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July 1: NASA's John F. Kennedy Space Center has awarded a $2,756,600 contract to EMI Technology, Inc., Stamford, Connecticut, for equipment that will be used during prelaunch checkout of experiments aboard the Spacelab orbiting workshop.

Under the terms of the fixed price contract, EMI Technology will fabricate, test and install 13 high density recorders and supporting equipment. The equipment will be used to record the large volume of raw test data produced during pre-launch checkout of Spacelab experiments.

Four of the high density recorders will be installed at the Goddard Space Flight Center in Greenbelt, Maryland. Five of the units will be installed at Houston's Johnson Space Center, and the four remaining recorders will be located here.

The contract contains an option provision to purchase five additional units which would also be installed at the Kennedy Space Center in the facility where the Spacelab will be assembled and checked out prior to launch.

The contract extends from June 27, 1980, to February 11, 1982. Work will be performed in Stamford, Connecticut, at the various NASA Centers previously mentioned, and in Somerset, England, under a subcontract to SE Labs, Inc.

Other companies bidding on the contract were: Ampex Corporation, Redwood City, California; and Martin Marietta Corporation, Denver Colorado. (NASA News Release No. 118-80, July 1, 1980)

o NASA's John F. Kennedy Space Center has awarded a $77,270 contract to Talbert Manufacturing Inc., Rensselaer, Indiana, to supply a 50-ton trailer to be used in hauling Space Shuttle solid rocket booster components. (NASA News Release No. 121-80, July 1, 1980)

o House/Senate conferees have agreed on a $5,587,904,000 FY '81 authorization for NASA, $70.25 million above the amount requested by the President in his revised request in March. The bill is $148.75 million below the President's original January request.

As approved, the authorization is $34.25 million less than the amount originally voted by the House, and $18.05 million above the amount initially approved by the Senate.

The compromise boosts NASA's R&D authorization by $72.25 million to $4,436,750,000; reduces Construction by $2 million to $118 million, and endorses the $1,033,154,000 requested for Research & Program Management.

The bill includes all of the $1.873 billion requested for development of the Space Shuttle.

Conferees decided as follows on the points of contention:

* Directed NASA to procure long lead materials necessary to maintain the most efficient production for a fifth Shuttle Orbiter within current Shuttle funds.

* Added $13.8 million for Advanced Programs to be used for the Solar Electric Propulsion System and other programs.

* Cut $7 million from the Spacelab.

* Restored the $6.1 million cut in the revised budget for research and analysis under Physics and Astronomy. [House effort to restore $18 million for Spacelab payloads went by the boards.]

* Added $6.1 million to the revised request for Life Sciences.

* Added $22 million to the revised request for Space Applications, including $9.3 million for multilinear array technology and for definition studies of an operational Land Observing Satellite System including private sector involvement. [Funds authorized include $15.8 million for resource observations ARDA, $52.9 million for environmental observations ARDDA, and $11.5 million for technology transfer.]

* Added $500,000 for Technology Utilization.

* Added $15.5 million for Aeronautical Research & Technology, with increases allocated for aircraft technology for future fuels, conservation of scarce aerospace materials, variable cycle engine high-temperature validation, high performance flight experiments, high speed aircraft structure technology, and general aviation and commuter propeller technology.

* Added $5 million under Space Research & Technology for advanced chemical propulsion technology and space platform and large space structure technologies.

* Added $750,000 for Tracking & Data Acquisition.

* Cut $2 million from the Plum Brook reactor facility. (Defense Daily, Vol. III, No. 1, Tuesday, July 1, 1980, p 2)

o The Senate approved a $23 billion FY '80 supplemental appropriations bill including $285 million for NASA to pay for increasing costs of the Space Shuttle. The House has approved a supplemental with the full $300 million requested by NASA. The Senate said the $15 million could be taken from the $100 million "reserve" in the Shuttle supplemental. Quick passage of the bill is being sought on the Hill, which conferees expected to meet today. (Defense Daily, Vol. III, No. 1, Tuesday, July 1, 1980, p 8)

July 2: The Intelsat board of governors has agreed to exercise options for two additional launches of Intelsat V satellites on the European Space Agency's Ariane launch vehicle, which has had one success in its first two test flights. The launches are planned for 1982.

The options for the additional two vehicles were included in Intelsat's historic order for one Ariane vehicle a year and a half ago -- the first time that a non-U.S. launch vehicle had been selected to launch an Intelsat satellite. The organization also ordered two Shuttle launches at that time.

Up until now, the Intelsat V satellites have been launched by the U.S. Atlas-Centaur.

The European Space Agency says that it now has firm orders for 13 Ariane launches and reservations for 10 others. (Defense Daily, Vol. III, No. 2, Wednesday, July 2, 1980, p 14)

July 3: Gerald D. Griffin, Deputy Director of the Kennedy Space Center, FL, has been named Acting Associate Administrator for External Relations at NASA Headquarters, effective July 7.

Mr. Griffin's prime responsibility in his new position will be the policy level management, direction and coordination of the NASA Office of Public Affairs, International Affairs, DOD Affairs, Government/Industry Affairs and University Affairs. He will report to the NASA Administrator. Mr. Griffin's day-to-day responsibilities at KSC will be delegated temporarily to several senior managers at the Center. (John F. Kennedy Space Center, NASA Announcement, July 3, 1980)

July 4: It wasn't the Saturn V or the hulking blockhouses which line the beach that the Tuckers and Redditts came to see when they toured KSC and the Cape last month.

As much heritage and history as those sights have, the 38 members of the two-family clan came to see the ghosts of structures which hold even more heritage and history for them. They came from all of Florida to walk the land and see the sights that some of them had called home.

Shirley Tucker, oldest living member of the clan, was 10-years-old when he helped his father, William Andrew Tucker II, swim their oxen and cart across from the mainland in 1922. The Tuckers' first shelter, for parents and six children, was a lean-to where the VAB now stands.

Even that was not a first Cape landing for the family, for they trace their ancestry back to Captain M. O. Burnham, first keeper of the Cape Lighthouse.

After the lean-to, W. A., as they called their father, built a 10-foot by 14-foot house where three more daughters were born. The first of these was Beulah Jean.

The night she was born, her father kept shouting "Scat!" to make the awakened children in the attic believe that the cries they heard were cats fighting.

Years later, Beulah Jean would marry Willard Redditt to begin the second family in the close-knit clan.

The second Tucker daughter born on the Cape was Canaveral Rose, a prolific song writer inspired by the beauty of the land for which she was named. On their recent tour, Shirley, Beulah Jean and Canaveral Rose all shared their memories with the rest of the clan.

Throughout the Cape, they would point to a tall clump of trees and tell the tale of who had planted them to surround a home or store. They pointed out where the first rutted sand roads had been and which road was the first to get a shell "paving." They told of the schools they once walked to, the stores where they shopped and the post office whose mail boat was a biweekly tie to the mainland.

As they toured, three generations of the clan heard tales handed down from other ancestors to the elder Tuckers. They heard of the old pier which served as the first port to trade ships and how some ships foundered on shoals after mistaking the false cape for the real cape farther south.

They heard tales of slave ships in the surf slipping their human cargo into the oak hammocks to be sold elsewhere.

They heard of the hotel which had stood at the end of the pier, the original lighthouse and how mule teams had moved it on specially-laid tracks.

Shirley recalled the times he hunted deer and the time a bear with cubs had nearly hunted him while he walked to school.

There were stories about the lumber ship which foundered, and whose cargo provided the basis for the second Tucker house, about the hurricane which nearly washed the home away, and the mosquitoes which nearly carried the family away.

The clan listened to Shirley tell of the smudge pots kept burning in the house at night to repel mosquitoes, and they laughed when he said that the smoke was so thick in the attic where he slept that he has never felt the urge to use tobacco.
He told of his life on the Cape, from 1922 until 1952, when the government finally made him leave his own home, located between what would soon become Complexes 12 and 14. They heard Beulah Jean ruefully tell about the four acres she was forced to sell to the government for a little over $100.

But mostly the clan heard stories about the lighthouse. From the tales handed down from Capt. Burnham to Shirley's memories of climbing the many stairs whenever he could, they listened. They heard Canaveral Rose sing one of her songs about the lighthouse. One of its lyrics went, "Lighthouse, light the way to my used to be."

And that was what the tour was about. The graves; the gardens, once planted and now wild; the Indian mounds; the tales of Shirley's work as a heavy equipment operator on the Cape until his 1975 retirement; all were like the beams of the lighthouse. From their used-to-be at the tip of the Cape they have spun outward, growing. (Spaceport News, Vol. 19, No. 14, July 4, 1980, p 1 & 4)

o A third shipment of mechanical ground support equipment for Spacelab has arrived at KSC as preparations are being made to receive a full-scale engineering model of the orbital laboratory later this year.

The equipment - which includes slings, pallet covers and a specialized trolley - recently arrived by barge following a two-week ocean journey from Bremen, Germany.

Remaining ground support equipment and the engineering model of Spacelab are expected to be delivered by C-5A cargo planes in mid-November and mid-December.

About 30 major pieces of mechanical ground support equipment will be used to transport and process Spacelab flight components in the High and Low Bay area of the O&C, where the laboratory will be integrated before installation in the Space Shuttle at the OPF.

A fully loaded C-5A is scheduled to deliver the first half of the engineering model, three Spacelab pallets and additional ground support equipment on Nov. 15, according to John Link, a NASA Spacelab mechanical engineer.

Most of the mechanical ground support equipment was manufactured in Spain by Sener, a sub-contractor to ERNO, the prime Spacelab contractor. (Spaceport News, Vol. 19, No. 14, July 4, 1980, p 3)

July 7: Martin Marietta has received $272.9 million in Marshall Space Flight Center contracts to carry production of external tanks for the space shuttle into mid-1984.

A $230-million contract covers Martin's work at the National Aeronautics and Space Administration's Michoud, La., assembly facility on seven full external tanks. The funding also covers long-lead items for five more tanks and raw materials for 19 additional tanks.

Martin's earlier external tank contract covered nine tanks, three for development and test and six for the first six space shuttle missions.

In addition to the production contract, Martin has a $42.9-million contract amendment to its design and development contract to cover weight reductions on external tanks to be delivered starting in mid-1982.

The lightweight tanks will weigh about 6,000 lbs. less than initial flight tanks, increasing shuttle payload performance. (Aviation Week & Space Technology, Vol. 113, No. 1, p 25)

- Walter R. Dornberger, 84, wartime chief of Germany's guided-missile program and postwar chief scientist and vice president of the then Bell Aerosystems Co., died June 26 during a visit to his homeland. Born in Giessen, Hesse, he began testing solid-fuel rockets in 1930 and, as a general, headed the V-2 rocket base at Peenemunde, now part of East Germany. He came to Wright-Patterson AFB, Ohio, with the late Wernher von Braun and a group of rocket engineers after World War 2. (Aviation Week & Space Technology, Vol. 113, No. 1, p 25)

- Ten-year effort to define a mission to a comet will near culmination July 9 in Paris when the European Space Agency's science program committee receives a formal proposal for a European/U.S. spacecraft to intercept Halley's Comet.

ESA executives will encourage the committee to decide specifically July 9 to make the Halley flyby an ESA new start using a European GEOS spacecraft design.

No matter what decisions are made, they will affect a U.S. planetary flight program in the 1980s that is focused on Venus and the comets, but with far fewer missions than those that provided such spectacular planetary discoveries during the 1970s.

"In the face of this, we are alarmed by the apparent near-term prospects for continuation of a vigorous program of planetary science," the National Research Council's Committee on Planetary and Lunar Exploration said in a new report. "The pace of planetary new starts has slowed to a rate totally inconsistent with achieving recommended objectives....The level of initiative is not responsible to the stated national commitment to leadership in space science as set forth in the National Aeronautics and Space Act as reiterated in 1978 by the President of the United States."

The realities of funding and launch windows invariably force planetary mission tradeoffs. In this regard, a major watershed occurred in late 1979 when the Carter Administration killed NASA's Fiscal 1981 request for development of solar electric propulsion, a move that in turn killed a planned U.S./European flyby of Halley's Comet and a rendezvous with the Comet Tempel 2 on the same mission. As a result of that decision, the lead for a Halley's Comet flyby belongs to ESA and the important (now separate) NASA comet rendezvous will be paced by development of a solar electric stage, not vice versa. If ESA rejects the Halley flyby, an unlikely prospect, NASA would be forced into rethinking planetary priorities for the 1980s.

NASA's number one planetary priority is the Venus orbiting imaging radar (VOIR) mission to be proposed as a Fiscal 1982 new start. The mission has the potential for making the kind of discoveries at Venus that Mariner 9 made at Mars. These changed the course of planetary theory, totally reversing scientific "findings" made before Mariner 9 on the nature of the planet. (Aviation Week & Space Technology, Vol. 113, No. 1, p 38)

- The House, on a vote of 384-21, passed the $5.588 billion FY '81 authorization for NASA recommended by Conference Committee. The bill is $70 million above the President's revised request. (Defense Daily, Vol. III, No. 3, Monday, July 7, 1980, p 19)

- House/Senate conferees agreed on a $285 million supplemental for NASA in the omnibus FY '80 supplemental appropriations bill, and the House and Senate were working to pass the bill Wednesday. NASA had requested $300 million, but the Senate Appropriations Committee voted to cut $15 million because NASA had not identified full use of the $100 million in "reserve" funds in the request. The supplemental funds have been urgently requested by the agency by June 30 in order to prevent a cutback of work on the Shuttle. (Defense Daily, Vol. III, No. 3, Monday, July 7, 1980, p 23)

- The National Society of the Daughters of the American Revolution, Palm Beach Chapter, will recognize the Kennedy Space Center for past and future achievements in space at a ceremony to be held July 16, the 11th Anniversary of the launch of Apollo 11, the mission which landed the first men on the Moon.

Nationally, the DAR has recognized about 2,500 places as historical sites. A plaque will be presented to the Kennedy Space Center which reads: "To the Kennedy Space Center for outstanding achievement to mankind and to commemorate the launch site of man's first flight to the Moon - July 16,

1969 - and the United States of America's first operational Spaceport." Charles T. Hollinshead, director of Public Affairs at KSC, will accept the plaque, which will be permanently erected at the Visitors Information Center. (NASA News Release No. 122-80, July 7, 1980)

July 8: Congress on July 2 approved a $16.9 billion FY '80 emergency supplemental appropriations bill which includes $285 million for NASA to maintain the Space Shuttle on its current schedule. With government printers off for the July 4 holiday, the bill is not expected to be delivered to the White House before Wednesday. The White House noted that the President will have ten days, excluding Sundays, to take action on the bill. (Defense Daily, Vol. III, No. 4, Tuesday, July 8, 1980, p 27)

o Depending on the results of the failure analysis of the second test flight of the Ariane launch vehicle, the third flight test of the vehicle may be slipped by 1-3 months from the planned November date, according to the European Space Agency.

"This means that the fourth [and final test] launch should be by the end of the first half of 1981 and enable the launcher to be declared qualified in time for the first operational launches," ESA said. First operational flight had been planned for April 1981, carrying ESA's Marecs and Sirio 2 payloads.

The agency said that the possible cause of the Ariane LO2 engine failure has been narrowed to three possibilities: 1) the presence of a foreign body in the injector [an identification plate was found near the injection orifices after the engine was recovered from the ocean]; 2) interference between the launcher and the ground during lift-off [possibly caused by the exhaust-jet deflector located beneath the launcher]; and 3) engine start-up problems [combustion-pressure build-up was slightly abnormal but has not yet been linked to the failure sequence]. (Defense Daily, Vol. III, No. 4, Tuesday, July 8, 1980, p 28)

July 9: Scientists studying data from the Marshall Center's second High Energy Astronomy Observatory have confirmed the emission of X-rays from Jupiter. The giant planet thus joins Earth as the only planets known to produce X-rays.

The X-ray emission was confirmed by a team of scientists led by Dr. Albert Metzger of the Jet Propulsion Laboratory. The group's findings were reported by Metzger at a recent meeting of the American Astronomical Society at the University of Maryland. (Marshall Star, Vol. 20, No. 43, July 9, 1980, p 1)

o Dr. William R. Lucas, director, received the following note of congratulations on the Marshall Center's 20th anniversary from Richard G. Smith, director of Kennedy Space Center and former deputy director here:

"On behalf of all of MSFC's friends at KSC, I would like to express our congratulations on twenty years as a NASA Center. The next twenty should be as outstanding as the first. KSC looks forward to continuing our excellent relationship. Best Wishes, Dick Smith.

P.S. Sorry I am not there to share the cake." (Marshall Star, Vol. 20, No. 43, July 9, 1980, p 2)

o Two of the three Space Shuttle Main Engines retested in June at National Space Technology Laboratories have been shipped back to the Kennedy Space Center. The third is slated for shipment about July 25.

Shipped June 23 was number 2005, and number 2007 was sent out Monday. Remaining at NSTL is number 2006.

The three engines, destined to power the orbiter Columbia on its first flight, were tested last year. Although their flight readiness was demonstrated then, NASA felt it advisable to retest them after several modifications were made. (Marshall Star, Vol. 20, No. 43, July 9, 1980, p 2)

o NASA and the European Space Agency (ESA) announced Monday that two European scientists have entered NASA's Mission Specialist training program at the Johnson Space Center.

NASA agreed to train the European scientists nominated by ESA in recognition of the substantial contribution ESA is making to the Space Transportation System by funding development of Spacelab. ESA will reimburse NASA for the costs of training the two European scientists.

The two European nominees have undergone a screening and selection process similar to that of U.S. applicants. They enter the mission specialist training program with the same commitment as candidates selected by NASA, that is, to undergo the full training in preparation for possible duty as mission specialists utilizing the Space Transportation System.

The two European nominees selected for training are: Claude Nicollier, 33, Swiss, an astronomer formerly at the European Space Technology Center (ESTEC), Noordwijk, Netherlands; and Wubbo Ockels, 31, Dutch, a physicist formerly with Groenigen University, Netherlands.

Both Nicollier and Ockels are now ESA employees and are Spacelab 1 payload specialist candidates. The opportunity for mission specialist training arose when additional time became available for preparing for the Spacelab 1 mission currently scheduled for launch in May 1983. (Marshall Star, Vol. 20, No. 43, July 9, 1980, p 4)

July 10: Three times in 24 hours Kennedy Space Center test operators tried to simulate a flight of the spaceship Columbia into near space. And each time, the test was scrubbed.

Two of the Columbia's computers failed Tuesday afternoon, canceling a simulated ascent into orbit. After the computers were working once again, a midnight flight was planned for standby astronauts Joe Engle and Richard Truly.

But five seconds before midnight, those monitoring the test noticed a low voltage signal in the circuit designed to ignite the Shuttle's two rocket boosters. The weak signal resulted in an automatic shutdown, just as it would have in a real launch.

The test was restarted Wednesday morning, and the countdown again reached T minus five seconds. The signal to ignite the rocket boosters came through without a hitch, but the signal to ignite the Columbia's three engines did not arrive.

When the signal from the ground failed, the countdown was automatically stopped. NASA officials said test operators are still trying to determine what caused the problems.

The astronauts again tried to ascend at about 11 p.m. Wednesday. One of the computers failed, however, and test operators decided to recycle the test for 2 a.m. today.

Officials were unable to say when a planned simulation of a flight out of orbit will begin.

Robert Crippen and John Young, the crew for the Shuttle's first flight, are scheduled to take the controls for the descent. (TODAY, Thursday, July 10, 1980)

- The 1980 Global Telecommunications Traffic Meeting of Intelsat, designed to evalute future demand for satellite communications, opened in Washington, D.C., Tuesday and will run until Monday.

The meeting, which is being attended by more than 80 of the 104 member countries of Intelsat, will collect data on the global satellite communications requirements of all users of the Intelsat system and develop short, medium and long-term demand forecasts. Intelsat notes that it is currently carrying about two-thirds of the world's international transoceanic telecommunications and that demand for its services is increasing at a rate of 20-25 percent a year.

The organization plans to launch nine Intelsat V satcoms in the next two years, to be followed by a number of Intelsat V-A's and Intelsat VI satellites in the remainder of the decade. The demand forecasts will be used in determining the number of satellites and launch schedules. (Defense Daily, Vol. III, No. 6, Thursday, July 10, 1980, p 40)

- The White House announced Tuesday that President Carter has signed the $16.9 billion FY '80 supplemental appropriations bill, which includes $285 million for the Space Shuttle.

The bill also includes $29.5 million for Indian Ocean/Diego Garcia facility design and construction, $42 million below the amount requested. Congress wants a report on facility concept plans by Feb 1. The $29.5 million will be taken from new appropriations ($9.5 million), NATO Infrastructure Program ($5 million), the High Energy Laser Facility ($3 million) and the Culebra Weapons Range ($12 million). (Defense Daily, Vol. III, No. 6, Thursday, July 10, 1980, p 40)

July 11: In a Kennedy Space Center simulation of a flight into orbit, the Space Shuttle finally got off the ground.

At 2 a.m. Thursday, after an abortive attempt Wednesday night, the electronic signals came through to light the main engines, to fire the Shuttle's solid rocket boosters and to sever the bolts which hold the Shuttle to its pad.

Once the launch sequence got going, the systems performed as planned, a NASA spokesman said.

"It went well, and we're happy with it. There were no major problems," he said.

The Columbia reached "orbit" on schedule, and standby astronauts Joe Engle and Richard Truly simulated a number of in-orbit operations for about two hours, including testing the antennas, the star tracker and the orbital rockets.

But the astronauts and test operators left the Shuttle hanging Thursday.

Astronauts Robert Crippen and John Young, the crew that will fly the Shuttle for the first time, are scheduled to bring the Columbia back out of orbit at 3 a.m. today. They will go into the cockpit of the Columbia at 1 a.m.

Thursday's successful simulation of an ascent was the fifth try for the KSC launch team. Computer problems were largely responsible for the difficulties, a spokesman said.

The computer problems were with the simulated program and the test process rather than with the actual flight hardware. The problems probably would not have been encountered had this been an actual flight, the NASA spokesman said. (TODAY, Friday, July 11, 1980)

o Astronauts John Young and Robert Crippen successfully simulated a landing of the Spaceship Columbia early Friday at Kennedy Space Center.

The astronauts began simulating landing operations at 3 a.m. and touched down at 4:01 a.m. The countdown and descent from orbit went smoothly and as scheduled.

A simulated flight earlier in the week did not go as smoothly. A successful ascent into orbit Thursday was the fifth time the KSC launch team had attempted the simulation.

The operation, called the Orbiter Integrated Test, was designed to test the Orbiter's mechanical, electrical and hydraulic systems. Originally, the test operators hoped to check out all of the Columbia's systems to see how they operated together. But the Columbia's engines are scattered around the country after being sent to Bay St. Louis, Miss. for retesting, and another integrated test is likely in mid-August. (TODAY, Friday, July 11, 1980)

July 13: Wednesday marks the 11th anniversary of Apollo 11's historic lift-off toward the moon, and the Apollo 11 Commemoration Association plans ceremonies at Kennedy Space Center. (TODAY, Sunday, July 13, 1980)

o A test firing of the Space Shuttle's main propulsion system was cut short Saturday because of a minor fire, a spokeswoman at the National Space Technology Laboratories said.

The three-engine cluster was shut down after 105 seconds of a scheduled 542-second test, officials said.

Sensors indicated there may have been a hydrogen leak in the rear of the mock-up containing the engines, which are identical to those to be used on the Space Shuttle Columbia, which is at Kennedy Space Center.

Officials said the leak was probably small and that there was no indication of significant damage to the equipment. (TODAY, Sunday, July 13, 1980)

July 14: First space shuttle launch is expected to be delayed from March, 1981, to the following May as the result of a decision to densify an additional 3,400 tiles on the orbiter Columbia at the Kennedy Space Center. The new delay will complicate payload manifesting, possibly result in the need for reprogramming space shuttle funds and could jeopardize support for the space shuttle in Congress. NASA has been examining the possibility of densifying up to an additional 9,000 tiles to increase load margins on the thermal protection system. The work is expected to delay rollout of the spacecraft from the Kennedy Orbiter Processing Facility from September to late November.

In addition to the tile situation, substantial changes are expected in the shuttle orbital maneuvering system pods, and this work has the potential of becoming a pacing item toward first launch. Certification testing has shown the loads on the pods at launch would be above specification for major components such as the pod's propellant tanks. (Aviation Week & Space Technology, Vol. 113, No. 2, p 17)

- Japanese Space Council plans to request funds in Fiscal 1981 for full-scale development of the H-1 launch vehicle, reflecting a delay of a year in the program, which has been under study since 1978. The delay has been caused by the two launch failures in the Japanese comsat program.

  Goal is to develop the vehicle and its associated structures and conduct two test launches for $680-690 million, and to have a unit operational launch cost of $64 million.

  Two versions of the vehicle are under study:

  H-1A, the first model, a three-stage vehicle about 131 ft. long and weighing about 308,000 lb. at launch. It would be 8 ft. longer and 10,400 lb. heavier than the N-2 and be able to launch 7,000 lb. into a 120-mi. orbit, 1,200 lb. into a geostationary orbit or 2,800 lb. on an escape trajectory.

  Second-phase version, as yet undesignated but with improved performances over H-1A. (Aviation Week & Space Technology, Vol. 113, No. 2, p 25)

- European Space Agency last week opted to launch its own flyby of Halley's Comet in mid-1985 rather than cooperate with the National Aeronautics and Space Administration in a joint cometary mission, but it left the door open for NASA to join the ESA venture by the year's end.

  The decision is expected to affect the U.S. planetary flight program in the 1980s that is focused on Venus and the comets, but with far fewer missions than those that provided spectacular discoveries during the 1970s. (Aviation Week & Space Technology, Vol. 113, No. 2, p 27)

July 15: Director R. G. Smith discussed the responsibilities of supervisors for continuing misconduct over a period of time by their employees. He stressed that it was not the responsibility of the supervisors to serve as an employee's conscience, but it was their responsibility to oversee the activities of their employees and to take disciplinary action where necessary. A specific instance of misuse of government vehicles and improper charging of leave was cited. There was a question from Mr. Page concerning the availability of GSA vehicles for persons in carpools working unscheduled overtime and Mr. Lohse stated that his policy letter dated February 10, 1978, provides for having GSA vehicles available for civil service and contractor employees for such purposes. (Staff Notes #26-80 - Center Director's Staff Meeting)

- The Space Shuttle Main Engine, whose flight qualification has been proceeding ahead of schedule, encountered a new setback Saturday, when a three-engine Main Test Article test was aborted 106-seconds into a planned 542-second firing at NSTL. The test, which included 45 seconds at 102 percent of rated thrust, was shut down by a fire indication. Inspection of the cluster found a small hole in the fuel preburner of engine #3 which allowed burning gases to escape into an afterburner heatshield where the engine powerheads are located. Damage was confined to the one engine. An investigation team, headed by Dr. Herman Thomason, deputy director of NASA-Marshall's Science & Engineering Directorate, has been appointed, with testing delayed pending findings of the investigation. (Defense Daily, Vol. III, No. 9, Tuesday, July 15, 1980, p 65)

- The Viking I Orbiter, the last operating Viking satellite, will run out of nitrogen control gas by July 30 and will be turned off by NASA. To prevent the non-sterilized spacecraft from crashing on the Martian surface for about 40 years, it will be boosted to a higher orbit. (Defense Daily, Vol. III, No. 9, Tuesday, July 15, 1980, p 67)

July 18: Another step toward the first launch of the Space Shuttle was taken this week with the successful completion of an Orbiter Integrated Test.

The test, which began on July 7 and was completed Monday, was designed to check the way in which the various systems onboard Columbia operated together with computers, avionics and ground systems. Principal among the systems being tested were the orbiter's secondary propulsion system - the Orbital Maneuvering System - and its Reaction Control System, which will be used for attitude control.

"We consider the Orbiter Integrated Test we have just completed was very successful," said George A. Page, Director of Shuttle Operations. "We still have large amounts of data to evaluate and we believe we have the answers to the problems that caused delays in the ascent portion of the test.

"As in most testing here," Page added, "we learned a lot more about the interfaces between the vehicle and ground checkout equipment."

Participating at various times in the test were Astronauts John Young and Bob Crippen and Joe Engle and Dick Truly, prime and backup crews, respectively, for the first Space Shuttle mission.

Young and Crippen were in Columbia's cabin at 3 a.m. on July 10 for a simulated liftoff and ascent to Earth orbit and again at 3 a.m. on July 11 for the simulation of reentry, descent and landing. (Spaceport News, Vol. 19, No. 15, July 18, 1980, p 1 & 6)

o So many rockets have sizzled their way skyward from NASA and Department of Defense launch complexes on the rim of Brevard County's beaches that some jaded local residents have come to regard a launch as "old hat."

