Columbia is in High Bay 2 of the OPF; its orbital maneuvering systems pods were being installed this week. Discovery is undergoing maintenance, including main engine work, in High Bay 2 of the Vehicle Assembly Building. Discovery is scheduled to liftoff from Vandenberg Air Force Base, California, on March 20, 1986. [Heller. FLORIDA TODAY, p. 5A, Oct. 22, 1985.]

**October 22:** Proposals are being sought by Kennedy Space Center for an overall analysis of the current ground operations functions for the space shuttle in order to determine high payoff innovative methodologies and technologies to reduce those operations and cut life cycle costs. Kennedy Space Center will be the primary focus of the study, with secondary consideration given to the Vandenberg launch site. ["KSC Opens Study of Improved Shuttle Ground Operations," DEFENSE DAILY, p. 269, Oct. 22, 1985.]

**October 25:** A replica of the X-29 test aircraft with forward swept wings will be on display at Spaceport USA for a week beginning Oct. 29. The replica was built by Grumman Corp. under a contract with the U.S. Air Force for display at the Paris Air Show and has been displayed at Grumman plants around the country. ["Spaceport USA to Show Replica of Test Aircraft," THE ORLANDO SENTINEL, p. D-2, Oct. 26, 1985.]



**October 27:** The largest shuttle crew ever - five Americans, two West Germans and one Dutchman - arrived at Kennedy Space Center amidst thundershowers today. "The bird's in good shape, and I can assure you of one thing: The crew is ready to go," Cmdr. Hank Hartsfield said. "I'm still trying to figure out if we're a gaggle or a herd," said mission specialist Bonnie Dunbar. "But let's go."

For a complete crew listing see story of Oct. 18.  
[Herlihy. FLORIDA TODAY, p. 1A, Oct. 28, 1985.]

**October 28:** The countdown for the weeklong flight of STS 61-A began at 6 a.m. and continued smoothly as the record eight-member crew spent a light day preparing for the flight. West Germany has booked the entire shuttle mission for \$64 million, sponsoring 76 experiments valued at \$175 million. Most are housed in Spacelab, a 23-foot laboratory in Challenger's cargo bay where scientific research will be conducted around the clock. This will be the first time a manned space mission has been managed by a country other than the United States or the Soviet Union, but despite the precedent, only 50 foreign journalists have asked to cover the launch, half the number who came to Kennedy Space Center for the first Spacelab launch in 1983.

The weather forecast calls for good visibility, although there remains a chance of rain in the area. [Fisher. THE ORLANDO SENTINEL, p. B-1, Oct. 29, 1985.]

**October 29:** NASA's Teacher in Space Sharon Christa McAuliffe (Concord, N.H.) and her backup teachernaut Barbara Morgan (McCall, Idaho) took their first up-close look at the shuttle Challenger perched on its pad and ready for a noon launch October 30.

"Amazing," said McAuliffe, who spoke briefly during a photo session at LC 39A. "Especially with the superstructure. We've seen the mock-ups and everything (at Johnson Space Center's astronaut training complex), but we're only used to seeing the cargo bay. But to see the superstructure and the tank...it's unbelievable." McAuliffe is scheduled to fly on the January 1986 mission. [Lunner. FLORIDA TODAY, p. 1A, Oct. 30, 1985.]

- <> "Challenger and the cargo and the crew all seem ready to go," NASA shuttle chief Jesse Moore said. "We're a little bit concerned about the weather." Air Force weather officer Lt. Francine Lockwood said rain showers were likely throughout the noon-to-3 p.m. launch window, as a result of Hurricane Juan's remnants being close to Florida.

NASA will not launch shuttles through rain or high winds. If the liftoff is cancelled Oct. 30, it will be rescheduled for Oct. 31. [Lunner. FLORIDA TODAY, p. 1A, Oct. 30, 1985.]

- <> Princess Margriet Francisca of the Netherlands and her husband, Pieter van Vollenhoven, toured Kennedy Space Center in advance of their countryman's launch into space aboard the shuttle October 30. The princess said through her spokesman that her visit was intended as moral support for Dutch astronaut Wubbo Ockels.

In addition to the princess and her husband, other VIP's expected to view the launch of STS 61-A were Italian aerospace executive Renato Bonifacio; actor Kirby Grant, known as television's "Sky King" in the late 1950s; Hermann Oberth, a 91-year-old German astronautics pioneer; and a handful of current and former German government officials. ["Space Center Gets Dutch Treat," FLORIDA TODAY, p. 2A, Oct. 30, 1985.]

**October 30:** Kirby Grant, television's "Sky King," was killed in an auto accident at 8:00 a.m. four miles west of Titusville, Florida, on Highway 50. Grant, 73, of Winter Springs, had received an official invitation to attend Challenger's liftoff and was en route to Kennedy Space Center at the time of the accident. Traveling alone in his car, Grant was pronounced dead on arrival at Jess Parrish Memorial Hospital in Titusville. He is survived by his wife, Carolyn, two sons and a daughter. [Rink. FLORIDA TODAY, p. 1A, Oct. 31, 1985.]

- <> Challenger lifted off right on schedule at noon; rain that had threatened to delay the launch never materialized to mar the start of NASA's 22nd shuttle mission 61-A. A balky electrical power cell on board Challenger had raised some concern - someone on the launch pad forgot to close a circuit breaker. Otherwise the launch was by the book.

Flight director Gary Coen, speaking from Mission Control in Houston, said neither the fuel cell problem nor a glitch in one of the steering rocket systems would seriously hamper the flight. [Lunner. FLORIDA TODAY, p. 1A, Oct. 31, 1985.]