It wasn't always like that. The first of exactly 2,149 launches recorded from KSC and the Cape was conducted 30 years ago next week - on July 24, 1950.

The first rocket to send thunder peeling through Brevard's skies was Bumper 8, a shotgun marriage of a German V-2 with a WAC Corporal as an upper stage.

Bumper was a mere firecracker compared to its modern big brothers, but it proved the feasibility of programming a rocket into a level flight and separating in stages to shed useless weight.

The Bumper project was conducted by the U.S. Army and the General Electric Co. and a sub-project of Project Hermes. (Spaceport News, Vol. 19, No. 15, July 18, 1980, p 2)

o Four officials have been named to top management positions in two major staff areas here, KSC Director Richard Smith announced recently.

In the Design Engineering Directorate, John R. Lyon has been named Director, Project Management. Lyon has been serving as the deputy director of the division since August, 1979, and had also served as Chief, Shuttle Project Engineering Office as well as a manager during the Apollo program.

Replacing Lyon as Deputy Director, Project Management is James R. Rowe. Rowe's previous position was Chief of the Executive Staff, and he had formerly been special assistant to the director of Design Engineering before transferring to the Executive Staff in 1966.

Also within the Design Engineering Directorate, William E. Queen has been appointed Director, Electrical Engineering. Queen has been with the National Security Agency since 1960. He served as a design and project engineer, in responsible middle management positions, and has held two senior management assignments in NSA.

A functional change within the Executive Staff resulted in the appointment of George L. English as Director, Executive Management Office. English had been Chief, Management Systems Office.

The change allows the Executive Office to retain responsibility for the executive communications process and Congressional affairs, while expanding the role of the office to provide a capability for the development of Center policy, management consultations and the development of other management systems. The broadened scope of the office is the basis for the restructuring and name change. (Spaceport News, Vol. 19, No. 15, July 18, 1980, p 3)

o William Huseonica and Dallas Gillespie have been selected to participate in a new program designed to develop promising individuals for senior managerial positions in the government.

The two KSC employees are among the first 11 NASA staffers appointed to the Senior Executive Service Candidate Development Program.

By working with senior government executives and some formal classroom training, individuals selected for the program become a major source of highly-qualified candidates for filing SES vacancies.

The program will last one year and major portions of the training will be done at Headquarters in Washington, D.C.

Gillespie, recently appointed deputy comptroller at KSC, was previously Chief of the Resources Management Office. He was employed by Chrysler Corp. on its Saturn IB program at Cape Canaveral from 1966 to 1968. He joined NASA Launch Vehicle Operations in 1968 and transferred to the Center Resources Planning & Control Office in 1973.

Huseonica is currently the Chief of the Projects Control Office. He was Chief of the Project Integration Staff and served as technical assistant to the project manager in the KSC Shuttle Projects Office. From 1963 to 1974, he was in Unmanned Launch Operations at KSC, transferring after seven years at NASA's Lewis Research Center in Ohio. (Spaceport News, Vol. 19, No. 15, July 18, 1980, p 3)

o The National Park Service has launched a planning study to determine the best system for shuttling beachgoers to the south end of Canaveral National Seashore during periods when private transportation would conflict with Space Shuttle operations.

Prompted by the possibility that Playalinda Beach might be closed most of the time and a Congressional recommendation that the Park Service provide an alternate means of public access to the area, the transportation study is expected to be completed by October.

About 550,000 people visited Playalinda last year and, on peak weekend and holiday periods, it accommodates as many as 3,000 beachgoers a day, according to Canaveral National Seashore Superintendent Don Guiton.
Because of the beach's close proximity to Launch Complex 39, safety restrictions will close the area to private vehicles during times when the Space Shuttle is on the pad. As the Shuttle becomes operational and the frequency of launches increases, the beach will likely be closed to cars most of the year.

The Park Service and KSC are working together to find a way of allowing public access to the beach without compromising Shuttle requirements.

"We're looking at all the alternatives," said Guiton.

Buses have been receiving a lot of initial attention because they could be put into operation quickly, Guiton said. But other systems, including trams, ferry boats and use of the existing railroad, will be looked at during the study, he added.

The study will also focus on where staging areas could be located and whether one or several departure points would be desirable.

While a system could be put into effect this fall, funding for the transportation service is still uncertain.

"This report will give us for the first time some firm figures to work with," said Guiton. (Spaceport News, Vol. 19, No. 15, July 18, 1980, p 7)

o NASA's John F. Kennedy Space Center has awarded a $25,666,019 contract extension for engineering support services to Planning Research Corporation, 7600 Old Springhouse Road, McLean, Va.

The cost-plus-fixed-fee contract extension runs from May 20, 1980, through May 19, 1981. It provides for Planning Research Corporation to continue design engineering support services for the Space Shuttle program and other activities for which KSC's Design Engineering Directorate has design responsibilities. (NASA News Release No. 128-80, July 18, 1980)

July 21: An Indian four-stage solid propellant rocket, which India says can be used as a medium-range missile, launched a satellite into orbit Friday, July 18, from the Sriharikota space research center.

The 35-kilogram spacecraft, called Rohini 1 (Star 1), was sent into space with the SLV-3 rocket system developed and built by India with the assistance of France. It was launched over the Gulf of Bengal and the Indian Ocean from the space center near Madras in Andhra Pradesh in Southern India.

The orbiting of the Rohini makes India the seventh nation to launch its own space system. Two earlier Indian research satellites, one in 1975 and another in 1979, have been orbited by the Soviet Union from Soviet launch sites. The European Space Agency's Ariane is also scheduled to launch an Indian communications satellite from Guyana. (Defense Daily, Vol. III, No. 13, Monday, July 21, 1980, p 93)

o Reflecting its growing interest in space, Japan has announced plans to launch its first Earth Resources Satellite in 1985, with a two-year design life.

The satellite, designated "Meres-1," will take infrared pictures of terrain, geological formations and rocks on the entire land mass of the Earth, with emphasis to be placed on locating potential deposits of petroleum, coal and uranium.

The spacecraft, which will be placed in a 337-mile orbit, will reportedly be able to discern objects as small as "30 square meters."

Three Japanese contractors have expressed interest to date in developing and building the satellite -- Mitsubishi Electric Corp., Toshiba and Nippon Electric Co. Preliminary design is to be completed next year, followed by contractor selection, and development initiation in 1982.

Cost of the project, including ground facilities and launch costs, is estimated at more than $265 million (58 billion yen). (Defense Daily, Vol. III, No. 13, Monday, July 21, 1980, p 93)

o Top National Aeronautics and Space Administration management is meeting at the Kennedy Space Center this week for a sweeping space shuttle assessment officials hope will allow them to chart a course preserving a first launch by March, 1981, in spite of new thermal protection and orbital maneuvering system work requirements facing the program.

NASA Administrator Robert A. Frosch and his deputy, Alan M. Lovelace, will intensify pressure on shuttle management to cut the fat from shuttle work schedules and keep to those schedules. The attitude that nonflight safety improvements can be continually added to the program while other areas act as schedule controllers will be discouraged. "You can improve the spacecraft to the point of having a super hangar queen. We are at that point," Lovelace said.

Kennedy Space Center work schedules for the vehicle through first launch will be reviewed and refined this week. Kennedy has been on a four-month schedule but examining a schedule actually utilizing six months between the time the Columbia is rolled into the Vehicle Assembly Building and it is flown off Pad 39A by astronauts John W. Young and Robert L. Crippen.

NASA headquarters management wants to make the four-month schedule as close to reality as possible, and this could be a major factor in keeping first flight from slipping further into spring as a result of the new thermal protection and orbital maneuvering system requirements. (Aviation Week & Space Technology, Vol. 113, No. 3, p 16)

July 23: Dr. John H. McElroy, a 14-year veteran with NASA and formerly Director of NASA-Headquarters' Communications Division, has been named deputy director of the agency's Goddard Space Flight Center, Greenbelt, Md. He succeeds Robert E. Smylie, who joined NASA-Headquarters earlier as Associate Administrator for Space-Tracing and Data Systems. (Defense Daily, Vol. III, No. 15, Wednesday, July 23, 1980, p 108)

o Former Senator Frank E. ("Ted") Moss, who headed the Senate Committee on Aeronautical & Space Sciences, has joined the board of advisors of the "Citizens for Space" Political Action Committee. Moss is currently with the Washington, D.C., law firm of Schnader, Harrison, Segal & Lewis.

Political Action Committees (PAC's) solicit contributions [with a 50% tax credit] to support political candidates and causes. The Citizens for Space Committee intends to use its funds both to support political candidates and to seek grass root support for the space program through advertising, direct mail, leaflets, etc.

The Washington, D.C.-based committee, which filed with the FCC on May 5, is headed by Harrell Graham, formerly with the "Campaign for Space" PAC, which was founded by an associate of Princeton professor Gerard K. O'Neill.

Graham points out that there are 60 million elegible voters in the country between the ages of 18 and 34 who were raised in the "space age," and suggests that they are "more likely to support the presidential candidate most sympathetic to an expanded American space program." (Defense Daily, Vol. III, No. 15, Wednesday, July 23, 1980, p 113)

o The Space Shuttle Orbiter Columbia's third main engine, number 20006, was shipped Monday from the National Space Technology Laboratories to Kennedy Space Center.

Shipment of this engine completed the return of all three main engines to Kennedy for reinstallation on the Columbia. The engines were sent back to the test facility earlier this year for recertification test firings because several modifications and component replacements had been made since the original certification tests last year. (Marshall Star, Vol. 20, No. 45, July 23, 1980, p 1)

July 24: Eleven hundred Kennedy Space Center workers worry daily about the 30,922 heat-resistant tiles being glued to NASA's Shuttle before its first scheduled flight in March 1981.

But the handful of astronauts who will fly the rocket-powered bird are vexed by additional problems - like choosing a wardrobe for bedtime in the Shuttle, finding the way home from space, and landing the giant reusable craft in bad weather.

Overmyer said the problem of nightwear came up during discussions of "coed" flights that will take place now that six women are training for the Shuttle program.

On NASA's previous all-male space mission, "they usually just stripped down to their skivvies and slept wherever," explained the former Deputy Manager of Construction for the spaceship Columbia.

The women requested some sort of a "nightie" to wear at night, he said. "It does shed a different light on the subject of space flight." (TODAY, Thursday, July 24, 1980)

o Not even in the darkest hours of the United States space program, in the failure-ridden years of 1958 and 1959, has there been such a low level of activity as that demonstrated so far this year.

There have been only eight United States space missions. Only two of those have been the responsibility of NASA and one of those was a failure. The remaining six have been military missions.

As the United States space activity slows, with its hopes for revitalization on the delayed Space Shuttle, the Soviet Union continues its unabated aggressive exploitation of space across the board, but predominately in the military or military-related areas.

There have been 52 Soviet space missions in 1980. Those directly related to military operations total 38 and account for 73 percent of total space activity. These do not include the Soyuz-Salyut missions which, despite the avowed emphasis on scientific activities by the cosmonauts, is a sophisticated photographic security outpost in space being manned on a permanent basis.

The major Soviet military space activity has remained, since its inception in the early 1960s, photographic reconnaissance/surveillance. There have been 15 of these flights since the first of the year, both high and medium resolution, representing 40 percent of the military effort. One of these missions (Cosmos 1170) operated for over 40 days in orbit, an extension of the long duration system recently introduced by the Soviets.

Other Soviet military missions that have been fully exercised operationally this year include the navigation satellite flights -- five flights; early warning spacecraft systems -- four and possibly five launches, and electronic intelligence gathering, both land and ocean -- five flights.

The Soviet Union also used this period to resume its nuclear-powered ocean surveillance spacecraft flights, with the first flight of a new series at the end of April, and its space interceptor development program.

SOVIET SPACE FLIGHTS - 1980

1)	Jan. 9	Cosmos 1149	Military: Reconnaissance/surveillance(M)*
2)	Jan. 11	Molniya 1-46	Civil: Communications
3)	Jan. 14	Cosmos 1150	Military: Navigation
4)	Jan. 23	Cosmos 1151	Civil: Ocean monitoring
5)	Jan. 24	Cosmos 1152	Military: Reconnaissance/surveillance(H)**
6)	Jan. 25	Cosmos 153	Military: Navigation
7)	Jan. 30	Cosmos 1154	Military: ELINT (Electronic Intelligence)
8)	Feb. 11	Cosmos 1156-63	Military: Reconnaissance/surveillance(M)
9)	Feb. 11	Cosmos 1156-63	Military: Naval communications
10)	Feb. 12	Cosmos 1164	Military: Early warning
11)	Feb. 20	Raduga 6	Civil: Communications
12)	Feb. 21	Cosmos 1165	Military: Reconnaissance/surveillance(H)
13)	Mar. 4	Cosmos 1166	Military: Reconnaissance/surveillance(M)
14)	Mar. 14	Cosmos 1167	Military: EORSAT (ELINT Ocean Reconnaissance)
15)	Mar. 17	Cosmos 1168	Military: Navigation
16)	Mar. 27	Cosmos 1169	Military: Space Interceptor Monitor
17)	Mar. 27	Progress 8	Civil: Salyut 6 cargo transport
18)	Apr. 1	Cosmos 1170	Military: Reconnaissance/surveillance(H)

19)	Apr. 3	Cosmos 1171	Military: Space interceptor target
20)	Apr. 9	Soyuz 35	Civil: Cosmonauts Popov and Ryumin
21)	Apr. 12	Cosmos 1172	Military: Early warning
22)	Apr. 17	Cosmos 1173	Military: Reconnaissance/surveillance(H)
23)	Apr. 18	Cosmos 1174	Military: Space interceptor
24)	Apr. 18	Cosmos 1175	Military: Early warning or Moiniya failure
25)	Apr. 27	Progress 9	Civil: Salyut 6 cargo transport
26)	Apr. 29	Cosmos 1176	Military: Ocean surveillance (nuclear)
27)	Apr. 29	Cosmos 1177	Military: Reconnaissance/surveillance(H)(LD)***
28)	May 7	Cosmos 1178	Military: Reconnaissance/surveillance(M)
29)	May 14	Cosmos 1179	Military: Navigation failure
30)	May 15	Cosmos 1180	Civil: Geophysics
31)	May 20	Cosmos 1181	Military: Navigation
32)	May 23	Cosmos 1182	Military: Reconnaissance/surveillance(M)
33)	May 26	Soyuz 36	Civil: Cosmonauts Kubasov and Farkas
34)	May 28	Cosmos 1183	Military: Reconnaissance/surveillance(M)
35)	June 4	Cosmos 1184	Military: ELINT
36)	June 5	Soyuz T2	Civil: Cosmonauts Malyshev and Aksenov
37)	June 6	Cosmos 1185	Military: Reconnaissance/surveillance(M)
38)	June 6	Cosmos 1186	Military: ELINT
39)	June 12	Cosmos 1187	Military: Reconnaissance/surveillance(M)
40)	June 14	Gorizont 4	Civil: Communications
41)	June 14	Cosmos 1188	Military: Early warning
42)	June 18	Meteor 1-30	Civil: Weather
43)	June 21	Molniya 1-47	Civil: Communications
44)	June 26	Cosmos 1189	Military: Reconnaissance/surveillance(M)
45)	June 29	Progress 10	Civil: Salyut 6 cargo transport
46)	July 1	Cosmos 1190	Military: ELINT
47)	July 2	Cosmos 1191	Military: Early warning
48)	July 9	Cosmos 1192-1199	Military: Naval communications
49)	July 15	Cosmos 1201	Military: Reconnaissance/surveillance(M)
50)	July 15	Cosmos 1201	Military: Reconnaissance/surveillance(NR)****
51)	July 15	Ekran	Civil: Statsionar communications
52)	July 18	Molniya 3	Civil: Communications

* Medium resolution
** High resolution
*** Long duration
**** Soviets also identify as natural resources payload

(Defense Daily, Vol. III, No. 16, Thursday, July 24, 1980, p 114)

o Northrop president Dr. Thomas O. Paine, a former Administrator of NASA, charged that the United States' space program is drifting downward because of "a lack of vision and leadership" and urged the establishment of major new goals and programs so that this nation can reap the enormous benefits of space.

Paine testified at the first of two days of hearings on the nation's civilian space policy being held by the House Subcommittee on Space Science & Applications. Subcommittee chairman Don Fuqua (D-Fla.) said the

hearings, which come on the 12th anniversary of the Apollo 11 lunar landing mission, are intended to develop long-range policy goals for the space program.

Fuqua questioned the wisdom of the Carter Administration's space policy position which rejects any new high-challenge engineering initiatives in space, and pointed out that the U.S. is falling significantly behind the Soviet Union in both manned and unmanned space flight, and facing new competition in space from Europe and Japan.

Paine said that the first step is to "develop new policy statements that set forth measurable goals and timetables in science, in applications, and in the progressive development of the infrastructure needed to support man's presence in space..."

The next step, he said, is to create the critical capabilities needed, including:

1) A reliable, economical Space Shuttle system.
2) Construction of an evolutionary Operations Base and Orbital Laboratory in low Earth orbit, including space construction capabilities.
3) Development of an Interorbit Transport System for reusable transportation between low Earth orbit, geosynchronous orbit, and "eventually, the Moon."
4) Later establishment of an Orbital Base in geosynchronous orbit.
5) Planning for a Research Center, Resource Development Laboratory and Refueling Station on the Moon.

Paine said he personally believes that the establishment of a Space Station in low Earth orbit "is probably the next step in space" the U.S. should be considering.

In line with the lack of vision in space, Paine charged that the space program is "woefully underfunded." He pointed out that in today's dollars, the annual NASA budget in the mid-60's would exceed $14 billion, compared to the $5.5 billion FY '81 NASA budget.

Among other things, Paine praised the agreement between NASA and McDonnell Douglas for joint conduct of space processing aboard the Spacelab.

Dr. Rocco A. Petrone, former Apollo Program Director, said that the nation's civilian space program today "is in dire need of a bold central theme for future space goals that can focus support for these goals."

He said that argument that there is little public support for these goals, only reflects the fact that such goals have not been set and articulated.

Petrone warned that program options for space "have been studied and re-studied, and that "decisions are needed now in selecting programs and setting the goals of the space program for the eighties and beyond." (Defense Daily, Vol. III, No. 16, July 24, 1980, pp 115-116)

- The Senate by voice vote has passed the $5,587.9 million FY '81 authorization for NASA recommended by Conference Committee, clearing the measure for the White House. The authorization is $70 million above the President's revised request, with funds added for such programs as SEPS, the Operational Land Observing Satellite System, and aeronautical and space R&T.

Meanwhile, the FY '81 NASA appropriation is facing a delay of more than a month. If an agreement cannot be worked out between the House and Senate Appropriations Committees after the latter acts on the bill, the House committee is warning of the possible need to provide the funds in a continuing resolution -- a move which would prohibit funds for new starts, including the Gamma Ray Observatory and the NASA/NOAA/DOD National Oceanic Satellite System. (Defense Daily, Vol. III, No. 16, July 24, 1980, p 116)

- NASA Administrator Robert Frosch and other top NASA managers are meeting at Kennedy Space Center this week with the agency's Shuttle review committees for a total review of problem areas on the Space Shuttle leading to decisions on critical areas, particularly the Thermal Protection System (TPS) tiles.

Final decision is expected as early as tomorrow, but the actions -- which could require a request for additional funds -- will have to be approved by the White House, so that an announcement is not expected until sometime next week.

NASA has already decided that it will have to remove the two Orbital Maneuvering System (OMS) pods from the Orbiter Columbia, in order to redesign and strengthen the support brackets for the helium tank and the propellant tank and some other components.

The OMS problem surfaced in May when a bracket supporting the helium tank showed signs of collapsing during a vibro-acoustic test. A second test with additional instrumentation concluded that the helium tank bracket as well as other components of the OMS Pod and associated Reaction Control System did not meet qualification levels.

The OMS structure question is among those being reviewed, but the agency feels that it can make the necessary changes without delaying the initial Shuttle flight beyond the March 31 deadline.

This is not necessarily the case with the TPS question, where options which are growing more likely could delay the first Shuttle launch to between May and September 1981. The options basically are to:

1) Continue the ongoing baseline program, which involves pull-testing all of the tiles and replacing and densifying those which fail, along with some 1100 tiles which cannot be pull tested. [The densification involves coating the tiles with a thin coating of a substance called Ludox which improves the bonding of the tiles.] There are under 4900 tiles left to be installed, with another 1500 expected to be removed.

2) Removing and densifying all of the tiles installed at critical areas on the Shuttle, which would involve something less than 3500 additional tiles. It was estimated that this could push back the launch date for the Shuttle's maiden flight until May 1981.

3) Removing and densifying the critical tiles and all 9000 black tiles [which include most of the critical tiles]. This could delay the flight two to three months beyond May.

The NASA review also includes the Space Shuttle Main Engine, which continues to have some problems with its high pressure turbopump bearing, although NASA is optimistic the engine will be ready on schedule. A fix has been developed for the burn-through which occurred in the July 12 SSME test, but inspection of all SSME preburners could delay resumption of testing 8-10 weeks. (Defense Daily, Vol. III, No. 16, July 24, 1980, p 116-117)

July 25: NASA's John F. Kennedy Space Center has awarded Boeing Services International, Inc., Cocoa Beach, Florida, a $7,636,458 one-year contract extension for supply and transportation services. (NASA News Release No. 127-80, July 25, 1980)

- NASA's John F. Kennedy Space Center has awarded a $49,124,176 one-year extension to Boeing Services International, Inc., Seattle, Washington, on its ground systems operations contract.

  The cost-plus-award-fee contract extension runs from July 1, 1980, through June 30, 1981. This extension marks the fourth year of service and brings the cumulative value of the contract to $176,321,644. (NASA News Release No. 130-80, July 25, 1980)

- The Aerospace Services Division of Pan American World Airways, Inc., Cocoa Beach, Fla., has been awarded a one-year extension of its contract to supply medical services at NASA's John F. Kennedy Space Center and Cape Canaveral Air Force Station.

  The $2,814,000 award covers the period from July 1, 1980, to June 30, 1981 and brings the cumulative value of the contract since July 1, 1977, to $8,799,197. (NASA News Release No. 131-80, July 25, 1980)

July 28: The Commerce Department, under a new program to stimulate the availability of public service satellite communications has awarded $1.2 million in grants to two non-profit and two profit-making organizations to set up public service satcom television services.

The one-year grants, which may be continued for up to four years, went to Bell & Howell Co. ($320,000), American Educational Television Network ($150,000), the profit-making concerns; Appalachian Community Service Network ($410,000), and Public Service Satellite Consortium ($300,000).

The four will use the funding as "seed money" while they organize to become "self-supporting businesses in the development of the first satellite system for national public service use." They are expected to operate complete telecommunications systems.

Bell & Howell will set up ground stations in ten cities for transmission of training programming for federal agencies, a $1 billion effort last year, of which about half went for transportation. Program could expand to 100 cities. ACSN will expand its education services in the Appalachian region; PSSC will provide services for its various nonprofit members, and AETN will solicit customers for its educational/training programming.

The program is under the direction of DOC's National Telecommunications & Information Administration (NTIA) which was created in October 1978 to assist in market aggregation and possible development of domestic and international public satcom services, something which commercial satellite operators have shown little interest in.

NTIA said that its four grantees will continue on the program if they are found to be moving ahead as planned [and if they choose to]. It said that additional organizations may be awarded grants if money is provided by the Administration and Congress, something which is not as yet certain. (Defense Daily, Vol. III, No. 18, Monday, July 28, 1980, p 133)

o Vietnamese and Soviet cosmonaut crew launched July 23 on Soyuz 37 were preparing to rendezvous with Salyut 6 late last week, where they will spend about seven days with Leonid Popov and Valeriy Ryumin, now in their 16th week in the space station.

Launch of Vietnamese cosmonaut Lt. Col. Pham Tuan is a continuation of the Soviet program to fly Communist Block crewmembers along with Russian cosmonauts on short visits to Salyut station. Commander of the Soyuz 37 mission is Viktor Gorbatko, who flew previously on the five-day Soyuz 7 mission and the 18-day Soyuz 24 mission to the Salyut 5 military station. Launch of a Vietnamese prior to a Romanian is an effort by the Soviets to obtain prestige in the Third World nations, while an affront to Romania, a far more developed but independent nation in the Soviet sphere than is Vietnam. (Aviation Week & Space Technology, Vol. 113, No. 4, p 17)

o Space shuttle management conducting a project review at the Kennedy Space Center last week was nearing a decision on whether to fly the Martin Marietta manned maneuvering unit and tile repair kit on the first shuttle mission.

The National Aeronautics and Space Administration earlier had generally decided not to fly the tile repair capability until after first launch but with the inherent option of reexamining the issue if the shuttle schedule slipped to being more compatible with maneuvering unit development.

An option receiving attention last week was to fly the unit and tile repair kit but without a specific commitment to use the maneuvering unit for a tile inspection extravehicular activity unless data obtained by other means indicated there might be a tile problem. In this case, the planned 54-hr.

first mission could be maintained but with an additional two-day contingency flight plan added in the event an EVA was decided upon during the flight.

If no EVA were needed, reentry would be after 54 hr. If a tile inspection and repair were needed, the flight would be lengthened by two days. Johnson Space Center is examining in-orbit schedule issues on this concept.

The type of event that could trigger an EVA inspection of the tiles would be crew-out-the-window inspections of the tiles that are visible, telemetry from insrumented tiles, launch photography and any abnormal physiological cues perceived by the crew during launch, such as any loud bumps that might indicate ice from the external tank had struck the thermal protection tiles.

Earlier, there was a consensus in shuttle management that launch of the manned maneuvering unit was a commitment to inspect under any circumstances, and that view was being aired last week along with the possibility of flying the maneuvering unit without a preflight commitment to actually use it. Impact to the shuttle launch schedule of carrying the unit on the first flight for a possible EVA also was being assessed.

Martin Marietta and Johnson Space Center manned maneuvering unit officials are examining how their schedules can be advanced to achieve readiness. Completion of a flight unit by late January, 1981, appears feasible, and first shuttle launch is likely no earlier than March. (Aviation Week & Space Technology, Vol. 113, No. 4, p 18)

July 29: The Center Director discussed the following:

(a) Mr. Smith discussed his meeting with the Save Our Beach delegation on July 24. Their concern was to retain access by private vehicle to Playalinda Beach. They have several suggestions including vehicle search, ban of vans and buses, and a "tunnel" for the roadway to the beach. Action: Mr. Parker was asked by the Center Director to look into criteria for vehicle search by the National Park Service and the feasibility of a "tunnel" approach; i.e., a solid wall of fence on the south side of the road with containment fencing on the north side of the road.

(e) Mr. Page reported on Shuttle hardware status as follows: The third main engine was installed on the Orbiter during the third shift on Sunday, July 27. There has been no decision as of this date on pulling the forward RCS -- it may be decided today. The pad oxidizer hot flow ran slow last week. Minor problems are being worked with Design Engineering.

Mr. Page stated that a memorandum had been received from Mr. Yardley regarding the making of movies during operations and that contractors were to be advised. In response to Mr. Page's question, Mr. Hollinshead stated that the Public Affairs Office is working with the Program Office and Technicolor and there were no additional requirements from the line except cooperation when the film is under way.

Mr. Griffin stated that CBS filmed the program review here on July 22 and it will appear in a documentary probably in September with Morton Dean as moderator. The producer, Phil Burton, may be around KSC for additional filming with the statement that Dr. Frosch has given him carte blanche. Mr. Griffin stated that Mr. Burton will not be allowed to do any filming without prior clearance from him. (Center Director's Staff Meeting, Staff Notes #27-80)

July 30: "All the projects were alike in that they were opportunities for new work and new challenges to make successes."

Those are the words of Gustav A. Kroll, the last member of the original "von Braun team" to leave the Marshall Center. He was speaking of the projects on which he has worked since he came to Huntsville in 1950.

The head of the Structures Division of Structures and Propulsion Lab, Kroll retired last week, just six weeks short of having 35 years of government service.

Kroll arrived in the United States in 1945 in "Operation Paperclip" and worked at Ft. Bliss, Tex., with the 118-member von Braun team. The group was transferred to Huntsville in 1950, and Kroll became an American citizen in 1954.

He has worked in structures throughout his career. "I have worked on all of them -- every one of Marshall's projects -- Redstone, Jupiter, Saturn, Shuttle -- all of them," he said. "In looking back at all of these projects, there are no favorites, but the highlight would have to be the Saturn V flight and landing on the Moon."

Kroll received the NASA Exceptional Service Medal on Nov. 4, 1976 for "exceptional scientific achievement in guiding the overall structure design of the Solid Rocket Boosters which culminated in a unique combination of weight savings, low-cost manufacturing and high reliability for reusable structures."

He and his wife do not plan to trave extensively, but he does intend to spend more time at his cabin on Mirror Lake in Guntersville -- boating and fishing. He also plans to spend more time in his wood-working shop.

They will stay in the Huntsville area. He said that his thoughts when he first came to Huntsville were, "Beautiful, that's my home!" He still feels the same way about Huntsville.

Kroll's last official day to work at the center was Monday, July 21, a day he says, "I'll never forget as long as I live." (Marshall Star, Vol. 20, No. 46, July 30, 1980, p 2)

- Viking Orbiter 1 has used nearly all the attitude-control gas that keeps its solar panels pointed to the Sun and its antenna aimed at Earth. When the gas is gone, controllers at the Jet Propulsion Laboratory will send radio commands to the spacecraft, ordering it to cease operating and thus end its productive mission of more than four years. (Marshall Star, Vol. 20, No. 46, July 30, 1980, p 4)

- KSC engineers today will demonstrate the gaseous oxygen collection system that prevents ice from building up on the tip of the Space Shuttle's external propellant tank. Ice is potentially dangerous because frozen chunks could break loose during liftoff and damage the orbiter's critical protective tile system.

  The 154-foot long, 27-foot diameter tank holds the super cold liquid oxygen (-297 degrees F.) and liquid hydrogen (-423 degrees F.) propellants burned by the orbiter's three main engines.

  This collection system, which looks like and is often referred to as a "beanie" or "coolie cap," traps and removes vapors released by the liquid oxygen vent system at the tip of the external tank. The cap is lowered over the top of the external tank and sealed by an inflatable collar. Then cold oxygen vapors are vented from under the cap and released some distance away.

  Hydrogen gas vented from the external tank is removed by a separate system already installed at the pad.

The gaseous oxygen collection system is officially called the GOX (for gaseous oxygen) Vent Arm. It is being tested here at KSC's Launch Equipment Test Facility prior to being installed at Launch Complex 39-A. (NASA News Release No. 133-80, July 30, 1980)

o Freeze prediction techniques developed to help protect Florida's citrus crop from cold losses are being studied to determine if they can be used in other states to protect temperature-sensitive crops.

NASA's John F. Kennedy Space Center has awarded a $50,000 contract to the University of Florida's Institute of Food and Agricultural Sciences, Gainesville, Fla., to continue its study with Michigan State and Pennsylvania State Universities in cold weather prediction techniques. (NASA News Release No. 134-80, July 30, 1980)

July 31: India has announced plans to launch a semi-operational remote sensing satellite in 1984 or 1985 to be used in the management of the country's natural resources. The three-axis stabilized satellite would be placed in a Sun-Synchronous orbit of 372-625 miles. First Indian launch of a satellite, the 35-kg Rohini, designed primarily to monitor the launch vehicle and space operations, was conducted earlier this month. Previous Indian satellites were launched by the Soviet Union. In addition to India, Japan has also announced plans to launch its first Earth Resources Satellite in 1985. (Defense Daily, Vol. 111, No. 21, Thursday, July 31, 1980, p 153)

JULY 1980: In the deep, dramatic tone that identifies a public relations manager, George Meguiar announced to us, "We've had our first birth at Kennedy Space Center Tours!"

The newborn was a French addition to a Japanese family.

It occurred several Sundays ago, said George, who's with TWA Services Inc. His boss Harry Chambers heard about it in a memo from tour operations supervisor R.G. Lovern, stating:

"A Japanese family of seven brought into Departure Control four poodles, the mother and her three full-grown off-spring. They requested to put their pets in our kennels, which Carol Wainscott, Loading Agent, took care of."

Before leaving on the tour, the family tipped off another supervisor, Helen Cushman, to the possibility of a blessed event. Helen and Carl "kept checking on the poodles periodically," the memo continues. "At approximately 2:30 p.m. Carl discovered that the mother had given birth to one puppy, Kennedy Space Center Tours first birth ever!

"The Japanese family returned from the bus tour and retrieved their five poodles, thanked us, and left." (TODAY, July)

o The Space Shuttle has moved yet another step closer to launch with the success of a fuel tank separation test.

Explosive bolts were tested that hold the 500,000 gallon external tank to the bottom of the Columbia. After the fuel is consumed during liftoff, the bolts explode, sending the tank splashing into the Indian Ocean. The tank was not attached to the Shuttle during Saturday night's test.

NASA scientists were particularly interested in the condition of nearly 100 heat-resistant tiles at the points where the Orbiter is attached to the external fuel tank.

"It seems none of the tiles were damaged. We used a heavier density tile at the attach points and it worked," Dr. Robert Gray, manager of the Shuttle projects office, said Sunday. (TODAY, July)

o Brevard County could become the nuclear waste capital of the nation if studies under way indicate that disposal of nuclear wastes in space is feasible and desirable.

NASA officials said last week a plan being worked on envisions sending the nation's high-level nuclear wastes into solar orbit from Kennedy Space Center.

These officials said the concept had been in the discussion stage for a decade and was still another decade from implementation. But last month's award of an eight-month research contract to Boeing Aerospace Co. in Seattle advances the concept one step further.

The $296,000 Boeing contract, paid for with Department of Energy funds, will determine whether the concept is technically feasible. NASA officials who have worked on the project think it is. (TODAY, July)

August 1: NASA says the Space Shuttle will indeed be launched in March, but Kennedy Space Center workers will have to really hustle to meet a new accelerated work schedule.

Dr. Robert A. Frosch, head of NASA, announced Thursday that an intensive review of the Space Shuttle program by NASA officials, contractors and outsiders resulted in a decision to go ahead with a previously planned March launch date, despite a number of problems, both major and minor.

But the spaceship Columbia will not leave its hangar in September as originally planned, primarily because of continuing work on heat-resistant tiles.

Instead, the Columbia will stay in its hangar until late November while workers remove and strengthen about 4,500 additional tiles. The tiles are designed to protect the Shuttle from the heat of re-entry.

The time lost due to additional tile work will be made up by accelerating the schedule for mating the Shuttle's various components in the Vehicle Assembly Building and readying the Shuttle for blast-off after it has been moved to the launch pad.

Frosch outlined a "difficult but achievable schedule" that gives KSC workers only 15 weeks to get the Shuttle ready for launch after the Columbia leaves its hangar. The schedule has been shortened by about a month. (TODAY, Friday, August 1, 1980)

- To keep pace with the forecast of operational use of the Space Shuttle, KSC is planning the construction of two new facilities. One facility will be a processing area for the orbiter's thermal protection system tiles, while the other facility will be used for buildup of solid rocket booster aft assemblies and storing solid motor segments. (Spaceport News, Vol. 19, No. 16, August 1, 1980, p 1)

o Two major milestones in preparing for the launch and recovery of the first Space Shuttle were completed recently with the reinstallation of Columbia's main engines and the successful sea test of various solid rocket booster recovery equipment.

While KSC engineers were busy checking out the engines, and discussing data gathered during the simulated recovery operation, a group of top-level NASA managers were meeting here to decide what work was still needed prior to the Shuttle's maiden launch.

Among the decisions still to be made that could effect the schedule are whether or not to pull and densify more of Columbia's thermal protection tiles, and what modifications are needed to the orbiter's maneuvering system pods. The pods are scheduled to be removed in early September for outfitting with new propellant tanks, structural beefups and valve modifications.

Columbia's three main engines were pulled earlier this year for modifications to the high pressure turbopumps, valves and nozzles. All three engines successfully passed subsequent flight readiness firings.

Two of the engines were installed July 19, while the third went in July 26. Before the Shuttle's first flight, the engines will have to pass another major test - a 20-second Flight Readiness Firing at the launch pad. (Spaceport News, Vol. 19, No. 16, August 1, 1980, p 1)

o The Soyuz 37 cosmonauts ended their mission aboard the Salyut 6 station complex yesterday, returning to the Soviet Union aboard the Soyuz 36 spacecraft. (Defense Daily, Vol. III, No. 22, Friday, August 1, 1980, p 158)

o The Defense Department told Congress yesterday that it has not yet taken a final position on whether the Moon Treaty should be ratified but that there are areas covered by the treaty which must be carefully reviewed -- namely the extension of the Outer Space Treaty's coverage from Earth orbit to undefined orbits and other trajectories around all celestial bodies.

We must "ensure that certain possible non-aggressive military activities in deep space or in the vicinity of the Moon are not precluded," Franklin D. Kramer, the Pentagon's principal deputy assistant secretary for international security affairs, told the Senate Space Subcommittee. (Defense Daily, Vol. III, No. 22, Friday, August 1, 1980, p 158)

- NASA Administrator Robert Frosch announced yesterday that NASA is scheduling the first flight of the Space Shuttle for March 1981, but he acknowledged that the flight could slip several weeks past that. NASA had slipped the schedule a month to March two months ago, but had been reexamining the whole program in light of a number of difficulties. Frosch said he made the decision despite a fire Wednesday in the high pressure oxidizer turbopump of SSME 0010 which shut down the engine 10 seconds into a planned 100-second firing, but he admitted that this could affect the schedule, depending on the cause. Rollout of the Shuttle from Orbiter Processing Facility is planned for Nov. 23, with a 20-second on-pad engine test slated for February. (Defense Daily, Vol. III, No. 22, Friday, August 1, 1980, p 160)

- Solar Power Satellites in Earth orbit, using energy from the Sun, are not subject to the provisions of the U.N.-approved Agreement Governing the Activities of States on the Moon and Other Celestial Bodies ("Moon Treaty"), according to State Department legal adviser Roberts B. Owen.

  First, he said there was an understanding in the U.N. Outer Space Committee which drafted the treaty that it would not apply to objects around the Earth. Secondly, the treaty would bar claims of sovereignty to nonterrestrial resources "found on" and "in place" on bodies -- not to solar energy [or, for example, to minerals that are removed]. The treaty is now being reviewed by the Executive Branch and is not expected to be submitted to the Senate for ratification prior to the November elections. (Defense Daily, Vol. III, No. 22, Friday, August 1, 1980, p 162)

- The Soviet Union, which like the U.S. has not as yet ratified the Moon Treaty, has been reluctant to give up any of its potential benefits from space that might be implied in the treaty's assertion that nonterrestrial resources are the "common heritage of mankind."

  From the introduction of the "common heritage" concept in 1972 to April of last year, the Soviet Union "adamantly rejected the inclusion of the concept in the Moon Treaty, citing various legal, philosophical and political

difficulties with the phrase," including the assertion that "mankind" was not a "proper subject of international law, only States were," according to the State Department's Roberts Owen.

The Soviets finally agreed to the common heritage phrase last year, but only after insisting that it be specifically qualified to the effect that the common heritage concept in the treaty finds its meaning "solely with" the treaty itself. While the developing countries "had difficulties with this language," Owen said, the U.S. has endorsed the Soviet interpretation. (Defense Daily, Vol. III, No. 22, Friday, August 1, 1980, p 162)

August 4: It is technically feasible and "potentially practical" to establish a materials production facility on the Moon, which would provide "useful construction feedstocks," such as iron and glass.

This is the view of Edward Bock, the manager of a 10-month study conducted by General Dynamics/Convair for NASA in 1978-79 on "Lunar Resources Utilization for Space Construction."

Elements that are readily available on the Moon -- such as oxygen, silicon, glass, aluminum and iron -- can be converted into a number of useful products, he said, including rocket propellants, photovoltaic cells and construction materials. (Defense Daily, Vol. III, No. 23, Monday, August 4, 1980, p 169)

August 5: The Deputy Director discussed the following:

Mr. Griffin discussed the press conference on the accelerated STS-1 schedule and said that Dr. Frosch understands Mr. Smith's position on the schedule; i.e., it is doable but any one part that is not met may extend the entire schedule. Dr. Frosch said this in the press conference.

Mr. Griffin also stated that funds were committed to the accelerated schedule but will probably be subjected to review, especially the R&PM since that fund source is so tight.

He further stated that Headquarters was looking at innovative ways to incentivize people to get the Orbiter out of the OPF by November 23.

Mr. Clark discussed the overtime policy for the STS-1 flow and the bottom line is that because of the schedule there will be no way for all personnel directly involved in the STS-1 flow to take off earned compensatory time. It will be necessary to provide for paid overtime for civil service employees. He further stated that the overtime should be managed and that while the overtime will not require prior approval by the Center Director its use would be subject to review by the fourth floor. Mr. Clark also stated that it is hoped that every individual involved would be able to have at least one day a week off. Mr. Page stated that he hoped that it could be arranged for everyone to have at least two consecutive days a month off. Mr. Hursey advised that the AFGE was advised prior to the staff meeting that the personnel directly involved in the STS-1 would be paid for overtime worked.

Mr. Clark stated that the Comptroller should put together a crisp policy statement regarding the use of overtime in these circumstances for the earliest possible dissemination.

Mr. Clark said that the Center Director would like to have the clean-up/fix-up plan ready by his return and he asked Mr. Minderman to get the appropriate people together for a status report to him by the end of this week.

Mr. Clark asked Mr. Minderman to have Design Engineering do a title search on State Highway 402 as a part of the continuing controversy with the Save Our Beaches group from Titusville. Mr. Minderman stated that Mr. Bobby Nelson is working this problem.

Dr. Buchanan reported that nine people working on Pad A on Saturday complained of "hydrazine exposure". There was an odor from a vent pipe at 290 feet level and monitoring established that there was a 5 ppm concentrate within two feet of the vent pipe - beyond that distance it was a zero level. Monitoring on Sunday established a 20 ppm at the pipe but a zero level a very short distance away. Physical examinations of those exposed revealed no problems and the employees stated they had just smelled it and had no effects. Dr. Buchanan will follow up. (Staff Notes #28-80, Executive Director, notes from meeting held August 4, 1980)

o The Voyager 1 spacecraft was 82.4 million miles from the Planet Saturn yesterday and will make the world's first [SIC] fly-by of the planet Nov. 12. The spacecraft's velocity relative to the Sun is now nearly 46,000 miles per hour. Its sistership, Voyager 2, will reach Saturn a year from now. (Defense Daily, Vol. III, No. 24, Tuesday, August 5, 1980, p 179)

August 7: NASA-Goddard is contracting with Lockheed Missiles & Space Co. to develop improvements to the vibroacoustic payload environment prediction system program for predicting the random vibration environment of payload components in the Space Shuttle Orbiter cargo bay. (Defense Daily, Vol. III, No. 26, Thursday, August 7, 1980, p 190)

o Numerical fluid dynamics analysis of specific manufacturing-in space orbital flight experiment configurations will be conducted by Lockheed Missiles & Space Co. under a contract being negotiated with NASA-Headquarters. (Defense Daily, Vol. III, No. 26, Thursday, August 7, 1980, p 190)

August 8: ". . . America's preeminence in the exploration of space is threatened by the failure of the Carter Administration to fund fully the Space Shuttle program (with its acknowledged benefits for both the civil and military applications) as well as advanced exploration programs. Republicans pledge to support a vigorous space research program." The Republican Platform. (Defense Daily, Vol. III, No. 27, Friday, August 8, 1980, p 199)

August 11: NASA's John F. Kennedy Space Center has awarded a $337,178.25 contract to the Imperial Electric Company of Akron, Ohio, in support of Space Shuttle operations.

The award is for the manufacture of spare motors and generators for the 175-ton and 250-ton bridge cranes in the Vehicle Assembly Building at KSC's Launch Complex 39. (NASA News Release No. 141-80, August 11, 1980)

o The first Space Shuttle flight hardware to be rolled out of the Vehicle Assembly Building will emerge from the huge structure beginning at 9 a.m. Friday, August 15.

The twin solid rocket boosters mounted on the Mobile Launcher Platform from which the Space Shuttle Orbiter Columbia is to be launched on its maiden voyage next spring will be rolled out of the VAB's High Bay 3 for a distance of 375 feet.

Purpose of the move is to conduct a solid rocket booster deflection test to determine how much the boosters will flex under the cold-induced contraction of filling the external tank with its load of supercold liquid hydrogen and liquid oxygen propellants. (NASA News Release No. 142-80, August 11, 1980)

o NASA's John F. Kennedy Space Center has awarded Connell, Metcalf & Eddy, Coral Gables, Fla., a $169,250 contract to provide architect-engineering services for design modifications to Complex 17B, launch site for NASA's Delta rocket.

The Delta rocket, called the "workhorse" of the space program because it has successfully transported over 130 scientific, weather, communications and applications satellites into space, is launched from Complexes 17A and 17B at Cape Canaveral Air Force Station. (NASA News Release No. 142-80, August 11, 1980)

o When the Space Shuttle finally lifts from its pad at Kennedy Space Center, TV viewers will be looking at a lot of widows' peaks and shiny pates. Gone are the flattops and crewcuts so evident during the Mercury and Apollo days.

It's not just a matter of style. KSC and its average worker are getting older, just like you and me. But what seems perfectly normal for the rest of us is an agency anathema.

NASA officials are concerned about the aging of its agency - especially at several key centers, including KSC.

"When you are constrained from getting new people, everyone with you gets one year older," said John F. Duggan, NASA's chief of personnel analysis and planning in Washington, D.C.

And as delays keep the Shuttle on the ground month after month, rumor has it that there are plenty of KSC workers eligible for retirement who are just hanging on until the Shuttle is spaceborne. These workers will retire en masse after the Shuttle's first flight, some say, leaving KSC with a lot of inexperienced people on its launch crew.

The much-delayed first flight currently is scheduled for March next year and presumably would culminate years of work for some space center workers.

KSC first started getting gray in earnest in the late 1960s. In 1968 when Apollo 8 circumnavigated the moon, the average age of KSC's civil service work force was a youthful 39. Then for two years in a row during 1969 and 1970, the center aged like everyone else, a year at a time. Since then the average age has relentlessly crept up each year, little by little.

By 1975 when Apollo linked up with the Soviet's Soyuz spacecraft high above the clouds, the average age of a KSC space worker was almost 44. It is now 45. And about a third of the work force is over 50.

Is NASA worried about one third of its workers being over 50?

"As my old philosophy professor used to say, perception is everything," said George English, director of KSC's executive management office. "Look at it this way; two thirds of our work force is under 50."

It is, after all, a matter of whether you think the bottle is one third empty or two thirds full. And English stresses that in the last few years the aging of the agency and KSC has slowed down dramatically.

"From 1978 to 1979, the agency as a whole had the smallest increase in 10 years," he said. KSC aged only two tenths of a year in the same period.

"What we are most concerned about is the retirement potential," said Duggan. "At the end of each fiscal year, we look at how many people can tip their hats and walk away at their own option at any time."

At KSC, about 9 percent of the civil service workers (207 out of 2,200) could come to work one day and sing the lyrics of that country song that tells the employer what he can do with his job. And in a business where experience gained from the first launch is invaluable for the success of each subsequent launch, the sudden loss of 9 percent of the work force could be devastating.

But like the erroneous and untimely news of Mark Twain's demise, the reports of KSC's mass retirement are exaggerated, maintains English.

"I just don't think it will happen," he said. "I know that's been predicted, and we certainly have some people who are staying around through the launch, but I don't anticipate any mass exodus." (TODAY, Monday, August 11, 1980)

- National Aeronautics and Space Administration reaffirmation of March as a first space shuttle launch goal will force the Kennedy Space Center into a 7-day/24-hr. work week without any schedule flexibility. Under this concept, delayed work will translate directly into further launch delay, but the workforce will be pushed to maximum output to achieve the earliest liftoff possible.

  "It's a question of what is the situation of pressures under which a team of people can work best. We believe we are not at a 'business as usual' point in this program," Robert A. Frosch, NASA administrator, said. The decision to hold to a March goal was made after a lengthy shuttle review.

  The real threat to a March liftoff comes from NASA's decision to densify an additional 4,700 tiles on the orbiter Columbia, work that will keep the vehicle in the Kennedy Orbiter Processing Facility until about Nov. 23. NASA earlier listed March as the most probable month for first flight, but March is now more of a goal to maintain the highest work force pace, with April the earliest likely first launch date.

  The March goal lops nine weeks off the 24-week schedule Kennedy Space Center earlier said would be necessary for the highest confidence spacecraft flow through the Vehicle Assembly Building, pad checkout and first launch. That flow was based on a five-day, three-shift operation with significant pad between critical tests and buildup milestones. The 15-week schedule now selected, however, will require a seven-day/three-shift operation with no schedule pad and deletion or combination of some test activities.

  The schedule is more aggressive than ever used for an Apollo vehicle, and Kennedy management will be watching specifically for work force fatigue and test reconfiguration difficulties as threats to achieving the March objective. Potential test reconfiguration problems could arise when new tests are begun before full analysis of previous test results are available. Problems in this area could force time-costly reconfiguration and retesting. (Aviation Week & Space Technology, Vol. 113, No. 6, Monday, August 11, 1980, p 27)

August 12: The Viking I Orbiter, which has run out of nitrogen control gas, was switched off by JPL controllers last week. The Viking II Orbiter ceased operation earlier this year. The Viking I Lander continues to operate on the Martian surface and NASA will receive signals from the spacecraft on a weekly basis. (Defense Daily, Vol. III, No. 29, Tuesday, August 12, 1980, p 213)

August 13: NASA's John F. Kennedy Space Center has awarded a $27,582 contract to the Morton Company in Hayward, California, for equipment that will be used to handle recovery equipment for the Space Shuttle's solid rocket boosters.

The firm, fixed-price contract is for procurement of five handling pallets and eight retrieval hook assemblies that will be used to handle the solid rocket booster dewatering plugs which will be used in recovery operations. (NASA News Release No. 140-80, August 13, 1980)

August 14: NASA's Lewis Research Center is seeking proposals for analysis of the preliminary design of a zero-gravity combustion facility for Spacelab. The contractor will evaluate the sufficiency of design, make recommendations for modification as necessary and estimate costs for final design, fabrication, assembly and performance testing of the modified facility design. (Defense Daily, Vol. III, No. 31, Thursday, August 14, 1980, p 230)

o The Soviet Union has launched Cosmos 1205 from Plesetsk on a photographic reconnaissance/surveillance mission. The satellite was put into an orbit of 208/332 kilometers, 72.8 degrees, 89.6 minutes. (Defense Daily, Vol. III, No. 31, Thursday, August 14, 1980, p 230)

August 15: NASA's John F. Kennedy Space Center has awarded a contract to Lear Siegler, Inc., Romec Division, Elyria, Ohio, for four quick disconnect devices to be used in detecting hydrogen leaks in the Space Shuttle orbiter.

This device hooks up to internal gas sampling lines on the orbiter at the landing strip to draw gas samples and measure hydrogen content after landing. (NASA News Release No. 145-80, August 15, 1980)

August 16: One third of the Space Shuttle went on its maiden voyage Friday - 375 feet out of its hangar.

Looking like a couple of oversized candles on a birthday cake, the Shuttle's two strap-on rockets were wheeled out of the Vehicle Assembly Building atop the movable pad from which the Shuttle is scheduled to be launched in March.

The rollout was part of a test designed to measure the stress generated when the Shuttle's fuel tank is attached to the rockets and filled with supercold gases. (TODAY, Saturday, August 16, 1980)

August 18: Operational mode of the maneuvering backpack for space shuttle astronauts has been modified to reflect the more important role the system may play during early shuttle flights if it is necessary to inspect and repair the orbiter's thermal protection system (TPS) tiles in space.

The 330-lb. backpack initially was developed as a means of increasing astronaut mobility during operational shuttle missions as crew members performed extravehicular tasks such as servicing spacecraft, transferring payloads from nearby satellites or building large space structures.

A new dimension was added to the manned maneuvering unit (MMU) program, however, when it was determined that some thermal tiles might be damaged during early shuttle launches and require repair prior to reentry. As a result, Martin Marietta last year was requested to expedite development of the backpack so it could be available for initial shuttle missions if necessary.

National Aeronautics and Space Administration recently decided not to fly the manned maneuvering unit on the first shuttle flight for potential in-orbit tile inspection and repair, although program officials said development would continue at the current pace so required systems would be available for early shuttle flights as a backup measure.

The MMU is a derivative of the M509 maneuvering unit Martin Marietta developed during the early 1970s. The M509 was tested by five astronauts during 1973 and 1974 in the Skylab orbital workshop. (Aviation Week & Space Technology, Vol. 113, No. 7, Monday, August 18, 1980, p 65)

- Although the Space Shuttle will soon begin carrying the free world's satellites into space, "birdwatchers" at Cape Canaveral who thrill to the drama of unmanned launches will have much to look forward to in the next few years.

  Presently, 17 space missions are scheduled to be launched from this east coast launch site through 1982, with a high probability of at least five additional launches during those years.

  The 17 launches involve placing a variety of communications and weather satellites into orbit for both government and commercial customers. The additional launches are those which could be launched aboard traditional Atlas Centaur and Delta rockets or the Space Shuttle. The launch customer may choose between the traditional boosters or the Space Shuttle, depending on the shuttle's availability. (NASA News Release No. 137-80, August 18, 1980)

- The Soviet Union launched Cosmos 1206, believed to be an electronic intelligence monitoring spacecraft, on Friday, August 15. It was put into an orbit of 630/659 kilometers, 81.2 degrees, 97.4 minutes from Plesetsk. (Defense Daily, Vol. III, No. 33, Monday, August 18, 1980, p 241)

- NASA Goddard has awarded a $14 million letter contract to McDonnell Douglas Astronautics for production of long lead items for six additional Delta launch vehicles. (Defense Daily, Vol. III, No. 33, Monday, August 18, 1980, p 242)

- Soviet Union has begun to promote the success of its Salyut space station program as a direct contrast to the lack of U.S manned flight capability resulting from space shuttle delays.

  The United States used its last Apollo for the Apollo-Soyuz test project, then switched over to the design of the space shuttle, due to which it has not conducted a single manned space flight for the past five years," the Russians said. "The point is that the strategy chosen by the U.S. leadership has led to a long break in the implementation of the national program and to the postponement of the programs of international cooperation for those countries which have linked their fate with the shuttle."

The Soviets pointed out how the joint Soviet manned flights to Salyut 6 with Soviet Bloc countries and Vietnam had expanded their "sphere of cooperation" in international space activities, an area the U.S. has been unable to capitalize on because of space shuttle delays.

"It is difficult to say who will suffer most as a result of the course taken of late by the United States, the course of scaling down economic, scientific, technical and other ties with the Soviet Union," the Russians said. (*Aviation Week & Space Technology*, Vol. 113, No. 7, August 18, 1980, p 22)

o The Viking Project which produced an amazing amount of information on and numerous startling pictures of Mars wound down to one active unit August 7.

At 12:45 p.m. PDT controllers at Jet Propulsion Lab sent the signal to turn off Viking Orbiter 1. It will now sail along silently in orbit for several years before finally falling onto the red planet.

The only active unit of the mission is Viking Lander 1 which will continue to send messages to Earth. It will transmit weather data and one picture each week for at least 10 more years. It is operating in an automatic mode, and its nuclear power supply is expected to last until about 1994.

The two Viking spacecraft were launched in 1975 from Kennedy Space Center by Titan III-Centaur rockets. Both arrived at Mars in 1976. Both landers made successful soft landings on the surface and sent back results of soil analyses, weather data and numerous pictures. (Marshall Star, Vol. 20, No. 49, August 20, 1980, p 4)

o As many as 22 rockets will carry satellites into orbit from the Cape during the next few years to backstop NASA's Space Shuttle.

NASA announced that 17 missions are firmly scheduled for space flight from Cape Canaveral Air Force Station through 1982, with five more flights probable. NASA calls the flights transitional since it plans to eliminate single-shot rockets completely once the Shuttle becomes operational.

Customers who have booked space on the Shuttle may book a flight on more traditional launch vehicles, such as an Atlas Centaur or a Delta if the Shuttle is unavailable. Because the Shuttle is more than two years behind

schedule and because the Shuttle's first flight with a major payload is scheduled for September 1982, some customers are opting for a firm launch date on a single-shot rocket.

Although this will be more expensive, it eliminates the ever-shifting Shuttle launch schedule that results from schedule slips and resultant payload juggling.

According to NASA's most recent schedule for rocket flights, two Deltas and two Atlas Centaurs will be launched during the remainder of 1980. In 1981, six Atlas Centaurs and three Deltas are scheduled to blast off. Other Delta flights are possible.

During 1982, one Atlas Centaur and three Deltas are committed, according to the schedule. As many as four Atlas Centaurs may be launched by the end of 1984.