- <> Challenger (STS 61-A) experienced reaction control system and fuel cell problems shortly after its noon liftoff. Neither was expected to affect mission duration. Just after launch, a helium pressure regulator in the right-hand RCS pod fuel feed system failed in the closed position. Both fuel and oxidizer tanks have two legs in the propellant feed system, called A and B, and both must operate on the same leg. The crew was instructed to close the A leg and operate on B. When the system began to lose pressure the instructions were to close B and open A. When this was accomplished, pressure became normal. The effect of the problem was that the right-hand pod lost its redundancy. [Kolcum. AVIATION WEEK & SPACE TECHNOLOGY, p. 20, Nov. 4, 1985.]
- <> Professor Hermann Oberth, the 91-year-old German mentor of rocket pioneer Wernher von Braun, was on hand for the launch of Challenger and described it as "a wonderful achievement. This is the first step we are sure we have to take to go from Earth to the space station and back." After an orbiting space station, Oberth said, a base on the moon should be space technology's next major step. Oberth saw his last launch from KSC in 1969 when Apollo 11 lifted off. He watched that launch with von Braun who attributed much of rocketry's development to Oberth's theories and designs.
- Born in Transylvania (now part of Romania) in 1894, Oberth was inspired by the visionary science fiction author Jules Verne, and in 1923 wrote "The Rocket Into Interplanetary Space." In it he predicted rockets could leave the Earth's atmosphere and humans could live in space without risk. [Lafferty. FLORIDA TODAY, p. 1A, Oct. 31, 1985.]
- <> Teachernauts Christa McAuliffe and backup Barbara Morgan saw their first shuttle launch together at Kennedy Space Center. "The whole thing is so gorgeous!" McAuliffe said after the mission bearing Germany's Spacelab D-1 lifted off. "I didn't expect myself to be as excited as I was. A reporter told me I was jumping up and down," she said. Barbara Morgan had tears in her eyes as she watched.

McAuliffe and Morgan are representatives of the country's 2-1/2 million teachers whose roles already have been enhanced through the national attention the teacher in space program has received, McAuliffe said. [Gallagher. FLORIDA TODAY, p. 4A, Oct. 31, 1985.]

## NOVEMBER 1985

**November 3:** In 1986, KSC will receive \$3.2 million to continue definition studies on Space Station processing requirements, evaluate maintenance and resupply activities, and assess facility needs. These FY 1986 funds will be allocated toward in-house and contracted studies which are part of the Phase B stage of the Space Station preliminary design effort that is to continue through January 1987.

Current Phase B work at KSC focuses on ground processing options and concepts associated with preparing Space Station elements for launch. Also included is the study by KSC contractors evaluating facility requirements for processing station components, and commercial and scientific payloads. NASA will determine its ability to carry out on-going maintenance routines and resupply activities during continuous on-orbit operations.

Kennedy's Space Station operations are divided into four areas: Systems Engineering and Integration, Operations and Customer Support, Logistics System, and Project Control. The Space Station Project Office is headed by C.M. Giesler, who oversees approximately 180 NASA and contract workers.

KSC allocations of \$3.2 million for FY 1986 show a \$350,000 increase over 1985 funding of \$2.85 million. This is consistent with an overall trend that will see a gradual increase in funding for each step of Space Station design and construction until the time of its implementation. [SPACE CALENDAR, p. 5, Oct. 28-Nov. 3, 1985.]

**November 4:** Ramon's Restaurant, Cocoa Beach restaurant built by M. C. Minella in the mid-1950s, closed its doors after thirty years in business. "This used to be a landmark," said "Buck," new owner and manager of the restaurant since January. "A lot of astronauts used to party here."

A sign hanging over the dining room reminded patrons of the original seven astronauts, the ones immortalized in the 1984 film "The Right Stuff." The sign read: "Our All-American Space Team: Malcolm S. Carpenter, Leroy G. Cooper, John H. Glenn, Virgil I. Grissom, Walter M. Schirra, Alan B. Shepard, Donald Slayton." [Booth. FLORIDA TODAY, Nov. 5, 1985.]

- <> Don Beck, community relations coordinator for Lockheed Space Operations in Titusville resigned to assume duties as manager of communications for McDonnell-Douglas Astronautics in Titusville. ["PR Officials Switch Jobs," FLORIDA TODAY, p. 16C, Nov. 5, 1985.]
- <> Enterprise, the life-size prototype that was NASA's space shuttle test craft, will be leaving Kennedy Space Center for its permanent home in Washington, D.C., on Nov. 16. KSC officials announced that the engineless Enterprise, currently on public display by a horizontal Saturn V rocket near the Vehicle Assembly Building, will be mated to its Boeing 747 carrier aircraft November 15, leave the following day, and be removed from the 747 on Nov. 17 at Dulles Airport. ["Smithsonian Getting Ready for Enterprise," FLORIDA TODAY, p. 4A, Nov. 5, 1985.]

**November 5:** Kennedy Space Center initiated contracting for a 12-month study to examine present and future technology applications that can be used to improve the efficiency and lower the life cycle costs of space shuttle ground operations functions, including assembly, test and checkout, logistics, recovery, refurbishment, servicing, payload integration, launch operations, operations management and ground systems operations and management.

Primary focus will be on Kennedy Space Center with secondary consideration given to the Vandenberg launch site. Requirements for new and modified facilities, associated support equipment and services, optimized test and checkout methods, and operational concepts will be identified in the study, along with vehicle modifications required to accommodate proposed operation concepts. ["Kennedy Opens Study of Improved Shuttle Ground Operations," DEFENSE DAILY, p. 20, Nov. 5, 1985.]

**November 6:** Challenger (61-A) landed smoothly at Edwards Air Force Base in California, and paved the way for a return to Kennedy Space Center landings in December. "I talked to Commander Hartsfield, and he said it responded very well," NASA shuttle chief Jesse Moore reported at a press conference.

Hartsfield, using a new system of nosewheel steering that routes his manual commands through the shuttle general purpose computer, veered the 100-ton orbiter about 20 feet

off the centerline, then back, proving the system works. "I'll say the bottom line today is that we're planning on flying into the Cape in late December," Moore said. A final decision on KSC landings will be made in about a week, he said. [Lunner. FLORIDA TODAY, p. 1A, Nov. 7, 1985.]