Space industry estimates are considerably higher. McDonnell Douglas Astronautics Co. - the company that builds Delta rockets, tests and launches them - forecasts it will be launching at least a dozen Deltas a year during 1982, 1983 and 1984.

An additional Delta pad at the Cape is being modified to handle the more powerful Delta 3914, a rocket able to send 2,100 pounds into a stationary orbit. An Atlas Centaur can put 4,150 pounds into a stationary orbit. (TODAY, Wednesday, August 20, 1980)

NASA LAUNCH CALENDER

Here is the NASA schedule of 22 expendable rocket launches through 1982 which was announced Tuesday.

Seventeen of the shots are firm dates, with five listed as having a "high probability" for launch.

MISSION	VEHICLE	PAD	DATE
	1980		
GOES-D	Delta	17A	Sept. 9
SBS-A	Delta	17A	Oct. 23
FLTSATOM-D	Atlas Centaur	36A	Oct. 28
INTELSAT V F-2	Atlas Centaur	36B	Nov. 20
	1981		
COMSTAR	Atlas Centaur	36A	Feb. 26
GOES-E	Delta	17A	Mar. 12
INTELSAT V F-1	Atlas Centaur	36B	Mar. 19
SBS-B	Delta	17A	Apr. 23
FLTSATCOM-E	Atlas Centaur	36A	June 2
RCA-D	Delta	17A	June 18
INTELSAT V F-3	Atlas Centaur	36B	June 25
INTELSAT V F-4	Atlas Centaur	36B	Sept. 17
RCA-C1	Delta	17A	Oct. 29
INTELSAT V F-5	Atlas Centaur	36B	Dec. 10
	1982		
WESTAR IV	Delta	17	Jan. 7
INSAT 1-A	Delta	17	Feb. 18
TELESAT-E	Delta	17	May 13
TELESAT-F	Delta	17	Aug. 5
GOES-F	Delta	17	Sept. 16
RCA-E	Delta	17	Oct. 28
HCI	Delta	17	Dec. 9
INTELSAT VI	Atlas Centaur	36B	4th Qtr.

(TODAY, Wednesday, August 20, 1980)

August 21: Not rain nor sleet nor snow can stop the U.S. mail. But the forces of nature certainly have slowed down America's Space Shuttle program.

Getting the Spaceship Columbia off the pad and into near space has been delayed again and again by technological hangups encountered while developing the Shuttle - a radically new flying machine that takes off like a rocket and lands like an airplane.

Heat shedding tiles that break up like snack chips and engines that fizzle when they should be roaring have contributed to a launch date now more than two years behind schedule.

But all of the Shuttle's problems have not been technological. The forces of nature have been hard at work on the hangar-bound spacecraft.

For instance, the Shuttle program has been plagued by concerns about:

- o Rats eating rocket fuel.
- o Woodpeckers pecking holes in the spacecraft's fuel tank.
- o Lightning zapping the Shuttle before it gets off the ground.
- o Birds building nests in launch equipment.
- o Alligators feasting on downed astronauts.
- o Water birds taking over the Shuttle's landing strip.

(TODAY, Thursday, August 21, 1980)

August 22: Long after the $9 billion space shuttle makes its first scheduled flight in March 1981, the National Aeronautics and Space Administration will still be using rockets to launch dozens of commercial and scientific payloads.

A recently revised NASA schedule calls for at least 17 rocket launches by 1982 and as many as 33 by 1984. Most of the Delta and Atlas-Centaur rockets will be carrying payloads bumped from the shuttle.

Even after the orbiter is in full operation in September 1982, NASA has tentative plans to launch satellites aboard 10 expendable rockets. The Air Force also will rely heavily on rockets as a backup for the tardy space plane.

The new schedule includes four rocket launches this year, nine next year and four in 1982. The space agency also anticipates 15 "probable" rocket launches by 1984. (Sentinel Star, Friday, August 22, 1980)

o NASA's John F. Kennedy Space Center has awarded a $433,563 contract to Expedient Services, Inc., of Titusville, for road and ground support services and roads and waterways maintenance and repair.

The cost-plus-fixed fee contract is one set-aside for small business firms. The contract work will extend through December 31, 1980. (NASA News Release No. 149-80, August 22, 1980)

August 25: Some high school students may have spent the summer trying to perfect a suntan. Others may have earned a few dollars at odd jobs. But Titusville High Senior Gina Wilson and seven others from this area made lasting contributions to the space program here.

All but one of the eight will soon begin their senior year in local high schools, and some will remain available for part time space center work during the year.

The research they did here ranged from analysis of marine bottom life in a long term Space Shuttle environmental effects study to the interpretation of satellite views of citrus groves to test technological applications.

The aforementioned Gina Wilson did much of the work in the marine life study, and her contributions were most appreciated in what had been a two-person shop. Her observations will serve as part of a baseline to observe what effects, if any, the Space Shuttle will have on the local ecology. Also from Titusville High, Woodrow Grady helped design a monitor and test board which connects widely separated atmospheric monitoring stations. The test board also helps to troubleshoot the monitors without actual visits to the miles-separated stations.

Mike McKenna and Tom Horsfield, both of Satellite High School, often worked together as they tested fiber optics transmission characteristics and developed prototype electronic devices. Also working together were Wanda Brown of Titusville High and Beverly Roberts of Merritt Island High School. In KSC's Malfunction Lab, they tested polymeric and polyurethane substances in an attempt to limit the number of materials which are used in spacecraft design.

Cocoa Beach High School's Paul Enriques did a study which compares data from the LANDSAT spacecraft to ground observed conditions in both citrus groves and at phosphate mines in Florida. His research attempted to verify the accuracy of satellite surveys of those two types of land uses.

The other apprentice from Cocoa Beach High School is Tom Lorch, who worked in the wet analysis branch of a KSC chemical lab, determining the exact amounts of trace chemicals in various fluids. He learned to operate almost all of the esoteric analytical equipment in the lab, and said that the experience helped him to decide between a career in chemistry or engineering.

Helping the students pick a career was just one benefit of the new program. The students' contributions have proven to be valuable to NASA as well. As one of the students said, "It makes me feel good to realize that my work here will be used for many years."

NASA agrees. One official said, "As with anything new, there was some apprehension on both sides at first. Now, we couldn't be happier with each other. The reports from the supervisors are uniformly in praise of the students." One mentor, or supervisor, was quick to point out that next year he wants four students instead of two because they produce high quality work and are enthusiastic.

His request could be answered. Next year's allotment for NASA is expected to increase to 250 students, with 16 students, to work here. As word of the program gets out, there should be more than enough who are willing to trade a summer of tanning for ten weeks with the space program. (NASA News Release No. 148-80, August 25, 1980)

August 26: The overall objective of the Voyager mission is to investigate the Jupiter and Saturn planetary systems and the interplanetary medium by means of an instrumented spacecraft on a flyby trajectory that will use Jupiter's gravity-assist to reach Saturn.

The scientific objectives of the mission are:

a. To conduct comparative studies of the Jupiter and Saturn systems, including:

   1. The environment, atmosphere, surface and body characteristics of the planets.

   2. One or more of their satellites.

   3. The nature of the rings of Saturn.

b. To perform studies of the interplanetary medium between Earth and Saturn.

(signed)
A. Thomas Young
Director
Lunar & Planetary Programs

(signed)
Noel W. Hinners
Associate Administrator
for Space Science

(Mission Operation Report - Office of Space Transportation Operations - No. S-802-77-01-02, August 26, 1980, p 25)

o What costs $22 million, can spot hurricanes thousands of miles away and looks like a hot tub with an antenna?

The answer is the weather satellite that will be launched from Kennedy Space Center on Sept. 9 sometime between 6:27 and 6:58 p.m. aboard a Delta rocket.

The satellite's official name is GOES-D, short for Geostationary Operational Environmental Satellite. That's aerospace talk for a weather satellite that will "hover" in stationary orbit 22,250 miles above Columbia, South America.

From this vantage point, the satellite can take pictures of the cloud formations over about a third of the globe, including all of North and South America.

GOES-D will replace GOES-East, whose vital gases are running out. GOES-East provided all those awesome pictures of Hurricane Allen. But GOES-D will be able to do more than GOES-East.

"It has the capability of atmospheric sounding," said Ron Gunton, the project's launch system manager. "It will measure the moisture content at various levels above the Earth."

What's the use of knowing the moisture content at various levels above the Earth?

According to Pat Linder, test engineer for Hughes Aircraft Co., the company that built the satellite, "The National Oceanic and Atmospheric Administration along with weather forecasters have a goal set that by the end of the

decade they will be able to accurately forecast weather 30 days ahead of time. And one of the keys to this will be the weather sounding device on this spacecraft," Linder said. (TODAY, Tuesday, August 26, 1980)

August 27: Ronald L. Smith and family of Tulsa, Oklahoma, became the 15 millionth visitors to take a guided bus tour of the Kennedy Space Center on Sunday, August 24.

Smith, his wife, Bernadette; son, Sean, 13, and daughter, Tara, 10, were honored at a special ceremony on Monday, August 25, at the Kennedy Space Center's Visitors Center.

Presentations of plaques and photographs on various aspects of the nation's space program were made by Richard G. Smith, Director of the Kennedy Space Center, and Harry B. Chambers, Vice President and General Manager of TWA Services, Inc., operator of Kennedy Space Center Tours. (NASA News Release No. 153-80, August 27, 1980)

August 28: NASA's John F. Kennedy Space Center has awarded a contract to New World Construction of Titusville to replace a 1.5 ton bridge crane used in preparing solid propellant motors for use on the Delta launch vehicle, a "workhorse" in NASA's expendable rocket stable. (NASA News Release No. 154-80, August 28, 1980)

o Columbia's complexion is looking better these days, and the meticulous work to install heat protection tiles on its outer skin should cause no further launch delays, project officials said Wednesday.

Work on the heat shield tiles -- costing $700 to $1,000 each to make and install -- has caught up with revised schedules that could lead to a launch as early as next March, they said.

Astronaut Bob Overmyer, assigned to the Cape from Johnson Space Center in Texas as deputy manager of the shuttle orbiter, said concern about further delays centers on the orbiter's main engines.

The time-consuming task of installing the fragile, ceramic-coated tiles that will keep the spaceship from burning up on its return from orbit should be completed in about 10 weeks, Overmyer said.

The work is a lot more that cosmetic -- it could mean life or death for the astronauts who will fly Columbia.

"It isn't like going out and tiling your bathroom or floor," said Overmyer.

But he said the installation rate -- which has been a key factor in the program delays -- is averaging about 500 tiles a week, with about 5,000 gaps left to fill.

NASA hopes to finish the tiles and other work by Nov. 24, when the Columbia is scheduled to be moved from its hangar into the mammoth Vehicle Assembly Building for mating to other components of the hybrid half-rocket, half-plane spaceship. (Sentinel Star, Saturday, August 16, 1980)

fell **August 29:** A Kennedy Space Center ironworker was seriously injured Thursday afternoon when he (fee) nearly five stories from a launch platform being modified for the Space Shuttle.

George "Steve" Dixon, 20, of 201 Arthur Ave., Cocoa Beach, was drilling holes on the massive platform when he fell, about 1 p.m., said his father, James Dixon, who was working as his son's foreman.

The young man was rushed to Jess Parrish Memorial Hospital in Titusville and was in surgery for five hours. He was listed in serious condition late Thursday. (TODAY, Friday, August 29, 1980)

September 1: If the Space Shuttle's technical problems aren't enough to keep it out of the sky, labor problems threaten to ground the world's most sophisticated spaceship.

Brevard County labor leaders say three disputes earlier this year, settled only after strikes by engineers and by guards and a strike threat by firefighters, are a taste of the next few years when more union contracts come up for renewal.

At the root of the space center labor problems in February and March was COLA. That doesn't mean space center guards, engineers and firefighters were asking for more soft drinks in the canteen - they wanted a guarantee against inflation.

Generally, the COLA - or cost-of-living adjustment - is a provision that grants a pay increase based on a rising rate of inflation. With it, pay is increased as the price of consumer goods shoots up.

For the three space center unions, the adjustment was the only issue holding up an agreement. Labor saw it as necessary in times of double-digit inflation.

Management, however, considered the adjustment a major cause of inflation. (Today, September 1, 1980)

o Relations between Europe and the U.S. concerning future projects in space will be characterized by both cooperation and competition, depending largely on the project involved.

Ariane, Europe's launch vehicle, represents the most competitive end of the spectrum of relations. Restrictions on the European use of U.S. launchers, initiated by the Nixon administration, stimulated the program to develop Ariane. Now, Europe is selling payload space to satellite users who otherwise would have bought launches on the U.S. space shuttle.

Spacelab, built in Europe and designed to fly on board the U.S. space shuttle, probably represents the most cooperative end of the spectrum, although a significant segment of the European space community believes the U.S. is getting the lion's share of the benefits from Spacelab.

The two programs, although poles apart, have impact on each other. The shuttle now has been delayed about three years. Europeans involved in Ariane view the delay as an asset. They believe further delays will cause satellite users to buy more space on the European launcher. At the same time, these delays create anxiety among Europeans who have built experiments for the first Spacelab flight on board the shuttle.

Between these two extremes, there will be opportunities for cooperative projects between the European Space Agency and the National Aeronautics and Space Administration. ESA recently decided to undertake a mission called Giotto to Halley's Comet. The agency, however, has left the door open for a joint ESA/NASA cometary mission. (Aviation Week & Space Technology, Vol. 113, No. 9, September 1, 1980, p 275)

September 3: A prelaunch news conference on Geostationary Operational Environmental Satellite (GOES)-D, the first in a series of improved weather observers for the National Oceanic and Atmospheric Administration, will be held at 11 a.m. on Monday, September 8, in the E&O Building Conference Room at Cape Canaveral Air Force Station.

GOES-D will replace the weather satellite, GOES-East, that tracked Hurricane Allen's recent assault on the Texas coastline. GOES-D is scheduled to be launched atop NASA's workhorse Delta rocket on September 9 from Complex 17. (NASA News, Release No. KSC 156-80, September 3, 1980)

o Shuttle improvements for the operational era were identified and discussed. The next Management Council meeting will discuss Shuttle enhancements to improve turnaround. The Senior Staff is encouraged to support the on-going effort by the Shuttle Program Office to identify Shuttle operational improvements.

The Shuttle on-board O_2 system is being modified as a result of an O_2 system failure at JSC. KSC should also review the failure analysis to see if any "lessons learned" were applicable to KSC equipment. Mr. Parker stated that a review has already been initiated.

The ET GH_2 vent system backpressure mods should be incorporated into the ground system equipment to retain the 3 psig back-pressure capability, even though the static preload between the SRB's and the ET has been baselined. Dr. Gray stated that the backpressure mod package and the associated software has been approved for incorporation into the ground system equipment as soon as possible.

Mr. Clark discussed two concerns of BSI management. First, the requirement to have first line directors approval for anyone working over 12 hours per day or 60 hours per week. Mr. Parker stated that there was a safety requirement and he would review the requirement.

The second concern was for pad office space being satisfied by the "box-cars" on schedule. Mr. Minderman stated that the schedule was indeed very tight and efforts are being made to ensure that the schedule will be met.

Mr. Clark stated that the KSC Playalinda Beach policy has not changed and that the 3 1/2 miles security zone is still the official policy.

Mr. Page stated that the decision to remove the FRCS for structural mods had been made and that the work could be done in parallel with no schedule impact. Status of the orbiter and ET hardware was reported as satisfactory.

Mr. Parker stated that the draft of the accident report is complete for the worker who fell off Mobile Launcher #2 last week. The report will include recommendations to decrease the hazard levels on the ML; e.g., safey nets. (Staff Notes #32-80 from Meeting of OSTS Management Council Held September 2, 1980)

o Estimated cost of procuring the final two Space Shuttle Orbiters and of modifying the first two bought in development rose by $866 million from FY '80 until the FY '81 budget was presented in January.

In FY '71 dollars, the currency used to estimate non-inflation costs of the Shuttle, the increase was $331 million, or 25 percent. (Defense Daily, Vol. 112, No. 1, Wednesday, September 3, 1980, p 4)

- The Indian Space Research Organization says it plans to launch 500-600 kilogram satellites within the next 5-6 years by evolutionary upgrading of the SLV-3 launch vehicle. Further, the organization said, it plans to use "polar launch vehicles very soon." (Defense Daily, Vol. 112, No. 1, Wednesday, September 3, 1980, p 4)

- Satellites may be able to give a one to two day warning of the creation of tropical cyclones, according to NASA's Goddard Space Flight Center. Work to date has been based on inferring the latent heat [heat released as water vapor] in storms by observing the rainfall rate within the storm using the electrically Scanning Microwave Radiometer aboard Nimbus-5. Increases in latent heat release precede the formation of a cyclone by one or two days. (Defense Daily, Vol. 112, No. 1, Wednesday, September 3, 1980, p 4)

September 4: The Geostationary Operational Environmental Satellite (GOES) program is a joint effort of the National Aeronautics and Space Administration (NASA) and the Department of Commerce, and is intended to provide systematic worldwide weather coverage. The GOES program uses spacecraft in geosynchronous (stationary) orbit to obtain both day and night information on the earth's weather through the use of an instrument which forms images of the earth's surface and cloudcover for transmission to regional data-user stations for use in weather prediction and forecasting.

The pilot program, Synchronous Meteorological Satellite (SMS), launched three spacecraft: two prototype spacecraft designated SMS-A and SMS-B and one operational spacecraft designated SMS-C/GOES-A. Subsequently, GOES-B was successfully launched on June 16, 1977, and GOES-C on June 16, 1978. The GOES-D, -E, and -F launch series is presently scheduled, with these spacecraft designed for a 7-year useful life.

As provided for in the NASA-Commerce agreement, NASA is conducting an R&D program to develop improved sensors and techniques for the operational program. This program includes development of advanced radiometers and atmospheric sounders, improved spacecraft subsystems, etc.

NASA's primary objectives for the GOES-D mission are:

- To launch the GOES-D into a synchronous orbit of sufficient accuracy to enable the spacecraft to provide the capability for continuous observations of the atmosphere on an operational basis.

- To flight test the GOES-D in orbit and, when checked out, turn the spacecraft over to NOAA for operational use.

- To demonstrate, validate and assess the temperature and moisture soundings from the VISSR Atmospheric Sounder (VAS).

(Mission Operation Report - Office of Space Transportation Operations, No. E-612-80-02, September 4, 1980, p 1)

September 5: McDonnell Douglas Technical Services Co. has been selected by NASA-Johnson over Lockheed Engineering & Management Services for a six-year contract to provide engineering and operations support for the Space Transportation System. Estimated cost for the first four years of the contract is $25 million. It calls for technical and analytical support for STS engineering systems analyses, flight design, flight operations and management systems support. (Defense Daily, Vol. 112, No. 3, Friday, September 5, 1980, p 21)

- A sixteenth Moon of Jupiter, 25 miles in diameter and orbiting about 35,000 miles above the cloudtops of the planet has been discovered by Voyager scientists Stephen Synnott in analyzing Voyager photographs. It is the third Jovian moon detected via the Voyager mission. (Defense Daily, Vol. 112, No. 3, Friday, September 5, 1980, p 24)

September 6: Richard G. Smith, Director of the Kennedy Space Center, announced today that the results of the continuing analysis of security and safety requirements when the Space Shuttle is on the launch pad indicates restrictions to public access to Playalinda Beach can be significantly reduced. The ongoing analysis--conducted by NASA and the DoD--includes an assessment of national security requirements and KSC topography. "We have some more analysis to do and we may conduct some tests at the Beach Road to verify the analysis, but I'm very encouraged by the results we have to date," Smith said. "We have been working on this question for some months, *and I feel that we have accumulated enough information to update our* previous statements."

Current assessments of the shuttle security and safety requirements indicates that the public will be allowed vehicular access to Playalinda Beach via Beach Road when the Space Shuttle is on Pad A. Access to the road will be restricted during propellant loading, final countdown, launch and landing. During periods of vehicular access, the road will be under patrolled security surveillance, potentially including random vehicle inspections. (NASA News, Release No. 159-80, Sept. 6, 1980)

September 10: (Following is the text of NASA's press release on relaxed security measures on S. R. 402, leading to Playalinda Beach.

Released Saturday, it was the subject of two press conferences Monday--an 8 a.m. Holiday Inn meeting featuring Cong. Bill Nelson, Save Our Beach (SOB) representatives and Titusville government and business leaders as well as a 9:45 a.m. press conference at Kennedy Space Center (KSC) Headquarters. Featured there were KSC Director Dick Smith, Nelson and Canaveral National Seashore Superintendent Don Gulton, who also spoke at the earlier conference.)

Richard G. Smith, Director of the Kennedy Space Center, announced today (Sept. 6) that results of the continuing analysis of security and safety requirements when the Space Shuttle is on the launch pad indicates restrictions to public access to Playalinda Beach can be significantly reduced. The ongoing analysis conducted by NASA and DOD (Department of Defense) -- includes an assessment of national security requirements and KSC topography. "We have some more analysis to do and we may conduct some tests at the beach road to verify the analysis, but I'm very encouraged by the results we have to date," Smith said. "We have been working on this question for some months, and I feel that we have accumulated enough information to update our previous statements." (Star Advocate, September 10, 1980, p 1)

- An oversight hearing on the Science & Technology Policy Act and the activities of the White House Office of Science & Technology Policy will be held Sept. 19 by Sen. Adlai E. Stevenson's Senate Space Subcommittee. The subcommittee will review the Administration's first 5-year Science & Technology Outlook report and review S&T issues likely to be on the policy agenda in the coming year. (Defense Daily, Vol. 112, No. 6, Wednesday, September 10, 1980, p 46)

- On Sept. 3 the Soviets launched Cosmos 1209 from Plesetsk which it also identified as an Earth resources spacecraft. It was put into an orbit of 222/306 kilometers, 82.3 degrees, 89.4 minutes. (Defense Daily, Vol. 112, No. 6 Wednesday, September 10, 1980, p 43)

- The Soviet Union yesterday launched a Meteor 2 series weather satellite from the Plesetsk base, putting the spacecraft into an orbit of 868/906 kilometers, 81.2 degrees, 102.4 minutes. Moscow says the satellite will take global images of cloud cover and underlying ground areas in the

visible and infrared. It also carries radiometers for continuous observation of the penetrating radiation fluxes in near-Earth space. (Defense Daily, Vol. 112, No. 6 Wednesday, September 10, 1980, p 47)

September 11: Work on the Space Shuttle has been proceeding on schedule for a change, and a launch in middle or late March is still likely, despite some newly discovered problems, said John Yardley, NASA's Associate Administrator for the Shuttle.

At a press conference in Washington, D. C., Yardley said all the major activities planned during the first five weeks of NASA's new accelerated schedule for Kennedy Space Center had been accomplished.

But Yardley pinpointed three things that could still postpone a March launch; more main engine trouble, unsatisfactory results of tile tests and further problems with the Columbia's orbital engines. (Today, Thursday, September 11, 1980)

o Installation of the Thermal Protection System (TPS) tiles on the Space Shuttle Orbiter Columbia (OV-102), which has been the pacing factor in the Shuttle launch, is now thought by NASA to be "well under control," NASA Associate Administrator John Yardley said yesterday.

A total of 26,281 of the 30,922 tiles required on Columbia were in place as of Sept. 7, leaving 4641 cavities. A total of 738 tiles were bonded to the Orbiter last week, with 307 removed, for a net gain of 431. Yardley said all of the tiles should be installed by mid-November, preparatory to the roll-out of Columbia by Nov. 23.

The schedule calls for the Flight Readiness Firing of the Shuttle engines on the pad at the Cape on Feb. 7, with flight by March 31. As things now stand, the flight may come a few weeks earlier.

Yardley also reported that testing on the Space Shuttle Main Engine has resumed and that the program is on schedule. He said that the agency plans to conduct two more Main Propulsion Tests, the next on Nov. 1, and the second on Dec. 1. If these are "letter perfect," additional MPT tests will probably not be conducted. If there is a problem, a third test could be held at the end of December. (Defense Daily, Vol. 112, No. 7, Thursday, September 11, 1980, p 54)

September 12: Over 9,300 KSC workers and their families took the opportunity to get a close-up look at the Orbiter Columbia on Labor Day as KSC held an Open House at Complex 39. In addition to the Orbiter Processing Facility, visitors were allowed to tour Apollo and Space Shuttle firing rooms in the Launch Control Center and drive their cars out to Pad 39-A and the Shuttle Landing Facility. (Spaceport News, Vol. 19, No. 19, September 12, 1980, p 1)

o Unemployed since the last Saturn V blasted off five years ago, Pad 39-A is nearly ready for its new job--launching the Space Shuttle Columbia.

Major modifications to the facility are nearing completion, project engineers said this week, and it's expected to be launch-ready when the Shuttle rolls out of the Vehicle Assembly Building late this year.

"It's going to be a busy fall but I think we will be in pretty good shape," said Howell Row, chief project engineer.

Most of the current activity involves completion of several modifications which were determined to be necessary at a relatively late date in the program and not included in original facilities design.

Just last spring, for example, it was decided that some method was needed to reduce excessive moisture which has been absorbed by insulation on the orbiter's Orbital Maneuvering System, or OMS, pods. Above acceptable limits, moisture in the OMS pod insulation could cause structural problems during re-entry.

A device which KSC designed and built is scheduled to be installed on the pad's Rotating Service Structure next month to take care of the problem.

Pad project engineer Gary Ray described it as an encapsulation device which will fit over the OMS pods when the Shuttle is on the pad and allow a continuous flow of hot air to dry out the insulation. (Spaceport News, Vol. 19, No. 19, September 12, 1980, p 1)

- Charles D. Gay, KSC's Director of Deployable Payloads Operations, will serve as Vice Chairman of the Eighteenth Space Congress next spring.

  Since joining NASA in 1964, he has held positions as Spacecraft Test Conductor and deputy division chief during the Gemini and Apollo programs. More recently, he has been responsible for flight hardware operations and involved in launch facility modifications.

  The theme of this year's symposium on space technology is "The Year of The Shuttle." Sponsored by the Canaveral Council of Technical Societies, the Eighteenth Space Congress is scheduled for April 29 through May 1. (Spaceport News, Vol. 19, No. 19, September 12, 1980, p 3)

- The GOES-D satellite launched Tuesday is on its way to a post where it will keep watch over North and South America's weather, a Goddard Space Flight Center spokesman said.

  After the satellite had made two trips around the Earth, a tracking station in Australia sent a signal to the new weather watcher at 5:43 p.m. Wednesday to begin circularizing its orbit. NASA had originally planned to let the satellite go around the Earth three times before beginning to reshape its egg-like orbit into a circular orbit. (Today, Friday, September 12, 1980)

- The fourth Geostationary Operational Environmental Satellite (GOES-4) was successfully placed into a 166/49,786 kilometer, 26.5 degree transfer orbit Tuesday by a three-stage McDonnell Douglas Delta 3914 vehicle. Kick stage firing to boost the 875-pound weather satellite into geosynchronous orbit was scheduled for 8 A.M. yesterday. Launch was made at 6:27 P.M. from Complex 17 at the Cape.

  Built by Hughes Aircraft under a $39.4 million NASA contract, which also includes GOES-E and F, the GOES-4 will monitor weather over Canada, the U.S., Central and South America, and a large area of the Atlantic, with a new capability to provide storm warning.

  Primary instrument of the GOES-4, as well as GOES-E and F, is a Visible and Infrared Spin-Scan Radiometer (VISSR) built by Hughes' Santa Barbara Research Center, which will provide new data on the vertical structures of temperature and moisture in the atmosphere--data necessary to detect development of severe weather.

The launch of GOES is the first NASA launch since the unsuccessful NOAA-B launch on May 29, a hiatus of 103 days, which is near the agency's record for inactivity. (Defense Daily, Vol. 112, No. 8, Friday, September 12, 1980, p 62)

September 13: As many as 15 people who were working on the Space Shuttle Columbia at Kennedy Space Center have been exposed to enough microwave radiation to send them to the doctor for eye examinations, NASA disclosed Friday.

KSC's Biomedical Director Paul Buchanan said that one of the Columbia's S-Band antennas was inadvertently left on after a test Aug. 21. The antenna stayed on for three days while Rockwell International Corp. employees worked around it.

The official said it was unlikely any of the workers received a harmful dose of radiation. (Today, Sunday, September 13, 1980)

September 15: The Holloway Corporation of Titusville, Fla., has won a contract with NASA's John F. Kennedy Space Center to relocate two weather towers.

Under the $37,539 contract, Holloway will move the 60-foot towers to locations in the Space Shuttle Launch Complex 39 area, and to a test facility located in the KSC Industrial Area. The firm will also build a small instrument shelter for each tower and install power signal cabling. (NASA News, Release No. KSC 163-80, September 15, 1980)

o Rockwell's Space Systems Group has received $945,000 from NASA's Langley Research Center for assessment of alternate Thermal Protection Systems (TPS) for the Space Shuttle Orbiter. Rockwell was selected for the nine-month study over Boeing Aerospace four months ago. Primary objective of the study is to determine if a more durable TPS system requiring less maintenance with a lower life cycle cost is or can be made available based on improvements in TPS technology. Alternatives to be studied include, but are not limited to, metallic, ablative and reinforced carbon-carbon. (Defense Daily, Vol. 112, No. 9, Monday, September 15, 1980, p 69)

September 16: NASA is in the midst of a space crunch, but it doesn't have anything to do with the Space Shuttle or outer space. NASA and Kennedy Space Center are running out of inner space.

Before the Space Shuttle landed, KSC already had 63,000 cubic feet of records--enough to fill 6,300 file cabinets or the Columbia's capacious cargo bay six times over.

Now that the Shuttle and all its attendant paper work are at KSC, the file cabinets are overflowing. To make matters worse, the General Services Administration has put a government-wide freeze on file cabinet procurement.

So KSC has decided to have a "Records Roundup."

That's KSC's name for a month long campaign urging its managers to do something that is an anomaly to most bureaucrats: throwing away something other than money.

KSC appointed a new sheriff for the roundup. Mary Fouraker, and word has gotten around town that because of her Air Force experience, she is going to be tough on any record holders.

But cleaning out superfluous records is not as easy as moving papers to the infamous file 13, universally known as the round file--not in the federal government, anyway.

"We call it records disposition," Fouraker said, "The government has several authorized ways of disposition." One of them, of course, is the trash can.

That is unless the documents fall under the province of Privacy Act, in which case, the papers must be shredded "into little pieces beyond any possible recognition or reconstruction," Fouraker said.

Or unless the record is unique or must be kept to support NASA's continuing mission; in which case, the records are retired to either a staging area where they are kept in cardboard boxes in case someone needs them, or to an archives where they are preserved forever, or they are stored electronically.

The newest word is automation, Fouraker said, which includes microfilm, microfiche, microphoto, microform. (Today, Tuesday, September 16, 1980)

o NASA's John F. Kennedy Space Center has awarded a $1,214,005 contract to Fluid Scientific, Inc., Orlando, Fla., to supply lines that will carry Space Shuttle propellants.

The Orlando small business firm will provide vacuum-jacketed lines capable of carrying the supercold liquid oxygen and liquid hydrogen propellants burned by the Space Shuttle orbiter's three main engines.

Propellants are fed to the main engines from the 154-foot long external tank that is attached to the belly of the delta-winged orbiter vehicle. Two solid rocket boosters, located on opposite sides of the external tank, fire simultaneously with the orbiter's main engines at liftoff, producing a total of 7 million pounds of thrust to get the Shuttle off the ground.

One set of propellant lines will be used at KSC in the twin Tail Service Masts located on the second Mobile Launcher Platform being modified for use in the Shuttle program. One and one-half million pounds of liquid propellant are loaded into the external tank during the Shuttle countdown through these structures, located on the deck of the Shuttle's transportable launch base. (NASA News, Release No. 161-80, Sept. 16, 1980)

September 17: NASA Administrator Robert Frosch has rejected a recommendation by a non-Shuttle NASA review team that the Tile Repair Kit be included on the First Manned Orbital Flight of the Shuttle (STS-1), which is planned between March 10 and 31, 1981.

The proposal was turned down because Frosch and Shuttle Chief John Yardley believe that it would complicate the conduct of the mission; they would rather devote total attention to making certain that the Thermal Protection System will work as planned.

The TRK recommendation was one of only 18 proposals, or 5 percent of the total, which were made by NASA Chief Engineer Dr. Walter C. Williams, assisted by 13 teams of experts not involved in the Shuttle, that were turned down. A total of 149 recommendations, or 82 percent, were accepted, and another 10 are under study. Most of the recommendations were directed at STS-1.

Yardley said yesterday that "most of the recommendations not presently covered by the baseline program" have been accepted.

"Overall, the assessment provided a strong endorsement to the manner in which the program is being carried out and, with the actions being implemented, further increase our confidence in the success of the STS-1 mission," Yardley told the House Subcommittee on Space Science & Applications.

At another point, when asked about the morale of the Shuttle team, Yardley said the morale of the contractor personnel and at the NASA centers "is as good as I've seen."

He said the only thing that could hurt that morale would be some outside cause for delay of STS-1, such as having to put on the Tile Repair Kit, which he said would be "demoralizing." (Defense Daily, Vol. 112, No. 11 Wednesday, September 17, 1980, p 81)

o NASA, which has always felt it would need at least five Space Shuttle Orbiters, even after the Carter Administration cut the program to four, said yesterday that it sees a need to build a fifth Orbiter in the near term and a sixth Orbiter seven years down stream.

Plans for the two additional Orbiters were reported yesterday by Dr. Stanley I. Weiss, NASA's newly-named Associate Administrator for STS Operations.

He said the need for the additional Orbiters is based on growing demand for launch services. In the mid to late 1980's, NASA has "identified an increase in the potential market for launch requirements from the commercial and foreign user community which indicates that our capability to meet the total demand will be marginal," he said. With four Orbiters, "this situation will become even more critical when the full capability of the Shuttle is made available for missions requiring longer times in orbit. . . . Additionally, any unplanned interruptions in flight operations. . . will further reduce our capability to meet launch needs. . . We are, therefore, continuing studies of the Shuttle fleet size necessary to meet these demands, including lead times for potential fifth and sixth Orbiters." (Defense Daily, Vol. 112, No. 11 Wednesday, September 17, 1980, p 84)

o Mr. Malaga said that the President had signed a Bill on September 10 which increases regular per diem to $50.00 per day and actual expenses to $75.00 (GSA will issue implementing regulations which will probably limit the actual to $69.00). POV mileage will increase to 25¢ per mile. Unless travel budget language is changed to accommodate this increase it will result in a reduction of 16 to 17 per cent in available travel money. He

also reported that the pay increase was approved by the President for civil service employees to 9.1 per cent with no change in the maximum. Mr. Malaga noted that with this increase 118 KSC employees will be at the same salary level as the Center Director.

Mr. Malaga discussed with the Senior Staff the impact on the Agency, and KSC in particular, if the Congress does not pass an Appropriations Bill or a continuing resolution by October 1, 1980. In essence should such legislation not be passed it will be necessary for the affected agencies to cease operations. Mr. Smith directed that Mr. Malaga develop a standby closedown plan. Due date: Not specified. (Staff notes #33-80, September 17, 1980, from Executive Director, KSC, Notes from meeting held September 15, 1980: item "m.")

September 18: NASA's John F. Kennedy Space Center has awarded a contract to the New World Construction Co. of Titusville, Fla., to prepare a Saturn 1B/Apollo for display at its Visitors Center.

The Saturn 1B was on display at a space exposition in Japan during 1978-1979 and all costs for transportation, refurbishment and assembly are being paid by the Japanese government.

Under the $186,625 contract, the Saturn 1B/Apollo components will be refurbished at their present location in the turn basin parking lot south of the Vehicle Assembly Building and then transported to the Visitors Center for assembly. (NASA News, Release No. 165-80, September 18, 1980)

September 19: The Soviet Union yesterday was reported to be preparing the launch of Soyuz 38 for a mission with the Salyut 6 space station, piloted by Soviet commander Yuri Romanenko and with a Cuban research assistant, Arnaldo Tamayo Mendez, the first black cosmonaut. The launch, expected late yesterday, was said to be timed to coincide with Foreign Minister Andrei Gromyko's visit to Havana. The Soyuz 37 (36) cosmonauts aboard Salyut 6, Leonid Popov and Valeriy Ryumin, have been in space 163 days, only 12 days short of the 175-day record set last year aboard Salyut 6. (Defense Daily, Vol. 112, No. 13 Friday, September 19, 1980, p 97).

o NASA, whose original plans for a cometary mission including Halley's Comet were derailed by the Administration's denial of SEPS in FY '81, is now actively seeking to participate in the European Space Agency's Giotto mission that will fly by Halley in 1986.

Because of the high cost of the mission, ESA suggested to NASA that a cooperative mission be undertaken, with the U.S. providing a Delta vehicle for the mission instead of the originally planned, more costly Ariane and some of the scientific equipment. The Giotto is to be a version of ESA's GEOS scientific satellite, which was designed for launch by Delta.

The U.S. would expect to provide 25 to 40 percent of the instruments for the mission, including the CCD camera, and tracking via the Deep Space Network.

NASA's Deputy Associate Administrator for Space Science, Andrew J. Stofan, said yesterday that NASA is presently talking with ESA about joining the Giotto mission and that a decision is expected within two months. While he described the situation as "unsettled," he said the flyby is "ideal for a joint start mission." He said that the U.S. would get about the same scientific return it would from its own mission at much less cost. (Defense Daily, Vol. 112, No. 13, Friday, September 19, 1980, p 99)

September 20: Along with the windfall of benefits it will bring for mankind, the space shuttle may spawn a host of dangerous and unpleasant side effects when it finally roars into orbit next year.

The environmental impact of the shuttle program will include chemical fallout, sonic booms, possible acid rains and a reduction of the protective ozone layer that blankets the Earth's fragile atmosphere.

In addition to the known impact of shuttle launches, the space center also has calculated the consequence of "unplanned events," including flash fires, explosions, a shuttle crash in a heavily populated area, or the accidental release of toxic chemical propellants.

"We can't be 100 percent certain what will happen," said Dr. Albert M. Koller, Jr., Environmental Manager at the space center. "We've tried to consider everything, including worst case incidents that will probably never happen." (Sentinel Star, Saturday, September 20, 1980, p 1)

September 22: Launch of the first in a series of Satellite Business Systems (SBS) spacecraft from Cape Canaveral has been delayed due to a development problem--detected less than two months before the launch--in a new upper stage system designed to boost the satellite into final orbit.

The SBS satellite, first of a new series of communications satellites developed by Hughes Aircraft Co., was to have been launched Oct. 23 to provide domestic communication services for U.S. businesses, but program officials said it now appears the launch will be delayed until early November.

The upper stage motor problem was detected during analysis of a qualification firing of the spin-stabilized payload assist module (PAM), which is being developed by McDonnell Douglas Astronautics Co. to transfer spacecraft launched either on the space shuttle or expendable boosters into geosynchronous orbit. (Aviation Week & Space Technology, Vol. 113, No. 12, September 22, 1980, p 20)

- NASA Associate Administrator John Yardley reported to Congress last week that an oxygen-rich space suit system designed for use outside the Space Shuttle to inspect and repair the Thermal Protection System burned up in a flash fire during unmanned performance testing April 18. The fire in the Extravehicular Mobility Unit would have been fatal in a manned test or during an actual mission in space.

  NASA, after "exhaustive cycle testing of like components," has failed to reproduce the fire but has ordered "precautionary" design changes in the system and the replacement of aluminum components based on "analytical conclusions as to the most probable causes of the fire." (Defense Daily, Vol. 112, No. 14, Monday, September 22, 1980, p 104)

- NASA's new Office of Space Transportation Operations has a staff of 70 headquarters personnel and plans to increase this to over 100 this year. One need is for people with MATS/cargo airline experience. (Defense Daily, Vol. 112, No. 14, Monday, September 22, 1980, p 106)

- While the European Space Agency would like NASA to order a third Spacelab, the agency does not have a third Spacelab "under active consideration" at this time, according to Associate Administrator for Space Transportation operations Dr. Stanley Weiss. (Defense Daily, Vol. 112, No. 14, Monday, September 22, 1980, p 107

- NASA has successfully completed negotiations with the Indian Government for a Space Shuttle launch services agreement and is hopeful that the agreement will be signed in about two months. NASA says the agreement establishes a baseline for a number of other agreements with foreign governments. Launch service agreements have already been signed by Intelsat and Satellite Business Systems, the latter serving as a baseline for corporate users of the Shuttle. Within the next several months, additional launch service agreements are expected to be signed with RCA, MBB of Germany, the Government of Indonesia and Hughes Aircraft Co. (Defense Daily, Vol. 112, No. 14, Monday, September 22, 1980, p 107)

- As a result of the delay in the Space Shuttle program, NASA has added 30 new Delta missions in the 1981-85 time period, including backups for Shuttle launches. The new McDonnell Douglas Delta 3920 vehicle will cost $2-3 million more than the existing Delta 3910 and can boost up to 2750 pounds to geosynchronous transfer orbit. Production output of Delta is being raised from four to eight per year. In addition, a second Delta pad capable of handling the current and uprated configuration is being built at ETR for operational use in late 1981 or early 1982. Maximum launch rate capability will be 8 to 12 Deltas per year. (Defense Daily, Vol. 112, No. 14, Monday, September 22, 1980, p 107)

- NASA has now received earnest money payments for 324 Small Self-Container Payloads for the Space Shuttle. The "getaway special" payloads will be flown on a space available basis. Cost for launching these payloads during the first three years of Shuttle operations is estimated to range from $3000 to $10,000. The payloads include 154 from industry, 27 from government, 80-1/2 from educational instutions and 52-1/2 individuals. (Defense Daily, Vol. 112, No. 14, Monday, September 22, 1980)

September 23: One of the massive rockets used in the Apollo and Skylab programs--a Saturn 1B--will be refurbished and put on display at Kennedy Space Center's visitor center, and some Japanese industrialists are picking up the tab.

The Japan Science Society and the Japan Marine Shipbuilding Foundation are going to pay New York World Construction Co. of Titusville more than $186,000 to refurbish and to display the 500-ton space vehicle.

But there's no need to worry that the gift is a Trojan horse. The Japanese are only thanking NASA for loaning them the rocket for a couple of years.

The Saturn and a number of other space artifacts were sent to Japan for display at a space exposition.

"It's the only time something like that has left this country, except under its own power," explained Al Nagy, KSC's Deputy Director of Public Affairs.

The rocket was displayed, off and on, from July 1978 to September 1979, and it is now being cleaned and painted in the turn basin parking lot near the Vehicle Assembly Building.

The rocket, more than 200 feet long, will be displayed on its side in an area between the access road and the other rockets at the visitor's center.

A spokesman for KSC's public information office said the cost of standing the towering rocket was prohibitive.

He said the vehicle would have to be reinforced to withstand hurricane-force winds in order to display it upright.

It is also more expensive to maintain the rocket in a vertical position, he said. (Today, Tuesday, September 23, 1980)

o Soviet cosmonaut, Col. Yuri V. Romanenko and Cuban researcher-cosmonaut Arnaldo Tamayo Mendez, launched aboard Soyuz 38 at 11 minutes past midnight, launch complex time, Friday, Sept. 19, for a one-week mission aboard Salyut 6, docked with the station at 1:49 AM, launch complex time, Sept. 20, and transferred into the complex. Soyuz 37 (36) cosmonauts, Leonid Popov and Valeriy Ryumin, already aboard Salyut 6, have been in space 167 days. They will surpass the previous 175-day record next week, Wednesday, Oct. 1. (Defense Daily, Vol. 112, No. 15, Tuesday, September 23, 1980, p 115)

September 24: Mr. Malaga reported that the per diem change probably will be effective October 1.

He also reported that debate is continuing in the Senate on the NASA Appropriation Bill and that action is anticipated before the end of the week when it will go to the conference committee.

Mr. Malaga further reported that a very small group was being convened for phasing down planning should an appropriation bill not be passed by the first of October. Mr. Smith asked that the AFGE be advised as soon as practicable.

Mr. Malaga said that the GAO resident, Mr. Bradbury, is to do an STS survey at KSC looking at the cost base of the mission model and the impact on cost per flight. It appears that the mission model, itself, will be examined. Dr. Gray reported that his office had been furnishing documentation to the GAO for at least a month and he and Mr. Malaga are to get together to assure coordination of information furnished to the GAO. (Staff Notes #34-80, September 24, 1980, Executive Director's Staff Notes from meeting held September 22, 1980)

- The Soviet Union has launched two reconnaissance/surveillance oriented spacecraft, Cosmos 1210 on Sept. 19, and Cosmos 1211 on Sept. 23, both from Plesetsk. Cosmos 1210 was put into an orbit of 195/268 kilometers, 82.3 degrees, 88.8 minutes. Cosmos 1211 was launched into an orbit of 215/261 kilometers, 82.4 degrees, 89.1 minutes. (Defense Daily, Vol. 112, No. 16 Wednesday, September 24, 1980, p 120)

- NASA has successfully demonstrated a method for production of liquid oxygen propellant from a simulated Martian atmosphere via electrolytic techniques, a step forward in plans for a Mars Sample Return Mission. The agency notes that the cost and complexity of return propulsion is "one of the program barriers to planetary-return missions." Planetary return or stopover missions can be made less costly by development of on-site propellant production. (Defense Daily, Vol. 112, No. 16, Wednesday, September 24, 1980, p 120)

- Advances made this year in NASA's Large Space Structures technology development program include the following:

  -- **Truss Structure.** Simulated zero gravity deployment of a 36-element truss structure was conducted. A half-scale model of the structure module, in a folded configuration, was allowed to deploy in free fall over a 27-foot height in a vacuum chamber. Studies of the dynamic characteristics of the module showed that both deployment mechanics and internal dynamic stresses were close to analytical predictions.

According to NASA's Acting Associate Administrator for Aeronautics and Space Technology, Walter B. Olstad, the simulation "is an important step in the development of Space Platforms which could grow from tens to hundreds of meters." The platforms could be constructed in space from modules deployed by the Shuttle Orbiter.

-- **Hoop-Column Antenna.** Joints for a hundred-meter-aperture hoop-column antenna were fabricated, and acceptable kinematic behavior was demonstrated. Additionally, environmental and RF testing of graphite-fiber cables was conducted and the general performance characteristics were found to be satisfactory. (NASA's Langley Research Center is currently negotiating a contract with Harris Corp. for development of a hoop-column antenna.)

-- **Electrostatic Membrane Antenna.** A 16-foot-diameter membrane was shaped electrostatically at a 60,000 volt bias, providing "the first large-scale verification of this capability." NASA says that the electrostatic shaping holds "high potential" for use in configuration control of large, very-high-precision, actively-shaped antennas. (Defense Daily, Vol. 112, No. 16, Wednesday, September 24, 1980, p 121)

o The Senate has voted 66-0 to cut the advertising budget of the 13 agencies funded in the HUD-Independent Agencies appropriations bill, including NASA, by 10 percent. Advertising by the agencies cost $8.6 million in FY '79, including $1.9 million by NASA. Amendment sponsor Max Baucus quoted one NASA employee as saying it would take "an 18-wheeler to carry away one copy of all the publications NASA puts out." (Defense Daily, Vol. 112, No. 16, Wednesday, September 24, 1980, p 123)

September 25: The Senate Tuesday passed the $5.568 billion FY '81 NASA appropriation recommended in committee, an increase of $51 million over the President's revised budget request.

The bill includes $4.430 billion for R&D; an increase of $65.5 million; $120 million for Construction, and $1.032 billion for Research & Program Management, offset by a $14 million reduction to be made in consultants contracts. Sen. Jack Schmitt (R-N.M.) tried to get that reduction reduced on the grounds that NASA's consultants contracts were overstated but was unsuccessful.

NASA is also liable to a 2 percent across-the-board reduction made in the HUD-Independent Agencies appropriations bill.

The one change made in the committee's bill on the floor was an amendment by Sen. Howell Heflin (D-Ala.) exempting from the 2 percent cut any project that uses or will use solar energy as a source of energy--a stipulation which applies primarily to development by NASA of the Solar Electric Propulsion Stage (SEPS), for which Heflin persuaded the committee to provide $12 million. The understanding is that the 2 percent not taken from the SEPS will be taken from other NASA programs.

The House has voted to cut $20 million from the FY '81 NASA Construction/ R&PM appropriation but did not act on the agency's R&D budget. That is now expected to be worked out in conference with the Senate. (Defense Daily, Vol. 112, No. 17, Thursday, September 25, 1980, p 131)

September 26: NASA engineers are catching on to the trend toward backyard gardening in an attempt to cut down on rising energy costs.

As part of an exploratory project funded by NASA Headquarters Office of Energy Programs, KSC has been allotted $20,000 to work on an energy efficient method of distilling feed stock such as sugar cane and cassava for use as a source of energy in the future.

A three-year NASA program on biomass energy will study the possibility of growing selected plant species for production of energy through direct combustion, fermentation to alcohol and/or digestion to methane.

Wally Boggs, Design Engineering Energy Projects Engineer, described ways in which the sugar cane juice and molasses are processed for use.

"Gasahol requires pure, water-free alcohol. Extracting the last few percent of water by distillation requires much of the heat energy input.

"We've experimented with vacuum assist but the best method known is to pass the vapor through drying agents such as corn meal which absorb water and leave the alcohol," said Boggs.

Boggs says there are plans for using part of the small building south of the Flight Crew Training Building to install a 20-gallon per day prototype plant. The plant will use a still designed by James McDowell and Joseph Lombardi of PRC and built in the prototype development shops under Bob Newall of TG-DSD.

This still will ferment the sugar cane juices and is expected to be operational late this year. Funding is being requested for two more years' research, said Boggs.

Another project in the making from the Biomedical Office is the growth of cassava, a plant with a starchy root system being used extensively in South America for biomass.

Boggs reports that plans are underway for GSA to provide KSC with an experimental car which has been converted to burn pure alcohol for testing purposes. According to Boggs, 10 percent of the fuel required by the KSC vehicle fleet could possibly be supported by biomass grown at KSC, if the program were developed fully. (Spaceport News, Vol. 19, No. 20, September 26, 1980, p 3)

o Technicians at the Kennedy Space Center have discovered a sheared bolt on an attach fitting for one of the solid rocket motors on Delta 153. This is the Delta rocket presently being prepared to launch the Satellite Business Systems satellite in early November.

Technicians are working to remove all of the nine Castor IV solid rocket motors from the Delta's main body for further inspection. The solid motors, which weigh 24,500 pounds each, are held in place by two ball and socket type fittings. However, the weight is born entirely by the aft fitting.

The sheared bolt was discovered during routine preparations for solid motor alignment, which showed some of the RTV insulation on the solid motor was pulled away from the case around the attach point. The motor was immediately suspended by a hoist and further examination showed that the 1-1/2 inch diameter bolt had sheared.

Charles D. Gay, KSC Launch Director, says it is probable that the bolt problem will cause a further slip in the SBS launch schedule. Originally scheduled to be launched October 23, the launch was postponed for additional tests of the solid motor which is carried on board the satellite itself to circularize its orbit at synchronous attitude. (NASA News, Release No. 170-80, September 26, 1980)

September 28: The first ship specifically designed to recover NASA's space vehicles was christened here Saturday with a shower of words and a fifth of champagne.

Speaking over the fog horns of ships cruising by Atlantic Marine Inc.'s dock, dignitaries in their Sunday best said what was necessary, and what was not, in a ceremony commissioning the UTC Liberty. Tatooed shipbuilders in their Saturday best and the ship's eager crew, dressed smartly in their uniforms, joined a respectable crowd of well wishers in dedicating and inspecting the vessel, whose white paint was still bright and sticky.

The Liberty and its brother ship, the Freedom, are designed to recover the Space Shuttle's two assist rockets after they fall into the Atlantic. The ships were built by United Marine for United Space Boosters Inc., the company that will operate the vessels for NASA out of Kennedy Space Center. (Today, Sunday, September 28, 1980)

o The last few thousand pieces of one of high technology's most frustrating jigsaw puzzles are finally beginning to fall into place.

Space agency officials say that after 2.5 million man-hours of labor, an end to the installation of the space shuttle's unique thermal protection system of heat-resistant tiles is in sight.

"We feel we are over the hill," says John Yardley, Associate Administrator of the National Aeronautics and Space Administration. "We expect to have all of the tiles on by mid-November." (The Miami Herald, Sunday, September 28, 1980)

September 29: The Soyuz 38 cosmonauts, Soviet Col. Yuri V. Romanenko and Cuban research-cosmonaut Arnaldo Tamayo Mendez, launched from Baikonur Cosmodrome at 11 minutes past midnight, launch complex time, Friday, Sept. 19, returned to the Soviet Union Friday, Sept. 26, landing in Kazakhstan at 8:54 PM, launch complex time. Left aboard Salyut 6, with their Soyuz 37 spacecraft, were cosmonauts Leonid Popov and Valeriy Ryumin who will surpass the manned endurance record of 175 days Wednesday. (Defense Daily, Vol. 112, No. 19, Monday, September 29, 1980, p 140)

o The Soviet Union has launched another in what has become a heavy-trafficked space missions category--Earth resources, with the launch of Cosmos 1212 on Sept. 26 from Plesetsk. The satellite was put into an orbit 216/275 kilometers, 82.3 degrees, 89.1 minutes. (Defense Daily, Vol. 112, No. 19, Monday, September 29, 1980, p 146)

September 30: The National Aeronautics and Space Administration paid Rockwell International Corp., a major contractor for the space shuttle, only 57 percent of an $8 million performance bonus in 1979.

The bonus payment, NASA's way of telling contractors they like their work, was substantially less than incentive awards between 74 percent and 92 percent given three other major contractors during the same period, Cocoa Today reported Monday. (Sentinel Star, Tuesday, September 30, 1980)

o New World Construction, Inc., of Titusville, Fla., has won a $46,893 contract with NASA's John F. Kennedy Space Center for construction work on KSC's new Flight Kit Facility.

Under the contract, New World will make alterations to an existing building to include general refurbishment, installation of oxygen and nitrogen lines and painting. These alterations will provide the building with the capability to check out and store Space Shuttle flight kits.

Flight kits are groups of instruments that provide power, coolants and fittings for shuttle payloads. Each payload that will be carried into orbit in the orbiter's cargo bay will have specific functions and requirements. The flight kits are designed to make these payloads adaptable to the orbiter. (NASA News, Release No. 172-80, September 30, 1980)

o The Soviet Union has launched a Progress II resupply spacecraft to the Salyut 6 orbital station where cosmonauts Leonid Popov and Valeriy Ryumin will tomorrow surpass the 175-day manned endurance record set last year aboard the station.

Just how many days Popov and Ryumin will add to the old record is in question, however, following the return last week of the Soyuz 38 guest crew, from a one-week visit aboard Salyut 6, using the same spacecraft in which

they were launched. In the past, the visiting cosmonauts have returned in the previous Soyuz left at the station, leaving the most recent Soyuz for the endurance crew.

The current return spacecraft available to Popov and Ryumin, Soyuz 37, has now been in space since July 23, or 69 days, which is only about 3 weeks short of the 90-day in-space limit the Soviets have apparently put on the system.

A new guest cosmonaut visit would provide Popov and Ryumin a new spacecraft and provide them with the capability for several weeks of additional stay aboard the station, but the Soviets have been spacing their Soyuz flights at approximately two-month intervals, so that a new cosmonaut visit would normally not be expected before mid-November.

The Progress II resupply spacecraft, containing expendable materials and other cargo, was launched from Baikonur at 8:10 PM Sunday, Sept. 28. It was put into an orbit on 193/270 kilometers, 51.6 degrees, 88.8 minutes.

The Soyuz 38 cosmonauts, Soviet Col. Yuri V. Romanenko and Cuban researcher-cosmonaut Arnaldo Tamayo Mendez, returned Friday, Sept. 26, at 8:54 PM launch complex time, landed 175 kilometers southeast of Dzhezkazgan, the general landing area on the Sary Shagan ABM range, east of the Baikonur Cosmodrome, where the most recent Soyuz missions have been recovered. (Defense Daily, Vol. 112, No. 20, Tuesday, September 30, 1980, p 147)

October 1: In deference to ancient seafaring tradition, the U.S. space agency decided last year to name its tiny fleet of space shuttles after famous sailing ships of bygone days: Columbia, Discovery, Challenger and Atlantis.

With less fanfare, the start of regular shuttle flights in 1982 will revive another maritime tradition.

It is called "going down with the ship."

In any dire emergency aboard America's first shuttle spaceship, the fate of the captain, crew and passengers will be irrevocably committed to bringing the shuttle home intact.

There will be no call to abandon ship. There will be no lifeboat. And there will be nowhere to jump.

As a temporary precaution, the first few test flights will include ejection seats for the two-man crew, though authorities agree that abandoning the shuttle in flight will afford the astranauts only marginal chances of survival. (Sentinel Star, October 1, 1980)

o Space shuttle Main Engine number 0006 has been returned to the National Space Technology Laboratories where it will support the next test of the Shuttle's main propulsion system. That test is now tentatively scheduled for about Nov. 1.