**November 7:** Challenger is in "excellent" shape following its smooth landing Nov. 6 at Edwards Air Force Base in California, a NASA spokesman said. "Processing is proceeding as normal," said Nancy Lovato, a public information officer at NASA's Ames-Dryden facility in Edwards.

Only 18 heat-resistant tiles were damaged on re-entry after the 3-million-mile trip, Lovato said. A dozen of the tiles needing replacement are located on the shuttle's underside, while six additional damaged tiles need replacing elsewhere.

Challenger is tentatively scheduled for return to KSC Nov. 11. "They're doing de-servicing now, and making good time," Lovato said. [Booth. FLORIDA TODAY, p. 1A, Nov. 8, 1985.]

<> Following their week in space aboard Challenger (STS 61-A), five space shuttle scientists - Bonnie Dunbar, Guion Bluford, Ernst Messerschmid, Reinhard Furrer and Wubbo Ockels - flew to Kennedy Space Center for two weeks of medical tests. Doctors hope the results will help track the causes of the temporary spacesickness that afflicts nearly half of the astronauts early in flight - none seriously. The crew members will be tested in a specially equipped laboratory where among other things, they will be spun on rotating chairs, subjected to dizziness on a tilting table in a tilting room and accelerated on a sled. They often will be blindfolded and numerous blood samples will be taken.

Doctors want to compare the responses from the ground tests with the responses from the same tests in weightlessness and others made before the flight. Degrees of dizziness, balance, speed of reorientation, blood pressure and blood samples will be compared. Eye movement reactions to the tests are another comparison. The target of the investigation is the inner ear system. Scientists believe it and the eyes get conflicting impressions of what's going on, confusing the brain and triggering the sickness. [Jean. THE ORLANDO SENTINEL, pp. B-1 & B-6, Nov. 8, 1985.]

**November 8:** Kennedy Space Center workers, using a crane to speed their work, damaged a 300,000-pound rocket booster scheduled for use on January's space shuttle mission (51-L), NASA officials said. There were no injuries and a damage estimate was not available.

The forward center segment of the left solid rocket booster assembly was being processed at the rotating and processing storage facility, when the accident occurred, KSC spokesman Dick Young said. Workers were removing pins from a shipping ring attached to the solid rocket booster segments, he said. NASA cannot release details until two boards - one from NASA and one from Lockheed Space Operations Co. - complete their investigations of the incident, Young said. ["Crane Damages Shuttle Booster," FLORIDA TODAY, p. 3A, Nov. 12, 1985.]

**November 12:** NASA is expected to announce today that the launch date of U.S. Rep. Bill Nelson's five-day space shuttle mission has been moved two days earlier, to December 18, to avoid a Christmas Day landing at Kennedy Space Center. "We've hit every other holiday this year," a NASA spokesman said. "We want to avoid Christmas." (The actual launch date of STS 61-C was Jan. 12, 1986.). [Lunner. FLORIDA TODAY, p. 5A, Nov. 12, 1985. Lunner. FLORIDA TODAY, p. 1A, Jan. 13, 1986.]

<> The space shuttle Atlantis was moved from its hangar to launch pad 39A in preparation for its launch November 26 on an eight-day mission (61-B) that will include two spacewalks. Atlantis is set to begin its second flight at 7:29 p.m.

Meanwhile the shuttle Challenger returned to Kennedy Space Center on November 11 in the early afternoon aboard its 747 carrier plane. [Fisher. THE ORLANDO SENTINEL, p. C-3, Nov. 13, 1985.]

**November 13:** KSC firefighters successfully implemented - in three minutes and five seconds - a new rescue technique called the "Return-to-Landing-Site" maneuver. The simulation took place on the shuttle runway and involved the Smithsonian-bound Enterprise, four mock crew members in the orbiter, three EG&G firefighters and astronaut Dr. James Bagian.



The new rescue plan was developed for use with the new and more hazardous liquid-fuel Centaur upper stage which future shuttles will use to boost payloads into deep space. The liquid hydrogen which fuels the Centaur is highly flammable; current centaur stages use solid fuel which are far less volatile. ["Shuttle Crew Fire Drill is a Test Success," FLORIDA TODAY, p. 3A, Nov. 14, 1985.]

<> Johnnie Harrison, a Black female worker at Kennedy Space Center charged NASA with sex and race discrimination. The federal civil suit is the first of its kind to be filed against the space agency, a NASA spokesman said. Ms. Harrison asserted that she had "been denied equal opportunity" and wanted a trial "to let anything come forth."

J. Albert Diggs Jr., director of NASA's equal opportunity program, said he was familiar with Harrison's charges. "We knew she was contemplating this (filing the suit)," Diggs said. He said that all previous discrimination complaints had been resolved through the administrative process. Harrison said she filed the suit after her administrative complaint became stalled before the Equal Employment Opportunity Commission. [Jennings. FLORIDA TODAY, p. 3A, Nov. 14, 1985.]

**November 14:** Shuttle astronauts continue their countdown demonstration test aboard Atlantis today while workers move VIP bleachers to the press site parking lot. "The reason we're moving the site is that you cannot see launches from Launch Pad B from the existing VIP site on Schwartz Road," Darlene Hunt, KSC protocol officer, said.

Space shuttles have been launched from Pad A since the program began in April 1981. The Schwartz Road VIP site, which has accommodated up to 4,000 special guests of NASA, its contractors or customers, is about four miles from Pad A. The new press site is about a mile closer, near the Launch Control Center and the Vehicle Assembly Building, but it will only handle about 1,200 people, Hunt said. She said officials who oversee the KSC's VIP program and their hosts will hold a dry run - where to park the buses, where the restrooms are - next week. "All the guests that attend the launches there will be bused in - we'll be using the TW Services double-deckers," Hunt said. [Lunner. FLORIDA TODAY, p. 6A, Nov. 14, 1985.]