The engine arrived at the NASA test site near Bay St. Louis, Miss., Friday, from the manufacturer's facility at Canoga Park, Calif. It was in California for repairs following the last Main Propulsion Test, July 12, during which a burn-through occurred in the engines's pre-burner chamber wall.

Engine 0006 will now undergo a 1.5 second ignition test, a short calibration firing and a "full duration," 520-second static firing, before being reinstalled in the Main Propulsion Test Article about mid-October. (Marshall Star, Vol. 21, No. 4, October 1, 1980, p 4)

- NASA's John F. Kennedy Space Center has awarded Unified Services, Inc., of Washington, D. C., a $3,314,353 extension of its contract for custodial services at the Spaceport.

  Unified Services will be responsible for all custodial services, including janitorial, trash and garbage disposal and clean room services at Kennedy Space Center.

  Unified Services is a minority-owned firm, founded in 1971 in Washington, D. C. The firm now has operations in D. C., Maryland, Virginia, Florida and Colorado. The company's founder and president, Jerry Davis, Jr., is a member of the Board of Directors of the National Alliance of Black Manufacturers and was a delegate to a recent White House conference on Small Businesses. (NASA News Release No. 167-80, October 1, 1980)

- NASA's John F. Kennedy Space Center has awarded an $80,000 contract to Touchton's Air Brake Co., of Green Cove Springs, Fla., for 40 railroad box car bodies that will be used at the Center for work space.

  The insulated box car bodies will be connected and permanently installed at Launch Complex 39's Pad A to serve as an eating, storage and work area for KSC contractor groups that support Shuttle launch operations. Pad A, launch site for NASA's Saturn V rockets during the Apollo lunar landing program, has been refurbished and will be the launch base for the first Space Shuttle mission, now scheduled for March, 1981.

  The concept of using box cars as work space was chosen because of their ability to withstand the heat and blast of a Shuttle launch. The box cars will be permanent fixtures on Pad A, and will not have to be moved as were work trailers used during the Apollo program, a decision which will save two to three hundred manhours for each launch. (NASA News Release No. 168-80, October 1, 1980)

October 2: Mr. Walton reported that all of the solid rockets had been taken down from the Delta and there was extensive discussion regarding the hardware problem and it appears that improper heat treatment is the cause of the current problem. There will be no new launch schedule for the Delta until KSC has been satisfied that the problem has been resolved.

Mr. Walton also reported on Mr. Rigell's successful trip to Europe to work the delivery date for the Spacelab Engineering Model. Mr. Rock stated that ESA expects to ship the Engineering Model ahead of schedule with the C5A arriving on December 5 and 13, and the 747 between those two dates. It is hoped that the equipment and the Engineering Model can be put on the test stands and shut down for Christmas.

Mr. Walton further reported that there are significant structural problems with Spacelab flight unit #2. The estimate is the subcontractor could plan a fix in nine months; however, ERNO is considering doing the work in their own shop thereby reducing the time required. A cadre of six to eight European personnel will arrive at KSC with the Engineering Model.

There is to be a Ground Operations Review at MSFC on September 30 which Mr. Rigell will attend. There are approximately 1100 RID's. (Center Director's Staff Meeting Notes #35-80, October 2)

- The Soyuz 38 cosmonauts, Leonid Popov and Valeriy Ryumin, aboard Salyut 6, yesterday broke the old manned endurance record of 175 days 36 minutes set by cosmonauts Vladimir Lyakhov and Ryumin in August 1979. The Progress 11 resupply spacecraft, launched Sept. 28, docked with the Soyuz 37-Salyut 6 complex at 10:03 PM, launch complex time, on Tuesday, Sept. 30. How many days the cosmonauts will add to the old record will now be dependent upon how long mission control will allow the Soyuz 37 spacecraft to remain in orbit or whether it will be replaced shortly. (Defense Daily, Vol. 112, No. 22, Thursday, October 2, 1980, p 163)

- One of NASA's major tracking and data system activities during the FY '81-85 period will be to continue study of concept for the feasibility of "second-generation communications-ready satellites in geosynchronous orbit" to support both Earth-orbital and planetary missions in the 1990's, according to Tracking Chief R. E. Smylie. [A competitive preliminary design study of a data collection and relay system for the 1990's is being conducted by Goddard Space Flight Center. (Defense Daily, Vol. 112, No. 22, Thursday, October 2, 1980, p 165)

- A reception honoring the team which developed the highly successful Solar Maximum Mission (SMM) spacecraft will be held at Goddard Space Flight Center on the evening of Oct. 16 under the auspices of the National Space Club. NASA Administrator Dr. Robert Frosch and Goddard Director A. Thomas

Young will address the reception, which will include the presentation by NSC of a portrait of rocket pioneer Dr. Robert H. Goddard. (Defense Daily, Vol. 112, No. 22, Thursday, October 2, 1980, p 165)

October 3: A Satellite business Systems representative proudly showed off the company's first satellite to reporters at Cape Canaveral Air Force Station on Thursday, bragging that the company will provide its customers with something better for less.

In the case of the SBS satellite, now tentatively scheduled for launch Nov. 6, that something will be the capability of sending and receiving voice, video and computer signals.

With a relatively small rooftop antenna, the company's customers can use the satellite to exchange computer information at up to 3.1 million bits of information per second; to send electronic mail; to carry on phone conversations; and to conduct televised conferences.

SBS maintains customers will be able to reduce their long-distance phone bills with the satellite. Using a SBS system, distance between the computer or the people talking with one another is irrelevant, the company says. It doesn't cost a New York customer a nickel more to call Los Angeles than it does to call Boston.

Westinghouse electric Corp., Aetna Life & Casualty, Boeing Computer Services Inc. and IBM have already contracted to use SBS's satellite. (Today, Friday, October 3, 1980)

o Patrick AFB's Col. Russell Rubeor and KSC's William Holden will kick off the 1980 Combined Federal Campaign for Brevard County on October 6. Rubeor is serving as chairman, and Holden as vice-chairman for this year's campaign, the only annual charitable fund drive of the year for federal employees.

This year's CFC goal is $195,000, and monies collected will go toward supporting voluntary agencies such as the United Way, the National Health Agencies and the International Health Agencies and the International Service Agencies. (NASA News Release No. 175-80, October 3, 1980)

October 6: One of those "useful and productive jobs" Sen. Adlai E. Stevenson alludes to might be the manufacture - in space - of medicines that could help eradicate diseases mankind has suffered for centuries.

That hope rests in the hands of a pharmaceutical company that has entered into an agreement with McDonnell-Douglas, the manufacturer of space hardware, and the National Aeronautics and Space Administration to carry out experiments with the help of the space shuttle.

Those experiments will be aimed at producing purer drugs in greater quantity than can now be produced on Earth, thus pushing ahead the frontiers of medicine through radically advanced techniques not presently feasible. (The Florida Times-Union, October 6, 1980)

October 7: Citing personal opportunities in private industry, NASA Administrator Robert Frosch said Monday he is resigning as of Jan. 20, 1981.

The space agency chief, in a prepared statement released in Washington, said he has accepted the presidency of the American Association of Engineering Societies, an umbrella organization of 39 engineers' groups around the country.

"I can no longer ignore the competitive opportunities available to me and my family in private life," he said.

Kennedy Space Center officials said they doubted Frosch's resignation would set back the Space Shuttle's first scheduled launch in March. They speculated his replacement would be someone as strongly committed to the Shuttle program as was Frosch. (Today, Tuesday, October 7, 1980)

o The Soviet Union says the mission of Soyuz 35 cosmonauts, Leonid Popov and Valeriy Ryumin, aboard the Salyut 6 station will soon be "drawing to an end."

Popov and Ryumin, who were launched into space on April 9, broke the previous manned endurance record of 175 days 36 minutes on Wednesday, Oct. 1.

They are scheduled to return in the "first half of October" and "no missions will be sent to the station before then."

Although the Soviets say "setting records is not the aim of this space-flight," Popov and Ryumin have now been in space for 181 days.

The Soviets launched two new space missions in the past few days -- Cosmos 1213, a reconnaissance/surveillance satellite from Plesetsk on Oct. 3, with an orbit of 207/343 kilometers, 72.8 degrees, 89.6 minutes, and a Raduga communications satellite, with an international designation of Statsionar-3, put into an orbit of 36,000 kilometers, 0.4 degrees and 24 hours 4 minutes. Raduga is used for radio and telegraph in the centimeter band and for black and white television for the Orbita network. (Defense Daily, Vol. 112, No. 25, Tuesday, October 7, 1980, p 184)

October 8: The GOES-D meteorological satellite was launched by Delta vehicle last month from Kennedy Space Center for the National Oceanic and Atmospheric Administration carrying a new type of instrument known as the VAS, or Visible Infrared Spin Scan Radiometer (VISSR) Atmospheric Sounder.

Satellite separation occurred as planned, and the meteorological satellite went into geosynchronous orbit about 30 hours after liftoff.

Scientists at Goddard Space Flight Center and the University of Wisconsin at Madison will conduct a long-term experiment to evaluate the usefulness of this instrument for prediction of severe local hurricanes, storms and other short-term weather phenomena.

The new atmospheric sounder will also be able to measure atmospheric temperatures and moisture at various altitude layers. As with previous GOES satellites, the new instrument will provide both day and night cloud cover photos with a resolution of approximately 0.9 kilometers (.55 miles) in daylight and 6.9 kilometers (4.28 miles) at night.

Since GOES (Geostationary Operational Environmental Satellite) is stationary with respect to the Earth, it can observe storms as they develop and hence should be useful in a forecast and warning system. (Marshall Star, Vol. 21, No. 5, October 8, 1980, p 2)

o International Business Machine Corporation, with offices at 7900 N. Astronaut Blvd., Cape Canaveral, has won a modification to an existing contract to provide project management and integration support for Space Shuttle payload facilities at the John F. Kennedy Space Center. The contract modification has a value of $12,925,230.

Under the contract, IBM will perform design, development, integration and other services for Cargo Integration Test Equipment (CITE) at KSC. The services involve receiving and assembling CITE gear for Space Shuttle payloads. The work will be done at horizontal and vertical payload processing facilities at KSC and at vertical processing facilities at Cape Canaveral Air Force Station. (NASA News Release No. 176-80, October 8, 1980)

o NASA's John F. Kennedy Space Center has awarded a contract worth $6,689,666 to W&J Construction Corp., Cocoa, for work on Pad B of Launch Complex 39. It is the largest construction contract ever let by KSC to a small business, according to a KSC procurement officer.

The work to be done by W&J Construction, which has had previous KSC contracts, includes installing the long-run piping and cable to pump and monitor fuels, coolant, gaseous helium and nitrogen, compressed air and hydraulic fluids from their storage areas on the pad to the Fixed Service Structure and the Rotating Service Structure. Connections to the Space Shuttle are made from the two service towers. The contract is a fixed-price agreement with the work expected to be finished in 20 months. (NASA News Release No. 177-80, October 8, 1980)

o The promotion of Richard H. Schnoor, of Cocoa Beach, and Nathaniel Pilate of Mims, to new positions at the Kennedy Space Center, has been announced by Center Director Richard Smith.

Schnoor becomes the Chief of the Institutional Management Office and Pilate succeeds him as Chief, Center Services Division. Pilate has served as Chief of the Equal Employment Opportunity Office since 1970.

In his new position, Schnoor is responsible for the planning and management of the Resources and Program Management appropriation at KSC. He also will direct development and improvement of financial systems, conducting studies to determine whether various functions should be performed by contractor or civil service personnel, and provides KSC point of contact for auditing services and the U.S. Inspector General's office.

Pilate's new responsibilities include providing for services to the Center, such as writing, printing, custodial, library and mail and distribution. (NASA News Release No. 178-80, October 8, 1980)

- Air Force Secretary Hans Mark, who continues to list the Space Shuttle as one of his "top priorities," nonetheless has called for the development of new expendable launch vehicles specifically designed to meet the military's needs.

  Earlier this year, Mark said the U.S. needs "an absolute minimum" of four Space Shuttles, and indicated that five, six or seven would be a better number.

  Mark said that the expendable LV's are necessary because of: the possibility of delays in the operational Shuttle Orbiter's; their unavailability for other reasons; limitations of the Shuttle, and because there may be times when DOD does not want to use the Shuttle for a particular launch.

  He said that one possibility for a heavy launch vehicle would be a version of the MX ICBM, although the Pentagon has not agreed to fund that proposal. (Defense Daily, Vol. 112, No. 26, Wednesday, October 8, 1980, p 193)

- Former Apollo astronaut Lt. Gen. Thomas Stafford (USAF-Ret.) and former Jet Propulsion Laboratory Director Dr. William Pickering were inducted Saturday into the International Space Hall of Fame at Alamogordo, N.M. Also inducted were Prof. Clyde W. Tombaugh, who discovered the planet Pluto in 1930 at the Lovell Observatory, and the late David F. Martin, whose contributions to radio physics led to development of a radar warning system. (Defense Daily, Vol. 112, No. 26, Wednesday, October 8, 1980, p 195)

- Continued analysis of sounding rocket and Space Shuttle payload cost studies with the objective of developing methods for estimating the cost of Shuttle/Spacelab payloads will be carried out through FY '81 by Delta Research Corp. (Arlington, VA.) under contract to NASA's Goddard Space Flight Center. (Defense Daily, Vol. 112, No. 26, Wednesday, October 8, 1980, p 196)

October 9: Mr. Griffin reported that Dr. Hans Mark, Secretary of the Air Force, appeared at an IEEE meeting in Virginia and expressed a number of new ideas regarding Shuttle. He made a relatively controversial statement that as long as NASA operates the Shuttle in an R&D mode that the Air Force and other users cannot realize its full potential. Dr. Mark later explained that he was trying to look to the future and his remarks were not meant to be critical of NASA. He further explained that in his opinion

NASA should stay in the development of new technology and that if a new family of launch vehicles is necessary to accompany the Shuttle that some agency other than NASA should be allowed to develop it. There ensued an extensive discussion regarding future NASA roles. (Center Director's Staff Meeting Notes #36-80, October 9)

o Leaders of the European space program visiting Kennedy Space Center Wednesday said delays in the Space Shuttle launch are costly to their own program, Spacelab.

And in his first visit to KSC, European Space Agency Director Eric Quistgaard predicted there would be few opportunities in the future for any orbiting detente between Western and Eastern European space programs.

In office for only five months, Quistgaard said delays with both the Shuttle and Spacelab have cost the 10 western European nations participating about an additional $300 million.

Under a cooperative NASA-ESA venture, Spacelab will be transported into orbit aboard the Shuttle for weather, communication and scientific experiments.

The first Spacelab launch aboard the Shuttle is scheduled for May 1983. (Today, Thursday, October 9, 1980)

o The launch of FLTSATCOM, a communications satellite for the Department of Defense by a NASA Atlas Centaur rocket has been postponed to October 30. (NASA News Release No. 179-80, October 9, 1980)

October 15: Soviet cosmonauts Leonid Popov, 40, and Valeriy Ryumin, 34, launched into space on April 9, were returned to Earth on Saturday after 185 days, surpassing the manned endurance record by 10 days.

Popov, flight commander, and Ryumin, a veteran of the 175-day mission last year, were sent into space aboard Soyuz 35 for a mission aboard Salyut 6. They returned to the Soviet Union aboard Soyuz 37, which had been left by one of the crews visiting the station during their stay in space.

The cosmonauts landed in the recovery area of the Sary Shagan range, 110 miles from Dzhezkazgan, at 2:50 PM, launch complex time, Oct. 11. The first medical examination reported they "withstood well" the long stay in weightless conditions. (Defense Daily, Vol. 112, No. 30, Wednesday, October 15, 1980, p 220-221)

- NASA's Johnson Space Center is seeking proven crop yield forecast systems which can be used with Landsat Multi-Spectral Scanner or Thermattic Mapper spectral data and satellite-acquired meteorological data to estimate agriculatural crop development and yield. Objective of the program is to develop techniques for using remotely sensed data with suitable models that provide a general capability for monitoring vegetative conditions over a wide range of geographic conditions for "potential worldwide applications." (Defense Daily, Vol. 112, No. 30, Wednesday, October 15, 1980, p 224)

- Will the problem-plagued space shuttle made its maiden voyage on Friday the 13th?

At least it seemed that way when James R. Thompson, Project Manager for the shuttle's main engines, named March 13, 1981, as the target launch date for the ill-starred space plane.

Thompson, addressing reporters at the Marshall Space Flight Center in Huntsville, Ala., failed to point out that March 13 is also Friday the 13th, a traditional field day for black cats and broken mirrors.

But the fate-tempting date drew quick denials from National Aeronautics and Space Administration officials at Kennedy Space Center, where the space shuttle has suffered enough genuine bad luck to send the most unsuperstitious engineer scurrying for a Ouija board.

"The launch will probably be in late March," said NASA spokesman Hugh Harris, dispelling the omen. "Just for working purposes we use March 10 as a tentative launch date. As far as we know, there hasn't been any change."

A spokesman for the space agency's Washington headquarters also confirmed that no final launch date has been set.

While a March 13 launch is possible, Harris said it would probably be avoided. NASA officials expressed no similar concern about avoiding March 15 -- the Ides of March. (Sentinel Star, Wednesday, October 15, 1980)

October 16: Dr. Thomas A. Mutch, NASA's Associate Administrator for Space Sciences, died in a mountain-climbing accident Oct. 7 in Kashmir.

Mutch, 49, fell while leading a seven-member expedition on Mount Nun.

An enthusiastic supporter of the U.S. space science program, Mutch has been an effective presenter of the NASA program to Congress.

His contributions to the U.S. space science program, said NASA Administrator Frosch, have "earned for him an extraordinary reputation among his peers." (Defense Daily, Vol. 112, No. 31, Thursday, October 16, 1980, p 230)

o The Soviet Union Tuesday launched Cosmos 1215, believed to be a military monitoring satellite. It was put into an orbit of 449/553 kilometers, 74.0 degrees, 95.1 minutes. (Defense Daily, Vol. 112, No. 31 Thursday, October 16, 1980, p 233)

October 17: (d.) Mr. Page reported on hardware status. The engines were successfully removed last week and the OMS pods have been reinstalled. Work has started on the thirteen instrument islands on the external tank and is going well, such that the overall mating schedule can be maintained.

(e.) The simulated flight on the Delta on October 13 went well.

Mr. Walton described the ongoing documentation assessment in Cargo Operations with MDSCO. It is being approached in two phases--the first phase concerns paper used to turn on work by the contractor and a drastic simplification is being implemented. Responsibilities are being shifted back to the systems engineers requiring fewer signatures and less distribution on OMI's, PRACA forms and other paperwork. A conscious effort is being made to reduce integration efforts and to produce OMI's only on truly integrated tests. They are also reducing Prelaunch Operations Plans (POP's) to the contractor. (These requirements will be deleted from the DRL's and DRD's in the contracts -- criticality will be a determining factor.) The contractor is also being asked to look at simpler systems on manufacturing type procedures. Phase two will be to look at anything that is a driver to people but not really necessary. Operations and Maintenance Plans (OMP) will be challenged in the cargo world. Also being examined in this area is the PRACA system and the NHB and KMI's in the safety function. Cargo Operations will be getting with Design Engineering, Safety

and Technical Support in these paper reduction efforts. Mr. Smith asked that Shuttle Operations review the Cargo Operations efforts after completion for application to their operations--particularly in the work authorization area.

(f.) The visit by Eric Quistgaard, Director General of ESA, went extremely well.

There was a discussion of the Arianne failure with the report that the cause was rough combustion caused by an injector not being made to specification.

Mr. Neilon reported on the Spacelab Mission Manager review and stated that MSFC rather than GSFC will probably be assigned the mission management responsibilities for Spacelab 5. It appears that MSFC will serve as mission manager for all Spacelabs other than life sciences missions and that GSFC will manage all pallets. (Center Director's Staff Meeting Notes #37-80, October 17)

o Deep in space, another Earth may be in the making.

Among NASA scientists, attention revolves around Titan, a moon of the spectacular ringed planed Saturn.

And they will get their closest, most detailed look ever at the solar system's largest moon Nov. 12 when Voyager I passes near the huge planet.

Even though it's technically a moon, Titan is a planet in its own right -- and may have some of the same geological characteristics that Earth did billions of years ago, wrote science author and NASA adviser Carl Sagan.

This is not to say Voyager Program scientists expect to find life on Titan (though many, like Sagan, won't rule out the possibility of primitive once-celled organisms there).

But they will gain insight into Titan's chances of producing life, said Ellis Miner, Assistant Project Scientist for the Voyager program.

"We will be able to tell if the conditions on Titan are conducive to life," he said, adding Titan's atmosphere may contain some of the elements that form the chemical building blocks of primitive life.

The mysteries of Titan intrigue Miner who explained Saturn's moon may have an atmosphere as thick or thicker than Earth's and may be heated by energy emitted from Saturn.

Launched from the Cape Canaveral Air Force Station in September 1977, Voyager I will conduct its final mission in this solar system between Nov. 6 and 18.

During that time, the 1,800-pound combination spacecraft, camera and laboratory will shoot thousands of pictures of the ringed planet and its 10 or more moons, including Titan. (Today, Friday, October 17, 1980)

October 19: The Space Shuttle, still scheduled for a March lift-off at Kennedy Space Center, has already launched a major shot in the arm for Florida's economy, a top NASA official says.

NASA Deputy Administrator Dr. Alan M. Lovelace was here to tout the hefty statewide economic benefits he contends come from having such a big chunk of the space program in Florida. He also put to rest any concern that the recently announced resignation of NASA Administrator Dr. Robert Frosch would delay the Shuttle project.

"I really do not see Dr. Frosch's pending departure in January affecting that (at) all," Lovelace said in an interview. "The most recent review I've had of that schedule indicates we've still got a good chance to make that launch in March." (Today, Sunday, October 19, 1980)

October 20: The two Orbital Maneuvering System pods that were removed from the Space Shuttle Orbiter Columbia (OV-102) for structural strengthening have been reinstalled on the Columbia.

At the same time, the three Space Shuttle Main Engines were removed from the Orbiter and are undergoing modifications in the Operations & Checkout Building. The modification includes the installation of new fuel pre-burner liners and refractory shields, and a new liquid oxygen pump in engine #20006. The three engines are to be reinstalled in the Columbia during the second week of November.

Roll-out of the Orbiter to the Vehicle Assembly Building is still scheduled for November 23, with transference to the launch pad slated for December 26, preparatory to launch March 10.

As of Oct. 12, there were 2112 tile cavities on Columbia and NASA estimated that a total of 2980 tiles would have to be bonded to the vehicle. For the week, a net of 426 tiles were added to the spacecraft. (Defense Daily, Vol. 112, No. 33, Monday, October 20, 1980, p 244)

- Data from NASA's Landsat satellite will be used to detect and monitor damage caused by gypsy moth caterpillars in the forests of Pennsylvania under a joint three-year pilot program between NASA and the State of Pennsylvania. Damage caused by the moths over the past ten years in Pennsylvania is estimated at $32 million. (Defense Daily, Vol. 112, No. 33, Monday, October 20, 1980, p 245)

- Magsat is adjudged successful based upon the results of the mission with respect to the approved prelaunch objectives.

Magsat was launched on October 30, 1979, and the sensor boom was deployed on November 1, 1979. From that time until re-entry on June 11, 1980, continuous measurements of the near Earth magnetic field were made. The Magsat lifetime exceeded the planned minimal lifetime by nearly 3 months and the accuracy requirements of the scalar and vector magnetometers as well as attitude and position determination were all met or exceeded. Efforts to acquire data at the lowest altitude possible were successful and the spacecraft remained under active control during re-entry through the last contact which was at an altitude of about 175 km. (Mission Operation Report - Office of Space Transportation Operations - No. E-662-80-01, 10-20-80, p 1)

October 22: Kennedy Space Center is seeking proposals for a study to investigate the feasibility of developing a small, lightweight GH_2 sensor to monitor fuel leaks in purge areas (no oxygen) in the tail section of the Space Shuttle, while introducing no intrinsic hazards of its own into the area. The planned contract will also cover prototype development and evaluation testing to verify the sensor's capabilities and limitations. (Defense Daily, Vol. 112, No. 35, Wednesday, October 22, 1980, p 262)

October 24: Long before we came with our steel gantries and concrete pads, our dreams of space and fiery gods named Apollo and Saturn, the old people were here.

When 16th Century man raised his flags of dominion against the green, semi-tropical jungles, the old people had been here longer than most men could imagine.

The dusky-skinned hunters had arrived in what is now Brevard County some 12,000 to 20,000 years earlier, pursuing across the continent great herds of giant bison and lumbering elephants. Their forefathers had followed similar herds eastward from Asia, across the frozen land mass that later would be reclaimed by the Bering Sea.

They were the Paleo peoples, and they were the Kennedy Space Center's first inhabitants.

We don't know whether they later voluntarily deserted the area, or if they died out as a race. We only are certain that the Paleos were replaced by a new people of different physical characteristics -- a people who apparently made the same long journey across the Bering land mass, or "bridge," during a later period of glaciation and low water.

Like their predecessors, these Archaic Period people were born into what we would consider abject poverty and hardship, lived their 30-35 year lifespans, and consigned their dead to the sandy soil.

Piecing together their lifestyle in an archaeological "detective story," scientists have deducted that the Archaic Indians apparently believed in a life beyond their earthly existence, and they provided food and tools for the use of those who passed into that afterlife.

These and a few other facts are gleaned from their stone, shell and bone artifacts and the cemeteries they left.

It's not known whether the Archaics endured, or some other people became the Ais, Timucuan and other tribes who gave European sailors their first -- and frequently fatal -- welcome to the Florida of the 1500's.

We do know that the cultures of the agriculatural Timucuan in what is now Volusia County, and the hunting and gathering Ais, collided -- sometimes violently -- in the KSC area. At other times there was peaceful trade.

But some Indians' remains reveal dark stores of flint knives buried in living throats, of spears hurled with deadly accuracy, and of skulls fatally fractured by the formidable hafted conch shell hammers so much used by the aborigines.

Despite battles over hunting rights, the sometimes bloody raids for wives, and natural disasters ranging from plague to tital wave, the Indians survived.

But thousands of years of successful adaptation to a merciless wilderness had not fitted the Ais to compete with civilization. Well before 1800, they were no more.

The Ais left no verbal legends, no tribal songs to hear by light of moon and smoking campfire. No scratches endure in the area's shifting sands, and if picture writings recorded Ais tradition in history, they failed to survive the humid climate.

Early Spanish accounts of the Ais culture are, at best, unsatisfactory, and the white man's sketches of the Indians look like Europeans in skimpy costumes.

The Ais are gone, but the invader remains. Who were these light-skinned people who came from across the open waters in huge canoes with white wings? From whence did they come -- and why? And why, once the savage nature of the Indians and the untamed Florida jungles were experienced, did they stay? (Spaceport News, Vol. 19, No. 23, October 24, 1980, p 4)

o Realizing that it was custodian of a major portion of Brevard County's pre-history and early history, NASA, in 1965, initiated a survey of the KSC's historical resources.

After examining more than 50 Indian and historic sites, and noting that more lay just beyond the Center's boundaries, anthropologist George A. Long compiled a comprehensive report that forms a digest of the lives of the people who went before us.

Their stories are told in shell picks, hammers, gouges, weights and rattles; an occasional projectile point of flint or agatized coral; and the bone projectile points, hair pins, awls, ornaments and fishhooks the Indians lost or took with them to their shallow, sandy graves.

Some sites predate the earliest pottery type, which appeared more than 3,000 years ago. Others represent later periods, when Indian populations increased and built up shell mounds of impressive size and height -- some of which were dug away to form the base of still existing highways.

The sites tell the story of battles, natural disasters, climatic changes and the minutiae of daily life, including the first contacts of the aborigines with European explorers and mariners.

The Indian sites, fragile and irreplaceable, will be preserved for future research. As cultural and historic resources, they are protected, and penalties for unauthorized excavation are severe.

Concern for the historical heritage of the KSC area and the surrounding area is not limited to official government policies.

A number of KSC employees and their families hold memberships in the Indian River Anthropological Society, and frequently help in research and excavations into Indian and historical sites the length of the county. Their ranks include William Boggs and his wife, Judi; Hugh Harris's wife, Ann; Dean Zimmerman; Frank Bryan; James Escoffier; Hubert Griggs and his wife, Anne; Gilbert Whittaker, and Bill Lubliner, retired.

Major projects involving I.R.A.S. members have included excavation of a rare Archaic Period Indian cemetery west of Cocoa, and more recently, excavation of a large European contact period burial mound at an important Ais Indian village site near Grant. (Spaceport News, Vol. 19, No. 23, October 24, 1980, p 4)

o Explorer Posts of the Boy Scouts of America may someday fly several experiments aboard the Space Shuttle, thanks to a prominent aerospace firm.