<> The crew of the Atlantis successfully completed its countdown rehearsal and pronounced themselves ready to undertake mission 61-B on Nov. 26 at 7:29 p.m. The seven member crew includes Commander Brewster Shaw - an Air Force lieutenant colonel - and Marine lieutenant colonel Bryan O'Connor, the pilot, Army Lt. Col. Sherwood Spring, mission specialist, Air Force Major Jerry Ross, mission specialist, NASA astronaut Mary Cleave, mission specialist, Charles Walker, payload specialist and Rudolfo Neri, a payload specialist from Mexico.

"I think the biggest thing we're going to learn is what man can and can't do as far as assembling space structures," said Jerry Ross. "We're hoping to get some kind of time-motion information to provide data to the designers of the space station to give them additional options when they go about designing the space station and actually start building it." [Lunner. FLORIDA TODAY, p. 7A, Nov. 15, 1985.]

**November 18:** Enterprise, NASA's prototype space shuttle, left Kennedy Space Center at 11:46 a.m. and arrived in Washington, D.C., about 4 p.m. atop the special Boeing 747 designed to ferry shuttles around the country. Enterprise's flight plan called for it to be flown as far north as Baltimore, then circle the Capital Beltway and the evening rush hour before landing at Dulles International Airport. [Lunner. FLORIDA TODAY, p. 3A, Nov. 19, 1985.]

**November 23:** The seven-member crew of Atlantis arrived at Kennedy Space Center to prepare for a mission that includes construction work in zero-gravity. "Everything looks real good right now," said KSC spokesman Jim Ball of the prospects for an on-time launch at 7:29 p.m. Nov. 26. [Herlihy. FLORIDA TODAY, p. 4A, Nov. 24, 1985.]

**November 24:** Atlantis shook off a temporary flight postponement by borrowing a part from the space shuttle Discovery and is back on schedule for its 7:29 p.m. liftoff Nov. 26. A leaky valve in the hydraulic system of engine No. 2 was the culprit, officials said. Kennedy Space Center spokesman George Diller said, "We scrubbed the scrub. By virtue of the fact that installation went on schedule and testing went so smoothly, we picked up the countdown at 2 p.m."

Diller said the delay - planned temporarily to have lasted a full day - wouldn't have affected the operation of the mission, because countdown hadn't begun. "It would've been some aggravation, but it wouldn't have been a major slip," he said. [Booth. FLORIDA TODAY, p. 1A, Nov. 25, 1985.]

**November 25:** Failure of a cold flow test in Centaur stage support equipment on Nov. 18 will not be a factor in the shuttle Centaur program schedule, according to Charles D. Gay, director of expendable vehicles operations here. He said the propellant flow milestones will be terminal countdown demonstrations in which liquid hydrogen and liquid oxygen will flow into the Centaur itself. The Nov. 18 test on Launch Pad 36, a modified Atlas Centaur pad, involved pumping liquid oxygen through ground support equipment, through the Centaur integrated support structure (CISS) and through a jumper back to the ground support equipment. ["Centaur Program," AVIATION WEEK & SPACE TECHNOLOGY, p. 22, Nov. 25, 1985.]

<> "Everything is ready to support the mission [STS 61-B]. We are all in a 'go' condition now," said NASA shuttle chief Jesse Moore. Air Force weather officer Lt. Scott Funk predicted scattered clouds, possibly a shower, but probably "a tremendously, clear, beautiful sky with almost a full moon" for Nov. 26's night launch of Atlantis at 7:29 p.m.

Mission managers have nine minutes in the first "window" to launch the 100-ton spacecraft. If they fail to meet that deadline, a second window is available from 8:07 to 8:11 p.m.

The night launch is expected to be visible from South Carolina to Miami. [Lunner. FLORIDA TODAY, p. 1A, Nov. 26, 1985.]

**November 26:** Atlantis [61-B] gave a dazzling fireworks show to Florida and parts of three other states when it climbed into orbit at 7:29 p.m. After burning for two minutes, the shuttle's two rocket boosters dropped toward the ocean; the blast of Atlantis's three main engines could be seen from the launch area for another five minutes when the orbiter was 500 miles downrange.

"It was a nice, smooth ride," said Brewster Shaw, commander of the mission. Nine minutes after launch, Mission Control in Houston reported Atlantis was in a secure orbit about 200 miles above the earth.

The second night launch of 23 shuttle missions was seen as a bright orange dot in Charleston, South Carolina about 300 miles north of Cape Canaveral, and was viewed as a ball with a flickering tail in Miami, about 150 miles south of the Cape.

About 80 small planes, more than eight times the normal number, flew west of the Indian River just outside the restricted air-space to get a bird's-eye view of the launch, said Air Force spokesman Bob Nicholson; no airspace violations were reported. [Fisher. THE ORLANDO SENTINEL, p. A-1, Nov. 27, 1985.]

**November 29:** NASA is planning for a shuttle flight rate that would exceed the current twice-a-month mission goal. The increase may mean using robots to speed between-flight processing, NASA officials confirmed.

"There's an anticipation of a flight rate of more than 24 per year," said Tom Utsman, deputy director of Kennedy Space Center. "A lot of it ties together with what the Department of Defense plans would be on SDI and other things." SDI is the Strategic Defense Initiative program, also known commonly as "Star Wars."

Utsman's comments came in response to questions raised by a \$500,000 efficiency study KSC is funding. An outside firm will spend 10 months looking for "new and better ways of doing business which could reduce shuttle ground operations, manpower and life cycle costs" at KSC and NASA's West Coast launch site, Vandenberg Air Force Base in California. [Lunner. FLORIDA TODAY, p. 1A, Nov. 30, 1985.]