TRW, Incorporated, of Redondo Beach, Calif., is sponsoring a national competition among Explorer Posts to select as many as four experiments to fly into space as part of a NASA "Get Away Special" payload. The company has offered to pay for the launch costs and provide technical expertise to the posts which submit the best ideas for experiments in space.

Some of the more than 15 submissions to date include proposals to determine the fixing of nitrogen in a growing culture, forming a permanent emulsion of oil and water under zero gravity, melting of oxygen glass compounds and the zero gravity formation of various sugar crystals.

Preliminary selection of the semi-final winners will begin at the end of this year by a panel headed by NASA astronaut Jim Lovell, say TRW officals. Final experiment choices will be made early in 1982, for a flight possibly in 1984.

The special canister for the experiments has a capacity of five cubic feet, enough for as many as four such experiments, according to TRW. (Spaceport News, Vol. 19, No. 23, October 24, 1980, p 6)

October 27: The Shuttle Training Aircraft (STA) being flown on shuttle landing exercises at KSC's Shuttle Landing Facility this week is one of two modified Grumman American Aviation-built Gulfstream II executive jets acquired by NASA's Johnson Space Center in the mid-1970s.

The STAs are used as trainers to instruct flight crews in the critical descent and landing phase of the Space Shuttle Orbiter.

The STAs are modified to simulate the Orbiter's cockpit, motion and visual cues and handling qualities. In flight, the STA will duplicate the Orbiter's atmospheric descent trajectory from approximately 35,000 feet altitude to landing on a runway.

Other structural modifications to the Gulfstream II include direct lift flaps to simulate the Orbiter's expected attitude and vertical control, and the installation of side force controls positioned under the wing to simulate expected sideward movements of the spacecraft.

The Gulfstream II is 80 feet long with a wingspan of 69 feet. It is powered by two Rolls Royce Spey turbo fan engines, each with a thrust rating of 22,800 pounds. These are reversible in flight to simulate the Orbiter's steep descent profile. (NASA News Release Callout No. C1 90-80, October 27, 1980)

o Launch failure of the European Space Agency's (ESA) Ariane launcher vehicle during its second test flight last May has been traced to a combustion instability in one of the vehicle's four first-stage rocket engines.

An extensive investigation determined that a high-frequency combustion instability developed in the vehicle's D engine 5.75 sec. after ignition. This stemmed from a combustion resonance in the combustion chamber, and it

occurred because of operating characteristics of the engine's radial injector, investigators said. The injector is the engine component that injects fuel and oxidizer into the combustion where the mixture ignites.

The investigation did not reveal any basic flaws in the overall design of the Ariane vehicle, and preflight work is continuing on the third Ariane in preparation for its launch next year. (Aviation Week & Space Technology, Vol. 113, No. 17, p 15)

o Soviet Union has launched three military spacecraft into orbit since early October:

Cosmos 1214--The spacecraft has parameters of the latest Soviet film reconnaissance satellite design believed to eject film pod reentry vehicles to allow a maximum useful life of 30 days. Cosmos 1214 was launched Oct. 10 into a 368 X 181-km. (229 X 112-mi.) orbit inclined 67.2 deg.

Cosmos 1215--The spacecraft has parameters characteristic of elint missions and was launched Oct. 14 into a 553 X 449-km. (343 X 279-mi.) orbit inclined 74 deg.

Cosmos 1216--This spacecraft is a standard Soviet film reconnaissance vehicle with a typical mission duration of two weeks. The spacecraft was launched Oct. 16 into a 404 X 209-km. (251 X 130-mi.) orbit inclined 72.9 deg. (Aviation Week & Space Technology, Vol. 113, No. 17, p 16)

October 28: The U.S. government is studying the possibility of setting up a new unit of the National Park Service to handle historic sites associated with America's space program.

In accordance with an act of Congress signed into law in September, the Department of Interior (the parent agency for the park service) has been ordered to meet with NASA and the Department of Defense.

The three are to see whether there is a need for the park service to "permanently safeguard from change the locations, structures, and at least, symbolic instrumentation features (associated with historic events in America's space program)... and to display and interpret these for visitors' appreciation."

The provision, sponsored by Rep. Keith Sebelius, (R-Kan.), is part of a larger bill that sailed through the House and Senate without opposition. (TODAY, Tuesday, October 28, 1980)

October 29: One of Skylab's smallest passengers, Arabella, has returned to the Marshall Center from the Smithsonian Institution, Washington, D.C.

Arabella, one of two "Space Spiders," participated in a web formation experiment aboard the Skylab Space Station. Photographs of her webs were studied by Judith Miles of Lexington, Mass., the high school student investigator who proposed Skylab Student Experiment ED-52, Web Formation in Zero Gravity.

The web characteristics compared by Miss Miles included such things as the number of spirals, the number of radials, angles between radials, distance between spirals, area of the web hub, area of the web catching surface, as well as the physical characteristics of the returned web material.

The information obtained from these analyses provided insight into the motor-sensory and neurosensory performances of the spiders in zero gravity.

Initial investigation revealed the web to be finer than Arabella had made prior to her space voyage, thus lending insight into the use of body weight to determine size of the webbing.

The Public Affairs Office has custody of Arabella's remains and is planning for public display of the "Space Spider" early next year. (Marshall Star, Vol. 21, No. 8, October 29, 1980, p 2)

o "The glory trip is over, now we've got to get down to the business of using space," said Maj. Sherwood C. Spring, one of 20 astronaut candidates who were on an orientation tour of Kennedy Space Center Tuesday.

Spring was referring to the glory that once accompanied being an astronaut. By the time he and the other candidates start flying the Space Shuttle, it will all be routine, he said.

"It will be like the railroads opening up the West," Spring said. "The Space Shuttle will open up space."

After the first few flights, astronauts will resemble airline pilots more than daredevils.

Although there are a number of military pilots in the new crop of astronauts, some of the candidates have never even flown a plane.

For instance, Wubbo Ockels, a research physicist who will be on Spacelab Mission 1, began his flight training on a T-38 -- a supersonic jet. "Fast," was about all Ockels would say about the experience. "I'm not one of those people who can't live without flying," Ockels said.

The European Space Agency is paying nearly $500,000 to NASA so Ockels can train as an astronaut. Ockels is training to be a mission specialist, an astronaut more responsible for the scientific end of the mission than for piloting.

Twelve of the 20 astronaut candidates at KSC Tuesday are training as mission specialists. The other eight are training as pilots.

Ockels is not the only new astronaut trainee who doesn't fit the mold of the sterotype astronaut.

Bonnie Dunbar has a master's degree in ceramic engineering. Dr. Franklin Chang is a physicist. Dr. William Fisher is an emergency physician.

"There's a lot of academic work," said Lt. Col. Roy D. Bridges Jr., a former U.S. Air Force pilot. "You have to study hard because the Shuttle is without a doubt one of the most complicated vehicles ever built."

Although Bridges said that this group of trainees could not be more enthusiastic -- "they're champing at the bit" -- Bridges acknowledged that they were quite different from those first seven astronauts. "Perhaps we've moved into a different era," he mused.

Ockels, however, said that this group had its share of bold angels along with the academicians. "We have a whole range of people: the wild guy and the more academic type. With the Shuttle, you need pilots and crew. We have both kinds," he said. (Today, Wednesday, October 29, 1980)

o Faced with an increasing problem of disposing of radioactive and toxic wastes, officials of the National Aeronautics and Space Administration (NASA) and the U.S. Energy Department are studying whether the Space Shuttle could ferry hazardous materials to a dumping site halfway between Earth and Venus.

Some experts contend space might be a better dumping ground than underground pits on earth, where nuclear and other poisons could leak into the soil.

But other analysts feel space disposal could cause a horrible nuclear accident -- for instance, if a shuttle crashed after launch from Cape Canveral and rained radioactive death on Central Florida.

The federal government is not currently planning to launch nuclear wastes into space, even though the two agencies have undertaken a four-year feasibility study, spokesmen say. (The Miami Herald, Wednesday, October 29, 1980)

October 31: The Soviet Union yesterday launched a high-resolution photographic film return satellite, identified as Cosmos 1218. It was put into an orbit of 178/374 kilometers, 64.9 degrees, 89.7 minutes. (Defense Daily, Vol. 112, No. 42, Friday, October 31, 1980, p 312)

o Letting out a thunderous groan as great as the Titanic god who was condemned to support the Earth and skies upon his mighty shoulders, Cape Canveral's own Atlas heaved a couple tons worth of electronic gadgetry high above Brevard skies late Thursday night.

Both NASA officials and military brass said the launch of the fourth satellite in the Fleet Satellite Communications (FLTSATCOM) system was near perfect.

NASA described the preparations of the 57th Atlas Centaur as "the smoothest launch operation in the history of the program."

More than 328,000 pounds of rocket and satellite lifted smoothly from Complex 36 at Cape Canaveral Air Force Station about 37 minutes behind schedule. The launch was delayed when a weather front moved in only

minutes before the end of the countdown. A couple weather balloons were sent up, and technicians reviewed the data before deciding to resume the count.

At 10:54 p.m., the rocket pierced a low cloud cover about 20 seconds into flight and the remainder of the flight was across clear skies.

Later Thursday night, launch officials confirmed that the satellite had successfully reached temporary orbit. From there it will be transferred into a permanent orbit 22,250 miles above the Earth. (Today, Friday, October 31, 1980)

During October: Nearly 170 KSC employees were honored for accomplishments and service Friday, October 31, at the Kennedy Space Center's Annual awards ceremony.

Seven persons received the NASA Exceptional Service Medal, one of the highest agency awards that can be earned by an individual. It is granted for achievement or service characterized by unusual initiative or creative ability.

William E. Backus of Cocoa Beach, Chief of the Center Planning Office, was honored for developing an organization of NASA and Air Force personnel to establish and operate an interagency logistics system for mutual support of Space Shuttle activites at KSC and Vandenberg Air Force Base. When the shuttle is to be placed in the polar orbit it will be launched from Vandenberg.

Donald J. Capone of Cocoa Beach, Chief, Cargo Planning Management Office, was cited both for his role in establishing the Cargo Operations Directorate and for his previous work as Chief, Resources and Financial Management. He was a key member of the team that estimated the shuttle's cost before the project was approved and he developed a system for cost control and fee-setting for the Space Shuttle. The latter is considered vital to meeting the goal of a self-supporting shuttle program by the end of 12 years.

William F. Huseonica became Chief, Projects Control Office, Cargo Projects, in May, 1979. At the time, KSC was reorganizing from a single program office, the Space Transporation System, to two program offices, Space Shuttle and Cargo Projects. Huseonica was honored for his leadership in building the organization and staff of the latter office. He lives in Rockledge.

Thurston B. McLeran, of Cocoa, who is Chief, Network and Support Services Branch, Technical Support Directorate, received his medal for his work in developing KSC's new telephone system, a very large and complex network with wide and varying needs for communications services. The conversion of the system was accomplished on schedule and without inconvenience to users.

Edwin S. Morgan, Chief, AC Power Section, was recognized for designing an emergency power system to support Space Shuttle operations. The new system is expected to reduce costs by $1 million over a decade compared to the previous system. He was also cited for his work on establishing the Complex Control System, which will remotely monitor and control all KSC utility systems as well as some Launch Complex support systems. He lives on Merritt Island.

Paul D. Myers of Titusville, Technical Assistant to the Director, Project Management, was recognized for exemplary efforts in resources planning and execution in support of design and acquisition of Shuttle facilities and ground systems.

Max Taylor, a Test Support Manager in the Operational Support Office, was recognized for his work on expendable launch vehicle operations. He is responsible for setting up and managing all technical support resouces needed for the pre-launch test and checkout and launches for the Centaur and Delta rocket operations. He lives in Cape Canveral.

DIRECTOR'S AWARD

The Center Director's Award, which includes a cash award of $2,500 is the highest award given by the Center. It was won by James E. Rice of Satellite Beach, Deputy Project Officer.

Rice was cited for his leadership and advice in competitions to select contractors for the tasks of checking out the Launch Processing System for the shuttle and the shuttle orbiter. He was also deputy chairman of the multi-center source board for the NASA cargo processing contract.

KSC FEDERAL WOMAN OF THE YEAR

Recipient of the Woman of the Year award was Lounette M. Price of Rockledge. She is secretary and personal assistant to the Comptroller. She is also a representative to the Federal Women's Program Working Group, was co-chairperson of KSC's Secretaries' Day, and helped to establish the Center's woman-to-woman network and monitoring project. She is first vice president of the Space Coast Chapter of Federally Employed Women and a member of the American Business Women's Association.

The award recognizes personal job competence, commitment to aiding other women to develop their potential and work toward enhancing the status of women at work and in the community.

EQUAL OPPORTUNITY AWARD

The Equal Opportunity Award is given to recognize outstanding contributions to providing fair and equal employment opportunities. This year's winner was Willie N. McClintock of Cocoa Beach.

McClintock, Chief of the Supply Branch, was cited for establishing an atmosphere that encourages his employees to strive for growth and progress.

SPECIAL AWARD TO CONTRACTOR EMPLOYEE

A special award was given to a contractor employee, Coolie Reynolds of McDonnell Douglas Astronautics Co., for preventing a potential accident at Complex 17. Reynolds, of Merritt Island, a safety inspector, last month discovered a sheared bolt on a load-bearing fitting for one of the solid rocket motors on the Delta rocket being prepared to launch the Satellite Business Systems satellite next month.

He received a certificate of appreciation, which may be granted to non-NASA employees for special services or contributions to the center.

"Because of Mr. Reynolds' concern and tenacity a major ground safety hazard was eliminated," Richard Smith, KSC Director, said. "The problem, gone undetected, would have resulted in a flight failure, possible severe pad damage and loss of mission".

SUGGESTION AWARDS

Two employees were honored for money-saving suggestions. Robert Garthwaite of Edgewater, a technician, received a certificate for a change he proposed in the type of roller guides used in the high-rise elevators of the Vehicle Assembly Building. The savings the first year were more than $106,000. Thomas H. Walthall of Titusville, a software design engineer, suggested a computer program that would cut the number of man hours needed to develop flow charts, which trace programs of various center operations. The first year's savings from his suggestion was $28,687.

GROUP ACHIEVEMENT AWARDS

Four working groups received special NASA-wide recognition for their accomplishments.

The Microchemical Analysis Section, besides analyzing the orbiter's thermal protection system tiles, developed an adhesive catalyst analysis and other analysis methods that have allowed critical shuttle processes to continue.

The Field Engineering Group of Delta Engineering is responsible for making corrective engineering changes in the field during construction projects. Through their efforts ground systems and equipment projects have been completed in time to support the shuttle schedule.

The Construction Management Office, a group of 44, was also cited for completing shuttle facilities within budget guidelines and without disrupting the shuttle schedule.

The Launch Processing System Simulation Task Team was cited for "the creation of a magnificent fake". They created a mathematical model that would fool the LPS into thinking it was attached to a real space shuttle and group support systems.

Thirty five men and women received Certificates of Commendation, the second highest individual awards presented by the Center. They were recognized for exceptional professional accomplishments.

Receiving certificates of commendation were: Judith A. Anderson, John N. Brewer, David A. Brown, Michael J. Cardone, Robert G. Covell, Jr., J. Albert Diggs, Jr., Alex S. Dula, Jr., Johnny G. Fraley, Charles D. Gay, Wayne R. Graham, Billy L. Haynes, Carroll V. Hughes, Robert B. Hughes, John R. Jamieson, William C. Jones, Konstanty Kebalka, Franklin D. Keck, Barry T. Kennedy, Arthur J. Mackey, John C. McBrearty, Conrad G. Nagel, Ted L. Oglesby, A. Reynolds, Mark R. Scholmer, Robert B. Sieck, Harry A. Silipo, Charles G. Stevenson, Billie L. Study, James E. Sullivan, Charles E. Taylor, Louis H. Whitby, Warren I. Wiley.

Forty-three persons received certificates for 40, 35, and 30 years of service in the Federal Government. Together, they have worked a total of 1,390 years.

Recipients of 40-year awards were Kennedy R. Behl, James R. Branard, Joseph E. Dulude, Samuel C. Grimbly, Ben W. Hursey and William D. Lutz.

Honored for 35 years of service were Frederick N. Bailey, Donald D. Buchanan, Sherman J. Evans, Marvin H. Heckendorf, John M. Meraviglia, Edmund F. Smith, Regina D. Vietor and Mary H. Waller. (NASA News Release No. 193-80)

- Another major milestone in preparing the Space Shuttle for launch on its maiden voyage next spring will be passed November 3 and 4 with the mating of the external tank with the shuttle's twin solid rocket boosters.

The external tank is 47 meters (154 feet) long and 8.4 meters (27.5 feet) in diameter. It carries the supercold liquid hydrogen and liquid oxygen propellants used by the Space Shuttle Orbiter's three main engines. Its empty weight is 34,545 kilograms (76,000 pounds).

At launch, it will be loaded with the 604,195 kilograms (1,332,000 pounds) of liquid oxygen and 101,606 kilograms (224,000 pounds) of liquid hydrogen which the three powerful engines will burn from liftoff until just before the Space Shuttle goes orbital eight and half minutes later.

The external tank is one of four major Space Shuttle elements and the only one which is not reusable. After it is jettisoned from the orbiter at an altitude of 118 kilometers (73 miles), it enters the Earth's atmosphere, breaks up and impacts in a remote and empty region of the Indian Ocean.

Assembly of the Space Shuttle "stack" on the mobile launcher platform in High Bay 3 of the Vehicle Assembly Building began in December, 1979 and January, 1980 with erection of the twin solid rocket boosters. (NASA News Release No. 192-80)

- The launch of the first in a series of three Satellite Business Systems spacecraft has been rescheduled for Wednesday, November 12.

Launch will be conducted by KSC aboard Delta 153 from Complex 17A at Cape Canaveral Air Force Station during a window extending from 5:47 p.m. to 6:54 p.m. EST. Additional launch windows that evening extend from 7:30 to 7:41 and from 8:17 to 8:30 p.m.

SBS-A is the first of three identical satellites to be launched by NASA for Satellite Business Systems. Each is designed for a seven-year lifetime of high-quality voice, data and video transmissions directly between commercial business customers.

The original launch date for SBS-A was October 23, but a test firing of a Spinning Solid Upper Stage-D rocket motor at the Arnold Development Laboratories, Tullahoma, Tenn., in late August resulted in a burn-through of the rocket nozzle. The SSUS-D rocket motor is a version of the Payload Assist Module (PAM-D) which will be flown for the first time on the SBS-A mission.

The PAM-D is expected to be test fired in late October, and if results are satisfactory, the November 12 launch will proceed. PAM-D is a new and more powerful spinning sold propellant motor which replaces the third stage normally used with the Delta rocket. (NASA News Release, No. 183-80)

November 3: The next to last scheduled Shuttle engine Main Propulsion Test is scheduled today at the National Space Technology Laboratories. The SSME cluster will be fired for 581 seconds. Final MPT test is scheduled for December. (Defense Daily, Vol. 113, No. 1, Monday, November 3, 1980, p 8)

- The Space Shuttle External Tank will be mated to the Shuttle Solid Rocket Boosters between Nov. 3 and 6 on the Mobile Launch Platform inside the Vertical Assembly Building at the Cape. The Orbiter Columbia is scheduled to be moved from the Orbiter Processing Facility to the VAB for mating with the ET/SRB on Nov. 23. (Defense Daily, Vol. 113, No. 1, Monday, November 3, 1980, p 8)

- Mr. Page reported on Shuttle hardware status that the Orbiter engine mods are going well with reinstallation scheduled for November 8-10; there are 1,000 tiles to go and the gap filler installation is doing better; the removal of the instrumentation islands on the external tank is going well and we are one day up on the schedule; the external tank forward ring simulator installation will begin October 27 and its use in the SRB pull test will eliminate one shift from the schedule.

  Mr. Page added that the UTC has arrived at KSC and the sea trial involving senior staff members is scheduled for November 5.

  There was some discussion regarding the maximum occupancy capacity of 1600 for VAB. He proposed that a total limit of 2000 be set beginning November 1 (there are individual limits set on organizations) with Shuttle Operations being notified by the Safety Office when that capacity is reached. Access will not be automatically shut down at that point but Shuttle Operations will do a realtime assessment as to whether additional access would be allowed.

  Mr. Page reported that the Shuttle Operations Directorate had achieved 122% of its goal in the CPC. (Center Director's Staff Meeting Notes #38-80, November 3)

November 4: Mr. Page reported that OPF rollout is still on schedule with ET/SRB mate scheduled to start today (Nov. 3). A new schedule showing the launch date as March 14, 1981, is ready for release.

Mr. Page requested guidance as to the timing for the OPF rollout. Mr. Griffin stated that Headquarters is taking a low-keyed approach to rollout with a very limited number of DOD and Congressional personnel invited. Therefore, timing of the rollout for ceremonial purposes should not be a driver, although Mr. Griffin assumed that there would be technical advantages to a daylight rollout.

Mr. Page stated that he has received a letter from Mr. Slayton (JSC) proposing a philosophy change in regard to the first turnaround processing of the Orbiter. Dr. Gray stated that to avoid misunderstandings KSC policy will be defined for the first turnaround processing of the Orbiter by letter to Mr. Yardley.

Mr. Page noted that safety dress codes in operational areas requiring slacks and low-heeled, closed-toe shoes were not being strictly observed by VIP's. Director, Executive Management Office, and Director, Public Affairs, will meet with Mr. Griffin to review current groundrules for VIP visitors to the operational areas. (Center Director's Staff Meeting Notes #39-80, November 4)

- DOD's fourth FLTSATCOM communications satellite was successfully placed into elliptical transfer orbit Thursday after launch from Cape Canaveral by an Atlas-Centaur vehicle. The 2215-pound TRW-built satellite was slated to be boosted into geosynchronous orbit over the Pacific Saturday. (Defense Daily, Vol. 113, No. 2, Tuesday, November 4, 1980, p 12)

- In addition to the European Space Agency's Giotto mission to Halley's comet in 1985-86, the Soviet Union and Japan are now reported to be planning missions to the comet, which passes close to the Solar System every 76 years. NASA, which had planned a U.S. Halley's mission, is now seeking to be a partner on Giotto.

  The Soviet Halley mission would be part of the joint Soviet/French mission to drop balloon-borne instruments into the atmosphere of Venus. The mission would use a Venus gravity-assist to swing by Halley.

The planned Japanese mission, designated "Planet A", would be a fly-by of the comet. (Defense Daily, Vol. 113, No. 2, Tuesday, November 4, 1981, p 13)

- Launch of SBS-1, the first satellite in the business communications satcom system being established by Satellite Business Systems, has been delayed from the planned Nov. 12 date in order to replace a Castor strap-on motor. A postponement of several days is anticipated. Launch will be from Kennedy Space Center with a McDonnell Douglas Delta 3910 vehicle. The 10-transponder spacecraft will be placed in synchronous orbit at 106 degrees west longitude over the equator (due south of El Paso). The Hughes-built satellite will be the first domestic U.S. satellite to use the 14/12 GHz bands. The two other satellites planned in the initial SBS system are planned for launch in April 1981 aboard a Delta 3910 and in November 1982 aboard the Shuttle. (Defense Daily, Vol. 113, No. 2, Tuesday, November 4, 1980, p 14)

- Air Force Secretary Hans Mark told the Air Force Association in Denver Sunday that Colorado Springs, Colo., should be the site for the Defense Department's $100 million Consolidated Space Operations Center. (Defense Daily, Vol. 113, No. 2, Tuesday, November 4, 1980, p 15)

November 5: With the successful connection of the Space Shuttle's fuel tank to its two strap-on rocket boosters Tuesday, America's first reusable space vehicle is two-thirds assembled.

The stage-and-a-half Shuttle, which takes off like a rocket on top of its fuel tank and lands like an airplane, is scheduled for launch March 10.

On Monday, workers hoisted the 154-foot-long fuel tank from one bay of the Vehicle Assembly Building to another bay, where two solid rockets had already been bolted to a movable launch platform.

On Tuesday, the tank was lowered into place between the two 149-foot-high rockets, and that evening, the mechanical linkages were completed.

The next major step toward the launch of the Space Shuttle will be the attachment of the Spaceship Columbia to the fuel tank, now scheduled for late November. Then, if all goes as scheduled, the assembled Shuttle will be moved about 3 1/2-miles from the VAB to its launch site on its movable launch platform shortly after Christmas. (Today, Wednesday, November 5, 1980)

o The launch of the first of a series of three spacecraft for Satellite Business Systems has been rescheduled for November 15.

The new communications satellite, SBS-A, will be launched by KSC aboard Delta 153 from Complex 17 at Cape Canaveral Air Force Station. The launch window is from 5:49 p.m. to 6:57 p.m., with two additional windows - 7:32 p.m. to 7:44 p.m. and 8:21 p.m. to 8:30 p.m. - available that evening.

The new satellite, to be designated SBS-1 in orbit, is designed to transmit high quality voice, data, and television communications directly between customers. All three satellites in the system will be identical. (NASA News Release No. 195-80, November, 5, 1980)

o Almost 68,000 visitors took guided bus tours of NASA's John F. Kennedy Space Center in October, an increase of more than 5 percent over the same month in 1979.

The 67,810 visitors brought the cumulative total for the year to 1,088,639. The number is only slightly behind that for this point in 1979, the third busiest year since the tours began in 1966. KSC officials predict that this year's totals may rival those of 1979. (NASA News Release No. 196-80, November 5, 1980)

o The launch of the Satellite Business System satellite on a Delta rocket will mark the debut of a new spacecraft propulsion system and the first test of what will be the upper stage for Delta-class payloads carried aboard the Space Shuttle.

The new solid-propellant rocket system is called the PAM, for Payload Assist Module. A modified version of the PAM designed to be carried in the orbiter's cargo bay will propel spacecraft deployed from the Shuttle to

altitudes beyond its reach. When the new vehicle is used in a Shuttle mission, it is called the SSUS - Spinning Solid Upper Stage. (NASA News Release No. 197-80, November 5, 1980)

o The planned 581-second next-to-last test of the three-engine Space Shuttle Main Engine (SSME) cluster was automatically terminated after 22 seconds Monday at the National Space Technology Labs.

Sensors had determined that temperatures in the turbine drive of the high pressure fuel turbopump in engine #2 exceeded acceptable limits.

An inspection by NASA found an irregular hole 6 to 8 inches in size a few inches above the base of the nozzle of engine #2, involving 22 coolant tubes which carry liquid hydrogen up the nozzle to cool the nozzle during engine operation. Loss of fuel through the severed coolant tubes resulted in an oxygen-rich mixture in the fuel pre-burner causing the high pressure fuel turbine's discharge temperature to exceed the automatic cutoff limit.

A visual inspection found no other damage to the engine, but a further investigation is underway.

The failure is a disturbing setback to plans to make the first Shuttle launch on March 10, but the agency said that the failure by itself will not force a rescheduling of that mission.

NASA had said before the test that it planned two final tests of the SSME, and if both were perfect, it would be ready for launch. [The second test was planned by Dec. 1.] However, it said that if one test was not successful, it could conduct a third test in late December or early January.

Monday's test was the 11th firing of the SSME cluster. Major test objectives had been performance evaluations of the engine's thrust vector control system, the liquid oxygen and liquid hydrogen pressurization system, and the low-level fuel cutoff system. (Defense Daily, Vol. 113, No. 3, Wednesday, November 5, 1980, p 16)

- The Soviet Union launched Cosmos 1219, a medium-resolution photographic reconnaissance/surveillance satellite, on Friday, Oct. 31. It was put into an orbit of 205/353 kilometers, 72.9 degrees, 89.7 minutes. Cosmos 1219 was the second recon/survey mission by the Soviets in as many days. Cosmos 1218 was launched the day before as a high-resolution photographic system.

  Launch of the SBS-1 domestic satcom has been rescheduled for Saturday, Nov. 15, at KSC. Three-day delay was caused by a decision to replace one of the Delta 3910 launch vehicle's Castor strap-on motors. (Defense Daily, Vol. 113, No. 3, Wednesday, November 5, 1980, p 17)

- "When Voyager's encounter with Saturn is over, all the textbooks in the world dealing with planetary systems will have to be rewritten"--Jet Propulsion Laboratory spokesman Frank Bristow, Nov. 3, 1980. (Defense Daily, Vol. 113, No. 3, Wednesday, November 5, 1980, p 21)

November 6: With the Republicans now in control of the Senate, Sen. Harrison ("Jack") Schmitt (R-N.M.) is now in line to become chairman of the Subcommittee on Science, Technology and Space of the Senate Commerce Committee, which is responsible for the NASA authorization.