**November 30:** James L. Cox (Titusville, FL), a Lockheed Space Operations worker, suffered minor injuries in a morning accident at Kennedy Space Center. Cox was heading east in a government vehicle on a road rimming Pad 39-A when a swinging road barricade punctured the passenger door, NASA spokesman Hugh Harris said. The barricade went through the vehicle, breaking the back window on the driver's side,

Harris said. Cox was treated for minor injuries at Jess Parrish Memorial Hospital in Titusville and released December 1. ["Lockheed Worker Injured at KSC," FLORIDA TODAY, p. 3A, Dec. 1, 1985.]

## DECEMBER 1985

**December 2:** NASA Administrator James Beggs was one of four men indicted by a federal grand jury looking into charges that General Dynamics executives conspired to cheat the government of \$3.2 million in weapons development fees. Beggs was a vice president of General Dynamics prior to joining NASA in 1981.

The indictments surprised Rep. Bill Nelson (D-Mel., FL), who chairs the subcommittee which oversees NASA's budget. "After all my dealings with Jim Beggs as chairman of the committee, my conclusion is that he is a very honorable man," Nelson said. He was contacted at the Kennedy Space Center where he is training as a crew member for the scheduled Dec. 18 launch of the Columbia. [Lunner. FLORIDA TODAY, P. 1A, Dec. 3, 1985.]

**December 3:** Dress rehearsal for NASA's next shuttle mission - STS 61-C on Dec. 18 - begins today at Kennedy Space Center, only hours after Atlantis is due to land in California. Columbia rolled out to the launch pad early Dec. 2, and its crew arrived throughout the day. The shuttle's cargo, and RCA communications satellite, was installed overnight, and the practice countdown is set to begin at 8:40 p.m. today. The Columbia mission is scheduled to land at KSC on Dec. 23. ["Congressman's Ship Rolls In," FLORIDA TODAY, p. 5A, Dec. 3, 1985.]

<> A new, state-of-the-art logistics support facility at KSC's Launch Complex 39 was formally dedicated at 10 a.m. Taking part in a ribbon-cutting ceremony were KSC Director Richard Smith, Lockheed Space Operations Company President E. Douglas Sargent, and Dulcie Burns, a special staff assistant and NASA liaison for U.S. Rep. Bill Nelson.

The new 324,640-square-foot building houses flight hardware spares and a variety of support equipment as well as office space for approximately 550 NASA and Lockheed employees. It consolidates into one facility logistics functions supporting shuttle launch processing and turnaround activities performed by Lockheed. [Ball. NASA/KSC NEWS RELEASE No. 239-85, Nov. 27, 1985.]

- <> Cmdr. Brewster Shaw guided the 102-ton Atlantis right on the mark to its Edwards Air Force Base, CA, landing at 4:34 p.m. [Mecham. FLORIDA TODAY, p. 1A, Dec. 4, 1985.]
- <> NASA Administrator James Beggs, facing federal charges of defrauding the government while a General Dynamics executive, will take a leave of absence from his \$72,600-a-year post to concentrate on defending himself, sources in Washington, D.C., said. "He wants to devote his time to clearing his name," said one source who declined to be identified. "We expect him to announce his leave of absence [Dec. 4]." Operations at Kennedy Space Center are not expected to be affected by any change in the top NASA job, several KSC observers agreed. [Lunner. FLORIDA TODAY, p. 1A, Dec. 4, 1985.]

**December 4:** The astronaut corps would like more steering tests first, but Columbia will return to Kennedy Space Center at the end of its mission that begins Dec. 18, mission commander Robert "Hoot" Gibson said. "We just went through a very successful test this morning," Gibson said at the end of a mock launch NASA holds before each flight. "Everything at this point looks real good on the 18th."

Gibson made his comments after the seven-member crew of Columbia completed its first dry run countdown, checked out the escape routes from the launch pad and test-drove the tank-like crew rescue vehicle. Gibson told reporters he and his fellow astronauts pressured NASA to retest the new nosewheel steering system that has had one test on the desert lakebed runway at Edwards Air Force Base, CA, but the agency ruled against them.

Now that the decision to land here Dec. 23 has been made, however, only an emergency situation would change the flight plan, Gibson said. "All we need now is decent weather to get us back here," he said, noting if the first landing day is unacceptable, Columbia would stay in orbit an extra day rather than land elsewhere.

The crew includes pilot Charles Bolden; mission specialists Franklin Chang-Diaz, Steven Hawley, George Nelson and Rep. Bill Nelson (D-Mel., FL). [Lunner. FLORIDA TODAY, p. 3A, Dec. 5, 1985.]

**December 5:** NASA Administrator James Beggs, on the first day of a leave of absence, told agency employees via closed-circuit television that federal charges against him "are baseless" and that he expects to be cleared. "There is nothing that I did in the case involved that I would not do again if I had it to do over again," Beggs said. The charges "are outrageous, ridiculous and I feel confident that once this is brought to trial that I'll be completely exonerated of the charges," he said. ["Beggs Takes His Case to Workers," FLORIDA TODAY, p. 1A, Dec. 5, 1985.]

**December 8:** The impact of NASA's Kennedy Space Center on the economy of Florida has been both direct and substantial. Businesses in the state benefited from more than \$810 million in ongoing and new NASA government contracts awarded during fiscal year 1985. According to year-end figures, Kennedy Space Center awarded \$77,595,000 in new contracts and purchases to the Florida business community during FY '85. Nearly \$28 million (\$27,905,000) of that went to off-center firms in Brevard County for services and supplies or equipment. The remaining \$42,790,000 in contracts or direct orders were awarded to firms located elsewhere in Florida. [Shea-King. NASA/KSC NEWS RELEASE No. 233-85, Dec. 8, 1985.]

**December 9:** The forward center segment of the left-hand solid rocket motor to be used on space shuttle mission 51-L is being replaced so that additional analyses can be made. While the booster was being rotated early last month, technicians heard a cracking sound that was traced to a pin from a handling fixture that apparently scraped the segment. The right-hand motor aft center segment also is being replaced because the segments are cast in pairs and are stacked according to the way they are cast. ["Industry Observer," AVIATION WEEK & SPACE TECHNOLOGY, p. 13, Dec. 9, 1985.]

**December 10:** Bob Sieck, shuttle chief at Kennedy Space Center, described his recent tour of Chinese space launch facilities the "trip of a life-time. A lot of it had to do with diplomacy," he said of the 11-day trip that took five KSC executives to the People's Republic of China. The NASA contingent was responding to a PRC trip to KSC earlier this year.



"The next step seems to be an agreement, what they call a protocol, to get on with a more detailed working agreement with their technical people," Sieck told members of the Canaveral Press Club. He told of "sharp, proud and dedicated" Chinese engineers who work in simple but effective facilities in Peking and elsewhere, and of the contrasts to be seen in a country just entering the space age. "We didn't expect to see anything fancy or really high-tech," Sieck said. "Looks were deceiving. You would go into a manufacturing facility or one of their rocket test facilities and externally, you'd say 'Well, this is very old; this doesn't look like it would get the job done.'

"But then as you walked through and looked at things closer, everything was pretty simple, but it was very clean and very tidy and very well-maintained, and for the technology that they have, obviously got the job done. Nothing fancy or frills, or bells or whistles - just basically what it takes to do what they're trying to do, which is launch unmanned vehicles and put satellites into geosynchronous orbit, with an Atlas-Centaur type of technology."

Sieck was joined on the voyage by KSC Director Dick Smith, cargo chief John Conway, director of mechanical and facilities engineering Jim Phillips and chief of staff George English. [Lunner. FLORIDA TODAY, p. 5A, Dec. 11, 1985.]

<> Kennedy Space Center workers John Godke, Russell Vessels, Geoff Bowles, orbiter mechanics, Tom Westcott, quality control, and David Coffman, supervisor, have been recommended for the Lockheed Space Operations Co. commendation award by H.C. Byrd, manager of Launch Pad 39-A operations.

NASA managers had announced a 24-hour delay in the Nov. 26 flight of Atlantis after tests showed a valve in the hydraulics system of the shuttle had malfunctioned. It happened around midnight Nov. 23, said shuttle chief Bob Sieck. The KSC workers named above "got together in the middle of the night and figured out how to fix it, and by the next morning they were saying" 'OK, Management, we're ready to retest this thing.' They totally exceeded our expectations of what the team would be able to do," Sieck said. [Lunner. FLORIDA TODAY, p. 5A, Dec. 11, 1985.]

**December 11:** Spaceport USA appears to be winning an ongoing marketing battle to attract tourists to Brevard County, according to Harry Chambers, general manager of the Kennedy Space Center tourist attraction. While 11,000 fewer people took Spaceport USA's bus tour of the Space Center in 1985 than in 1984, the attraction's gross sales to customers rose 10 percent in 1985, Chambers said. [Rink. FLORIDA TODAY, p. 18C, Dec. 12, 1985.]

**December 15:** The crew of STS 61-C arrived at Kennedy Space Center at 4:30 p.m., following a two-hour flight from Houston. The Columbia's seven-member crew had dinner with their spouses, were briefed on launch preparation and reviewed flight data. "[Rep.] Bill Nelson was buoyant, and the rest of them were jovial," NASA spokesman George Diller said. "They certainly seemed to be in a frame of mind that they were waiting for Wednesday [Dec. 18]."

Nelson, a Melbourne, FL, Democrat and chairman of the House Subcommittee on Space Science and Applications, will grow protein crystals and monitor blood banks during the shuttle mission, Diller said. He will also be a human guinea pig in a project studying biological characteristics in space. Flight crew items were stowed on board late on Dec. 15, before the countdown started at 1 a.m., Dec. 16, officials said. [Booth. FLORIDA TODAY, p. 1A, Dec. 16, 1985.]

**December 17:** Inclement weather and a series of minor, nagging problems caused the launch of Columbia (Mission 61-C) to be postponed one day to 7 a.m., Dec. 19,; that will mean a Christmas Eve landing at KSC at 7:13 a.m. "There was no single big hangup," KSC spokesman Dick Young said about the delay. "There was nothing major. It was nits. But, enough nits can put you behind." Launch technicians missed their original deadline when NASA held them to stringent preparation standards for Columbia, which hasn't flown for two years. "In a sense," Young said, "it's like flying it again for the first time. The message we got was: Make sure it's perfect, no matter how long it takes." [Lunney. FLORIDA TODAY, p. 1A, Dec. 18, 1985.]

**December 19:** Grounded by a faulty "power" steering unit in Columbia, NASA is aiming for Jan. 4 as its next launch date, narrowly missing an opportunity to double last year's launch rate. The shutdown came 14 seconds before Columbia's 61-C mission was to liftoff when an hydraulic power unit

malfunctioned. A turbine had begun spinning nearly 10,000 rpm faster than normal. A computer sensed the problem and automatically stopped the launch.

"It did what it's supposed to do," said Larry Mulloy, head of NASA's rocket booster program at Marshall Space Flight Center in Huntsville, AL. Four teams of experts will be probing the hardware failure to determine the cause. "We have not had, on any of the previous flights or ground tests, this type of problem," Mulloy said. While the orbiter has undergone hundreds of modifications since its last flight, Mulloy said the scrub was not related to any of the \$42 million in new equipment.

Mission commander Robert "Hoot" Gibson told reporters his crew took the last-minute postponement with professional poise. "We were just a little bit surprised when we got the nine-minute recycle signal at about 15 seconds (before liftoff)," Gibson said. "We were waiting for the noise of the main engines at that time.

"We immediately got into the safing procedures to turn the bird back around, getting everything configured to put it in a safe condition," said Gibson. "We were awfully busy at that point so we really didn't have time to reflect on it." The crew, who had been helped aboard Columbia by NASA technicians wearing Santa caps, safely left the cabin about 30 minutes after the 7:54 a.m. abort. Gibson said he will ask his crew to stay in shape during their forced holiday break.

KSC shuttle chief Bob Sieck said the delay is not expected to disrupt NASA's 16-flight schedule for 1986, which the agency has called "A Year for Space Science." [Lunner. FLORIDA TODAY, pp. 1A & 2A, Dec. 20, 1985.]

<> A host of United Nations ambassadors and U.S. congressional representatives joined several thousand people who braved chilly weather to await the launch of Columbia whose 61-C mission was scrubbed just seconds before liftoff.

"I wanted to give them a taste of what our space program is all about," said Vernon Walters, U.S. Ambassador to the United Nations, who brought with him ambassadors from 20 countries, including China and the Soviet Union. But I also wanted to show them how open we are - that we are not

ashamed for it to be known that the countdown stopped 14 seconds before launch. We have had so many successes that this is not a major matter," Walters said.

Among those attending was Rep. Don Fuqua (D-Ala.), chairman of the House Committee on Science and Technology. Fuqua was critical of the shuttle flight of U.S. Senator Jake Garn (R-Utah) in April.

"I still have a question about people in public office - non-astronauts - going on shuttle flights. There are a lot of highly trained people who would like to have those seats," Fuqua said. But Senator Paul Trible (R-VA) defended the flight of Rep. Bill Nelson (D-Melbourne, FL), "If we are going to send painters, teachers and journalists into space, we ought to send certain people from Congress who are directly involved in making decisions about the space program." [Williams. FLORIDA TODAY, p. 7A, Dec. 20, 1985.]

**December 20:** Launch pad technicians expected to have replaced and tested a faulty shuttle part that scrubbed the Dec. 18 launch, Kennedy Space Center officials said. "There have been no hangups so far, no problems," said KSC spokeswoman Debbie Marth. "Everything's been going according to plan." NASA rescheduled its next launch attempt for Jan. 4, 1986. [Lunner. FLORIDA TODAY, p. 1A, Dec. 21, 1985.]

<> Milorad "Mike" Konjevich, 58, of Cocoa Beach, FL, a NASA administrator for 23 years, died at Cape Canaveral Hospital in Cocoa Beach. He had been active in the Space and Range Missile Pioneers Institute and a charter member of the National Space Institute and the NASA/Kennedy Space Center Management Assn.

Konjevich was a member of the Armed Forces Defense Preparedness Assn., the Patrick Air Force Base Officers Club, the Board of Directors of the TESLA Members Society, the Ancient Free and Accepted Masons Lodge No. 42, the St. George's Greek Orthodox Church in Joliet, IL (where he was buried Dec. 24), the St. Simon Eastern Orthodox Church in Hollywood, FL, and the Serbian National Federal Lodge No. 47 of Joliet. He was also a strong supporter of the KSC Library Archives.

Survivors include his mother, Marthat Konjevich (Channahon, IL); wife, Joan Konjevich (Cocoa Beach); sons Eric Konjevich (Cocoa Beach) and Lauris Konjevich (Channel View, FL); daughters, Christine Konjevich (San Francisco) and Alexandra Konjevich (Arlington, Texas); brothers, Milos Konjevich (Dallas), Daniel Konjevich (Chicago), John Konjevich (Anchorage, AK), and Peter Konjevich, Sam Konjevich and Don Konjevich (all of Joliet); sisters, Mary Book (Honolulu), Mildred Zaloudek (New Lenox, IL), Sophie Anderson (Joliet) and Natalie Suyenaga (Dallas); and two grandchildren. [FLORIDA TODAY, p. 12A, Dec. 21, 1985.]

- <> Kennedy Space Center awarded Costello Construction (Merritt Island, FL) a \$125,000 contract for the construction of a test slab for the Space Telescope Shipping Container. Under the terms of the contract, Costello is responsible for construction of a concrete test slab with a series of three-foot-deep anchors used to hold the test equipment in place.

The Space Telescope Shipping Container will be proof-loaded to verify the container's structure. The dummy payload will simulate the weight of the actual Hubble Space Telescope to be held in the shipping container. The telescope is currently scheduled for launch no earlier than Aug. 18, 1986; it will have a launch weight of about 25,500 pounds. The new observatory will have an eight-foot diameter mirror and be able to see celestial objects 50 times dimmer than anything now seen. The overall length of the HST will be 43.5 feet and its diameter will be 14 feet. [Marth. NASA/KSC NEWS RELEASE No. 247-85, Dec. 20, 1985.]

- <> Kennedy Space Center awarded Ebon Research Systems (Titusville, FL) a contract extension for the continuation of safety and reliability engineering services at KSC. The cost-plus-award-fee contract is valued at \$995,330, bringing the total value of the original contract to \$2,560,026; the extension covers the period from Sept. 30, 1985, through Sept. 29, 1986.

Under the terms of the extension, Ebon will continue providing engineering and support services in the areas of safety, reliability, and quality assurance activities for the STS, payload/ground service equipment design and ground processing activities. [Marth. NASA/KSC NEWS RELEASE No. 243-85, Dec. 20, 1985.]

<> Kennedy Space Center awarded Computer Sciences Corporation, Applied Technology Division (KSC, FL) a contract extension for the continuation of communications, telemetry, and instrumentation support services. The cost-plus-award-fee contract is valued at \$4,384,235, bringing the total value of the original contract to \$10,033,687; the extension covers the period from Oct. 1, 1985, through Sept. 30, 1986. Under the terms of the contract extension, CSC will provide support in the areas of communications, measurements, telemetrics, instrumentation of launch control firing rooms, and reliability and quality assurance programs. [Marth. NASA/KSC NEWS RELEASE No. 245-85, Dec. 20, 1985.]

**December 21:** The second Centaur upper stage for launch of planetary missions from the space shuttle arrived at Kennedy Space Center about a month later than planned, but the Centaur project is back on schedule, the NASA shuttle Centaur program manager said. Problems with valving on the CISS (Centaur integrated support structure) that routes cryogenic fuel to Centaur have held up delivery of the second Centaur, but these problems have been resolved. ["Centaur Delivery," AVIATION WEEK & SPACE TECHNOLOGY, p. 26, Jan. 6, 1986.]

**December 23:** The launch of the Columbia (STS 61-C) was delayed two days, until Jan. 6, to give the seven crew members more training time, NASA officials said. The delay, third in a week, also means the launch of Challenger (STS 51-L) will slip one day to Jan. 23. Columbia's crew, initially scheduled to begin its mission Dec. 18, will need to brush up on training in shuttle simulators, said NASA spokeswoman Sarah Keegan in Washington. This will set back training time for Challenger's crew, which also needs to practice on the simulators at JSC in Houston, Keegan said. [Fisher. THE ORLANDO SENTINEL, p. D-1, Dec. 24, 1985.]

**December 24:** Lockheed employees who were scheduled to be off for the holidays will instead be summoned to work after Christmas to fix a faulty structure that services the Challenger, said NASA spokesman George Diller. A rotating service structure that wraps around the orbiter is not forming a perfect seal between itself and Challenger, and if not repaired could contaminate sensitive equipment in the payload bay, Diller said.

"As it stands now, we do not have contaminated air," Diller said. "We do have air that does not meet our standards. The payload guys are having heartburn about the situation." Repairs should be completed by Jan. 1, Diller said, and Challenger's payload doors will remain closed until Jan. 4, when a satellite designed to increase the amount of time a shuttle can communicate with ground stations will be loaded into the cargo bay. [Lafferty. FLORIDA TODAY, p. 1A, Dec. 25, 1985.]

**December 25:** Kennedy Space Center technicians monitored the launch pad temperature of Columbia and Challenger to avoid equipment-damaging freezes, spokesman Dick Young said. Meanwhile, a "hot-fire" test Dec. 24 of a hydraulic power unit aboard a solid rocket booster on Columbia that foiled last week's launch was A-OK, Young said. If forecasts for extremely low temperatures prove accurate, workers will drain water stored at the pads for drinking fountains, showers, eyewashes and fire extinguishers, Young said. "The water will be drained back to its source and will be easily accessible, so we'll still be able to fight fires," he said. Unlike launch pads, shuttles are freeze proof because heated air is constantly circulated through them, he added. [Harrison. FLORIDA TODAY, P. 1A, Dec. 26, 1985.]

**December 26:** The launch pads at Kennedy Space Center were nearly deserted as most NASA work shut down for the holidays. "We're essentially in a baby sitting mode," said KSC spokesman Jim Ball, one of a handful of staffers at the space center the day after Christmas. "There is a minimum crew out here."

"No work on the vehicles is under way and none is planned," echoed Ball's colleague George Diller. ["Holidays Shut Down Space Center Work," FLORIDA TODAY, p. 3A, Dec. 27, 1985.]

**December 30:** Administrative NASA workers returned to the job, but space shuttle processing and launch teams continue their holiday break until after New Year's. "They filled the headquarters building up today," Kennedy Space Center spokesman George Diller said. "Otherwise, there's...a handful of people out here...."

Immediately following Columbia's liftoff, Challenger's dress rehearsal countdown will begin. Challenger's 51-L crew, including NASA teacher-in-space Christa McAuliffe, will practice launch procedures, culminating in a mock liftoff the day after Columbia leaves, Diller said. [Lunner. FLORIDA TODAY, p. 7A, Dec. 31, 1985.]



## Appendix A

### NASA Space Shuttle Launches for 1985

<u>Flight</u>	<u>Crew</u>	<u>Launch Date</u>	<u>Mission</u>
51-C Discovery	Mattingly-C, Shriver-P, Buchli-MS, Onizuka-MS Payton-PS	Jan. 24	DOD
51-D Discovery	Bobko-C, Williams-P Seddon-MS, Griggs-MS Hoffman-MS, Walker-MS Garn-PS	Apr. 12	Anik C-1 LEASAT-3
51-B Challenger	Overmyer-C, Gregory-P Lind-MS, Thagard-MS, Thornton-MS, van den Berg-PS, Wang-PS	Apr. 29	Spacelab 3
51-G Discovery	Brandenstein-C, Creighton-P, Lucid-MS, Nagel-MS, Fabian-MS, Baudry-PS, Al-Saud-PS	Jun. 17	Morelos-1 Arabsat 1-B Telstar 3-D Spartan 1
51-F Challenger	Fullerton-C, Bridges-P Musgrave-MS, England-MS, Henize-MS, Acton-PS, Bartoe-PS	Jul. 29	Spacelab 2
51-I Discovery	Engle-C, Covey-P van Hoften-MS, Lounge-MS, Fisher-MS	Aug. 27	AUSSAT-1 ASC-1 LEASAT-4
51-J Atlantis	Bobko-C, Grabe-P Stewart-MS, Hilmers-MS, Pailes-PS	Oct. 3	DOD
61-A Challenger	Hartsfield-C, Nagel-P Buchli-MS, Bluford-MS, Dunbar-MS, Furrer-PS, Messerschmid-PS, Ockels-PS	Oct. 30	German Spacelab
61-B Atlantis	Shaw-C, O'Connor-P, Cleave-MS, Spring-MS, Ross-MS, Neri-PS, Walker-PS	Nov. 26	Morelos-B AUSSAT-2 Satcom Ku-2

C=Commander, P=Pilot, MS=Mission Specialist, PS=Payload Specialist

[STS Mission Summary Chart, updated through most recent mission (61-B)]

Appendix B

NASA Expendable Launches for 1985

<u>Launch Date</u>	<u>Payload</u>	<u>Launch Vehicle</u>	<u>Launch Complex</u>
March 19	INTELSAT V-A	Atlas-Centaur	36B
June 29	INTELSAT V-A	Atlas-Centaur	36B
September 26	INTELSAT V-A	Atlas-Centaur	36B

[Joe Green, PA-EAB. SPACEPORT NEWS, p.3, Dec. 20, 1985.]