Schmitt, the former Apollo astronaut and the most knowledgeable and enthusiastic supporter of the space program in the Congress, would replace Sen. Adlai E. Stevenson (D-Ill.), who did not run for reelection. Stevenson has been a consistent supporter of the NASA budgets submitted to the Congress, but has not sought to make any major increases, a move largely dictated by the mood of Congress. He and Schmitt, who has been the ranking Republican on the subcommittee, have worked closely together.

At the same time, both men have spearheaded the first effort in Congress to get the Executive Branch to establish a new long range space policy for the nation and to establish an operational Earth Resources Satellite system -- although they have advocated different course of action within those programs. (Defense Daily, Vol. 113, No. 4, Thursday, November 6, 1980, p 25)

November 7: Columbia's prime crew logged lots of landing practice last week as they made simulated orbiter approaches to the Shuttle Landing Facility in a modified Grumman Gulfstream jet.

The purpose of the exercises was to give prime crew astronauts John Young and Bob Crippen some practice at making manual landing approaches while becoming familiar with the automated Microwave Scanning Beam Landing System.

Crippen was at the controls on Tuesday as the Gulfstream aproached from the northeast at an altitude of about 35,000 feet. Looking like a white speck falling against an azure background, the plane made its steep descent to the runway and roared past spectators without touching down.

"It's not that much of a drop," Crippen told a group of newsmen following his six practice approaches. "The dive to the ground, if you weren't used to it, would look a little steep to you."

A "little steep," as he put it, is about seven times steeper than the landing approach made by a commercial aircraft.

The instruments and controls on the left side of the Gulfstream's cockpit have been modified to resemble those on the commander's side of the orbiter's flight deck. A screen which looks like a small television picture tube displays a computer schematic showing the craft's descent progress.

One big difference between the Gulfstream and the real orbiter is that the Shuttle Training Aircraft has power - the orbiter does not.

"That's the tricky thing about landing the Shuttle," said Crippen.

Astronauts will manually land the orbiter during the first couple of flights, Crippen said. After that, the Shuttle's return to the ground will be controlled by the automated Microwave Scanning Beam Landing System, or MSBLS.

Although the astronauts were flying manual approaches during last week's tests, the MSBLS was operating to familiarize the astronauts with the system. (Spaceport News, Vol. 19, No. 24, November 7, 1980, p 3)

o It is a craft for the Space Shuttle program, and its captain is named James Bond, but it's definitely not from "Moonraker."

It is the UTC Liberty, first of two specially-built ships used for the recovery of spent solid rocket boosters after each Space Shuttle flight.

Operated for NASA by United Space Boosters, Inc. (USBI), the 176-foot long vessel features many unique adaptations for the role of recovering and returning spent solid rocket booster casings for refurbishment and reuse.

The Liberty arrived at its Hangar AF berth on Oct. 22, and was scheduled to begin local sea trials early this week. The UTC Freedom is being fitted and readied for acceptance tests at the builder's Fort George Island shipyards, near Jacksonville, and will be delivered here in several weeks. (Spaceport News, Vol. 19, No. 24, November 7, 1980, p 3)

o The beauty of Saturn's rings is overshadowed only by recent discoveries of their complexity. Photographed by the voyager I spacecraft 8 million miles away, the flat rings look like ripples spreading out across a lake. The rings actually contain dark "fingers" that reach thousands of miles across their brightest parts. Each of the countless ring particles (in the fingers) moves in its own orbit around the planet like a tiny moon. Scientists can't begin to explain the baffling discovery. The spacecraft will sail within about 80,000 miles of the planet's cloudtops Nov. 12. (Today, Friday, November 2, 1980)

o Ford built it, NASA will launch it, and 105 nations will use it.

It is an INTELSAT V, the largest communications satellite ever built, weighing in at two tons. The satellite for the 105-nation International Telecommunications Organization (INTELSAT) will be launched Dec. 4 aboard a NASA Atlas Centaur rocket.

Ford, INTELSAT and NASA showed it off Thursday at the Cape Canaveral Air Force Station, where it will be launched.

Once it is in orbit more than 22,000 miles above the Atlantic Ocean, 70 percent of transatlantic phone calls will be bounced off its antennas and all live transatlantic television will traverse its circuits.

The satellite is the first of nine that will make up the INTELSAT V system. The new and bigger series of satellites can handle 12,000 calls at one time - twice as many calls as their predecessors.

The total system is costing INTELSAT $300 million. Why do the members of INTELSAT, many of them underdeveloped nations like the Congo, Bangladesh, Haiti, Iraq and Iran, want to spend all that money on satellites?

Because long-distance telephone traffic is doubling every four years, said Jean Louis Maury, INTELSAT's spacecraft program office manager. "The traffic is increasing very fast, and the lifetime of INTELSAT IV is coming to a close," Maury said.

The first five satellites in the series will be launched on Atlas Centaurs, he said. Originally, INTELSAT was considering launching the sixth, seventh and eighth satellites on the Space Shuttle, but because of delays, the organization has decided to reserve space on European ARIANE rockets. The Ariane, like the Shuttle, is a yet unproven system, Maury said.

But INTELSAT is keeping an ace in the hole. The satellites will be compatible with either the Shuttle or the Ariane.

Ford Aerospace and Communications Corp. assembled the satellite for INTELSAT. Some major elements of the satellite were built in Europe and Japan. It took four years to complete the satellite, which will have a lifetime of seven to 10 years. (Spaceport News, Vol. 19, No. 24, November 7, 1980, p 3)

o Without a contract for four days, workers at the Kennedy Space Center's Visitor Information Center are considering a strike.

Almost 135 workers, represented by the International Association of Machinists and Aerospace Workers, District 166, voted Tuesday night to strike.

The workers will strike if NASA's tour contractor, TWA Tours, does not begin negotiating "in good faith," and if the union's national leadership authorizes a walkout, said Frank Walley, strike committee chairman.

The strike vote came after the workers voted down the three-year contract TWA offered after a month of negotiations.

The workers' last contract expired Saturday.

The union represents about 150 tour bus drivers, cafeteria workers, ticket takers, bus mechanics, groundkeepers and maintenance workers.

Although union and TWA officials are scheduled to resume talks Sunday, Walley said he believes a strike is inevitable. (Today, Friday, November 7, 1980)

o Space shuttle program managers say they hope an accident that knocked a hole through an engine last week won't delay the first launch of the craft.

Major Test Manager James Sisson of the Marshall Space Flight Center at Huntsville, Ala. said Thursday that Monday's failure of the main propulsion test was similar to an earlier failure on a single engine.

The test at the National Space Technology Laboratories in Bay St. Louis, Miss., was of a cluster of three shuttle engines, fed by an external tank.

It is identical to the system that will power the Space Shuttle Columbia, scheduled for launch next March 14.

The system was to fire for 581 seconds Monday, but was cut short at 21.7 seconds by high temperatures in a pre-burner that powers the main fuel pump. Part of its hydrogen supply was cut off by a hole in the main exhaust nozzle.

Sisson said another main propulsion test might be tried before Nov. 24, with another firing to come around Jan. 1. The final test is scheduled for Feb. 7 at the launch pad at Kennedy Space Center. (Sentinel Star, Friday, November 7, 1980)

November 10: They're calling it an impasse but both sides in the labor dispute that could shut down the Kennedy Space Center's Visitor Information Center are confident an agreement can be reached by the end of the week.

That's when the approximately 135 visitor center workers, represented by the International Association of Machinists and Aerospace Workers, District 166, plan to go on strike.

The first day of bargaining with federal mediator Richard Deem and union and management teams lasted about four hours Sunday at the Cocoa Beach Holiday Inn.

At two rectangular tables set up in one of the larger hotel suites, union and management bargaining teams set in with plenty of cups of coffee and cokes.

Mediator Deem sat at the head of the table, occasionally breaking up the joint meeting to hold individual private sessions with the different parties.

A second round of talks is scheduled today at noon and both sides say they will negotiate through the week.

The union voted last Tuesday to strike and union business agent Roger Kendrick said Sunday afternoon TWA Services Inc. will be put on notice - without a contract the workers will walk out at the end of the week. TWA Services operates the Visitor Information Center. (Today, Monday, November 16, 1980)

o SBS-A, the first in a series of three commercial service communications satellites, is scheduled to be launched on a Delta 3910 vehicle from the Eastern Space and Missile Center (ESMC) no earlier than November 12, 1980. The launch support for this mission will be provided by NASA, on a reimbursable basis, to SBS, a consortium of IBM, Comsat General, and AETNA Insurance, at a fixed price of $22.0M. The launch of SBS-B on Delta is scheduled for March 1981.

The SBS-A spacecraft will be the first capable of transmitting point-to-point voice, date, facsimile, and telex messages within the continental United States, as routine commercial service in the 12/14 GHz (K-) Band. Prior K-Band service on the ATS-6, CTS, and Telesat-D was experimental.

This will also be the first use of the McDonnell-Douglas developed Payload Assist Module (PAM-D) which will place the SBS-A spacecraft into a synchronous transfer orbit. The spacecraft Apogee Kick Motor will be fired at transfer orbit apogee to circularize its orbit at geosynchronous altitude of roughly 19,300NM above the equator at approximately 106 degrees W longitude, roughly 3 days after launch. (Mission Operation Report, Office of Space Transportation Operations, No. 0492-213-80-01, SBS-A/Delta Launch, 10-9-80)

o The FLTSATCOM-C spacecraft was successfully launched into a synchronous transfer orbit by the Atlas-Centaur AC-49 at 2026 hours EST from the ETR Launch Complex 36 on 17 January 1980.

The transfer orbit parameters are:

	Actual	Nominal
Inclination (degrees)	26.3557	26.2526
Eccentricity	0.732301	0.732279
Apogee Height (KM)	35975.9	35971.5
Perigee Height (KM)	166.96	166.92

The spacecraft apogee kick motor was successfully fired at fifth apogee on 20 January 1980, injecting the FLTSATCOM spacecraft into the desired synchronous orbit. All spacecraft systems were turned on and are operating nominally.

MISSION OBJECTIVES FOR FLTSATCOM

NASA OBJECTIVES

To launch the FLTSATCOM spacecraft into a transfer orbit which enables the spacecraft apogee motor to inject the spacecraft into a synchronous orbit.

SPACE DIVISION - AIR FORCE SYSTEMS OBJECTIVES

To fire the apogee motor, position the satellite into its planned synchronous near equatorial orbit, and operate and manage the system for the USAF and USN. (Mission Operation Report, MOR No. 0-491-202-80-03, November 10, 1980)

o On Merrit Island, a few hundred yards from the 21st century, prehistoric times persist.

But will sea turtles - those lumbering, lovable survivors from 200 million years ago - survive the space age?

A new study warns that the John F. Kennedy Space Flight Center is disturbingly close to a vital breeding ground for sea turtles.

Once the space shuttle launches start, NASA should monitor the turtles to make sure that the roaring, fire-spitting rockets don't upset the shy, sensitive creatures, the study says.

And NASA has agreed, by and large.

The space agency is ironing out details of a turtle-watching program, said Dr. Bill Knott, the space center's Biological Sciences Officer.

The agency might even "re-orient" shuttle missions - for example, change launch times - if the flights seem to alter the turtles' lifestyle, Knott said.

And not just because NASA likes turtles, either. It's the law: The U.S. Endangered Species Act would require NASA to change its plans to avoid harming the turtles, Knott said. (Sentinel Star, Monday, November 10, 1980)

- NASA has pushed back the tentative launch date for the first Shuttle mission from March 10 to March 14 in order to add a Launch Readiness Verification Test after the Flight Readiness Firing of the SSME on the launch pad. The verification test will be an evaluation of the electrical/electronics and flight control system of the Shuttle in ascent, descent and return-to-launch-pad-after-abort simulation profiles. The launch schedule could also be affected by the SSME test failure Nov. 3, but NASA has not made such a conclusion to date. (Defense Daily, Vol. 113, No. 6, Monday, November 10, 1980, p 42)

- A nine-year space shuttle development has reached a significant turning point as the shuttle engineering and manufacturing phase is finally giving way to a formal launch processing flow here that should allow first flight next April or May.

  Integration and stacking of the first flight vehicle has begun to peak with activities centering around shuttle processing in the Vehicle Assembly Building. Martin Marietta's heavily insulated 154-ft. external tank was mated late last week to the two Thiokol/McDonnell Douglas 2.9-million-lb.-thrust solid rocket boosters mounted on the mobile launcher platform.

  The three Rocketdyne space shuttle main engines were to be reinstalled in the orbiter Columbia by this week to ready Rockwell's winged spacecraft for movement to the Vehicle Assembly Building as early as late next week for vertical stacking.

There is a distinct attitude among Kennedy management and technical personnel that the space shuttle program is coming together here: that although problems and hurdles remain, the major hardware and software elements are solidifying into a vehicle ready to fly. (Aviation Week & Space Technology, Vol. 113, No. 19, p 17)

o Three days of climbing around the space shuttle launch facilities here - eyeball-to-eyeball with recalcitrant thermal tiles and with a new generation of automated countdown hardware and software - leaves one overriding impression. Space shuttle is over the crest of its first-flight problems. Since the delivery of Orbiter 102 to the launch center a year and a half ago, there has been a wrestling match with tiles that would not stick, a succession of change orders, and the development and debugging of software for a launch sequence much different from Apollo. There are still problems lurking in the bushes, but the momentum has changed from an uphill grind to a downhill roll.

Latest in the series of launch dates for the first shuttle flight - designated STS 1 - is Mar. 14, 1981. NASA is going to stick officially to that date, even though everyone from the administrator on down is aware of the difficulties in meeting it. To make that date means that every sub-item in 26 milestone steps on a condensed schedule waterfall chart must be completed right on the button after the vehicle reaches the launch pad - checks, procedural validations, countdown dry run and flight readiness firing of the Orbiter's cluster of three main engines. No elasticity in the schedule exists for fixes, reruns, or procedural changes and revalidations.

Despite the improbability of that kind of a checkout and countdown for the first hot launch, the date will stand. Any admission of the possibility of a slip is the best guarantee, in Murphy's Law precedent, that the schedule will slip. The important change in the shuttle prognosis is that even if the March schedule is breached, it will not be breached by much: days or weeks rather than months or years. (Aviation Week & Space Technology, Vol. 113, No. 19, p 9)

November 12: As many as 650 Kennedy Space Center workers for the Space Shuttle, hired temporarily by Rockwell International Corp. to finish putting heat-resistant tiles on the Spaceship Columbia, will be laid off over the next two or three weeks, a Rockwell spokesman said Tuesday.

But it shouldn't come as a surprise to any of them.

"They knew when they were hired that they were temporary workers," the spokesman said. "In fact, many of them were college students."

The spokesman for Rockwell said some of the workers were told when hired they would be working for about eight months - that was two years ago, he said.

When the Columbia landed at KSC on the back of a Boeing 747 transport in March of 1979, it had 23,000 tiles on it - only 7,922 short of the more than 30,000 tile goal.

But because of flight damage and late design changes, thousands of tiles had to be taken off the Columbia to undergo strengthening. (Today, Wednesday, November 12, 1980)

o The outlook for passage of FY '81 HUD-IA appropriation, including money for NASA, remains uncertain. If the bill is not passed, Congress would substitute a continuing resolution, allowing money to be spent at last year's level or a level decided on, but excluding new starts.

While the HUD-IA appropriation has passed both the Senate and House, placing it ahead of most of the ten other money bills which remain to be passed [including the defense appropriations bill which has not even cleared Senate committee], no one knows as yet how long the "lame duck" session of Congress will last or if it will be long enough to accommodate the various bills.

Moreover, the HUD bill, which might otherwise be toward the top of the list, is enmeshed in a controversy over reprogramming by NASA between the House subcommittee chaired by Rep. Edward Boland (D-Mass.) and the Senate subcommittee, which includes Sen. Jack Schmitt (R-N.M.).

Boland, citing the cost overruns on a number of NASA programs, has been trying to get NASA to agree to a one-committee congressional veto over requested reprogrammings of $100 million or more. He argues that this is required in order to provide effective appropriations oversight, pointing out that this procedure is followed on the defense bill. However, since denial of such a reprogramming request [by either of the two appropriations or two authorization committees] would effectively kill some, if not most, programs, NASA has declined to go along. Schmitt has strongly endorsed the NASA position as has the authorizing committees, who believe the one-committee veto would improperly give programmatic authority to the appropriations committees.

Because of the failure to reach an agreement on the reprogramming authority, Boland withdrew the R&D portion of the NASA appropriation from the FY '81 HUD-IA appropriations bill, which was subsequently passed by the House, including a $20 million cut in NASA Construction and R&PM.

The Senate bill adds $51 million to the overall NASA budget, including $65 million for R&D. [However, both bills subject NASA to a 2 percent, $111 million, reduction].

While the money figures could be worked out relatively easily, the reprogramming impasse remains a serious stumbling block to passage of the HUD-IA bill.

[Note: Nine of the ten members of the House subcommittee, which consists of 7 Democrats and 3 Republicans, have been reelected. Rep. Bennett Stewart (D-Ill.) lost in the primaries. However, the Republican gains in the House are expected to require a reconstitution of the committee to a 6/4 margin for the Democrats.] (Defense Daily, Vol. 113, No. 7, Wednesday, November 12, 1980, p 48)

o The U.S. Voyager 1 spacecraft, nearly a billion miles from Earth and hurtling toward a 77,000-mile encounter with the giant planet Saturn today, has added to its discoveries:
    * A 15th moon of Saturn, about 50 miles across, and located just outside the planet's A-ring.
    * A 780-mile-wide Red Spot, comparable to a similar marking on Jupiter, believed caused by an immense, continuing storm.
    * Additional concentric features within the planet's "rings" [rings within rings]. (Defense Daily, Vol. 113, No. 7, Wednesday, November 12, 1980, p 49)

o The European Space Agency, which has been developing the Spacelab for 6-1/2 years, will turn over the non-flying engineering model of Spacelab to NASA Nov. 28 in Bremen, West Germany, where Spacelab is built by VFW-ERNO. The model, which will be used in Spacelab/Shuttle integration preparation, will be flown to Kennedy Space Center in early December. The first Spacelab flight unit is to be delivered next year. A second unit, to be paid for by NASA, will be delivered in the 1982-83 period. First two Spacelab flights are scheduled for June and November 1983. (Defense Daily, Vol. 113, No. 7, Wednesday, November 12, 1980, p 51)

o Intelsat, which has planned to launch its first five Intelsat V's with the General Dynamics Atlas-Centaur and then use the European Ariane for three of the next four launches, has confirmed those plans.

Fred Ormsby, chief launch vehicle engineer for Intelsat, was quoted as saying that the choice was between Ariane and the Space Shuttle.

"It was very tough to make a decision as to the launch vehicle when neither the Shuttle nor the Ariane has been proven in performance," he said, indicating the Ariane would be used for the sixth, seventh and eighth Intelsat V launches.

However, Intelsat has also ordered three augmented Atlas-Centaurs which could be used for any of the Intelsat V launches or for the follow-on Intelsat V-A.

Intelsat took options for two Space Shuttle launches for Intelsat V, but delays in the Shuttle has made its use improbable.

First of the Intelsat V's is scheduled for launch Dec. 4 from Cape Canaveral by an Atlas-Centaur. (Defense Daily, Vol. 113, No. 7, Wednesday, November 12, 1980, p 52)

o NASA's Jet Propulsion Laboratory is reported to have directly approached President-elect Reagan to provide funds in FY '82 to initiate a mission to rendezvous with Halley's Comet in 1985. That project was not approved by the Carter Administration and NASA has been concentrating its efforts on negotiating arrangements to participate in the European Space Agency's Halley mission.

The JPL approach to Reagan was said to be made by a trustee of CalTech, Earle M. Jorgenson, president of Jorgenson Steel Co. (Defense Daily, Vol. 113, No. 7, Wednesday, November 12, 1980, p 52)

November 13: Ivey's Steel Erectors, Inc. of Merritt Island, Florida, has won a $1,371,144 construction contract from NASA's John F. Kennedy Space Center, to build a Life Sciences Support Facility.

This facility, to be constructed within an existing building, will support non-human life sciences flight experiments to be flown on the Space Shuttle.

Up to 20 Principal Investigators will be able to work in the building, and as many as 30 primates and 500 rodents can be housed there. Holding and preparation areas for plants, fish and amphibians, cells and tissues will also be available.

NASA will fly several Shuttle missions dedicated to life sciences investigations containing between 20 and 45 experiments. This facility will provide the laboratories, shops, data managements, storage and synchronous ground control areas needed to support those missions. (NASA News Release No. 198-80, November 13, 1980)

o Sen. Jack Schmitt (R-N.M.), who is expected to become chairman of the Senate Subcommittee on Science, Technology & Space in the next Congress, is working on a revised version of his 30-year National Space & Aeronautics Policy Act which he first introduced in 1978 and submitted in revised form in 1979.

Schmitt, who is continuing to solicit comments on his draft bill, plans to reintroduce the legislation in the new Congress next year.

The 1979 bill, which had nine cosponsors, called on NASA and the White House to prepare a national 30-year space and aeronautics policy goals statement. It recommended that this start with a firm 5-year program plan with annual funding requirements, followed by a 10-year plan and then a 30-year policy goals statement. (Defense Daily, Vol. 3, No. 8, Thursday, November 13, 1980, p 57)

November 14: As Voyager 1 sailed away from a "flawless" rendezvous with Saturn, scientists reveled Thursday in a shower of discoveries, including hints that the giant moon Titan may be a frozen, murky swamp of liquid nitrogen.

Mission scientists also said Voyager confirmed long-held suspicions of a sixth ring around Saturn and may have discovered a seventh.

Pictures transmitted over nearly a billion miles of space also provided a wealth of new information about the smaller, icy moons that circle Saturn.

"We have had no problems. It's really been a flawless operation," deputy project manager Esker Davis said of Wednesday's close pass by the big golden planet. (Today, Friday, November 14, 1980)

o No, they're not dive bombing cars, scaring birds or "buzzing". Those jets that swoop down low over the southern access road to Playalinda Beach (State Road 402) are part of NASA's training program for Space Shuttle astronaut pilots.

For the past several weeks, Space Shuttle flight crews have been flying practice landing approaches to the Shuttle Landing Facility runway, located less than a mile south of the road. The flights, which take place in early morning and late afternoon, follow both the ground track and descent angles that astronauts will eventually fly to land the Space Shuttle at KSC. (NASA News Release No. 200-80, November 14, 1980)

o France on Oct. 30 ratified the convention establishing the European Space Agency, thereby completing the legal formalities required for the entry into force of the convention.

ESA, by the agreement of all its members, has been in operation on a "de facto" basis since the members signed the ESA convention in May 1975.

The agency said the formal ratification should "not be underestimated," since it provides the eleven member states with "the means of taking advantage of all the possibilities offered by the ESA convention, whose purpose is to give Europe's space effort a truly European dimension." The members are Belgium, Denmark, France, Italy, Ireland, the Netherlands, Spain, Sweden, Switzerland, the United Kingdom and West Germany. (Defense Daily, Vol. 113, No. 9, Friday, November 14, 1980, p 65)

November 15: The first underwater launch of a new breed of British Polaris missiles was successfully executed Friday by the crew of the HMS Renown, the U.S. Air Force said.

The two-stage missile popped ablaze from the Atlantic at 3 p.m., punching a hole in the low cloud cover. It left behind an inverted white mushroom cloud hanging over an azure boil that the missile had drilled in the surface of the Atlantic.

The launch, originally scheduled for 11:30 a.m., was repeatedly postponed: first, by a navigation problem on an airplane; second, by a malfunctioning computer on the plane; third, by a passenger jet that flew over the area; fourth, by a problem with the missile itself; and finally, by a downrange tracking ship that had drifted out of position.

The United States signed an agreement in 1962 to sell unarmed Polaris missiles to the United Kingdom.

The British have built four nuclear-powered submarines and have designed and built their own nuclear warheads. Friday's test was of an improved version of a new British warhead.

Although the test warhead was unarmed, such systems as guidance and telemetry can still be tested. (Today, Saturday, November 15, 1980)

o All systems appear to be go for today's scheduled launch of a communications satellite from Cape Canaveral Air Force Station.

The satellite, SBS-A, is owned by Satellite Business Systems and is designed to beam information, pictures and words to a network of Earth stations throughout the United States.

Robert S. Cooper, vice president for engineering for SBS, said the 1,200-pound telescoping cylinder will receive and beam back signals at frequencies twice or three times as high as those now being used by communications satellites.

And unlike other satellites which beam signals from one point of Earth's surface to another, SBS-A will beam signals from any one of 50 Earth stations to any of the other 49.

With relatively small rooftop antennas, the company's customers can use the satellite to exchange information at up to 3.1 million bits of information a second, to send electronic mail, to carry on phone conversations, and to conduct televised conferences.

"It will revolutionize digital telecommunications in this country," Cooper said.

Launch Director Chuck Gay said if all goes as planned, the Delta rocket that will hurdle the satellite into space will lift off at 5:49 p.m. today.

The first launch window spans eight minutes, from 5:49 to 5:57 p.m.

If that launch period doesn't pan out, there is a second window from 7:32 p.m. to 7:44 p.m. and a third from 8:21 p.m. to 8:30 p.m.

"We're going for the first portion of the first window so we won't have to worry about the other two," Gay said. "But they're there if we need them.

"Right now we have no known problems. We don't expect anything to hold us up," Gay said. (Today, Saturday, November 15, 1980)

o The violent history of the infant solar system is recorded on Saturn's small, icy moons which were cratered, cracked, split and perhaps even shattered during that early period, a Voyager scientist said Friday.

At all but one of the moons Voyager 1 explored this week, "we are clearly looking at objects whose surface dates back to a very early part of solar system history," said Eugene Shoemaker of the U.S. Geological Survey. (Today, Saturday, November 15, 1980)

November 16: NASA shot its own Saturday night special to the delight of Satellite Business Systems, whose first satellite was whirling around the Earth and talking to ground stations late Saturday night.

Bathed in spotlights, a sparkling-white Delta rocket rose slowly from Complex 17 at Cape Canaveral Air Force Station right on schedule at 5:49 p.m.

The evening sky turned a pale pink as the rocket disappeared into the clouds, but it was visible again as it wrote a fiery pink contrail across a break in the scattered clouds.

The communications satellite is the first of a new breed of orbiting relay stations able to bounce all sorts of signals around the United States.

Not only will customers use the satellite for telephone conversations, they also will use it to conduct conferences over closed-circuit TV, to send electronic mail and to transfer information from one computer to another.

And says SBS, all this for less. Customers can expect savings of 20 percent to 40 percent, depending on how much they use the system, said Robert C. Hall, president of the newly formed company. (Today, Sunday, November 16, 1980)

November 17: Kennedy Space Center's deputy director has been named to President-elect Ronald Reagan's transition team to acquaint the new administration with NASA.

Gerald Griffin will work with members of both Reagan's and President Carter's staffs.

Griffin, who was appointed Deputy Director of KSC in May 1977, has met with Edwin Meese, who on Friday was named Reagan's White House counselor.

Griffin said Saturday he will serve as NASA's transition officer between Carter and Reagan until the inauguration in January.

As transition officer, Griffin will serve as the point of contact concerning NASA for the incoming and outgoing administrations.

Reagan's chief liaison for the NASA transitional team has not been named.

"It's going to be a very busy several weeks. There is quite a bit of preparation involved," Griffin, 46, said.

Griffin said he will head an effort to prepare documents acquainting Reagan with issues facing NASA, particularly the Space Shuttle project.

"It wasn't a surprise to me," said KSC Director Dick Smith. "I'm happy to see him involved, but from a personal standpoint, I'd like to see him at KSC because we could use him. As far as the agency though, I think it's the right thing to do."

Griffin, who lives in Satellite Beach, has been associated with NASA since 1964. (Today, Monday, November 17, 1980)

- Martin Marietta Aerospace, principal contractor for the Space Shuttle's External Tank, has been awarded an 18-month, $600,000 contract by Marshall Space Flight Center to assist NASA in defining the technology requirements and developing conceptual designs for launch vehicles derived from the Space Shuttle.

  The derivative vehicles would be designed to provide more lift than the 65,000 pound payload capability of the present Shuttle.

  First phase of the work calls for Martin to define space mission requirements and develop conceptual designs for four Shuttle-derived launch vehicles utilizing "the basic components of the Space Shuttle." The most promising concepts will be selected for in-depth technology identification and planning.

  The second phase of the effort calls for the company to perform a detailed technology analysis of the selected concepts. This will include a complete system analysis, determination of detailed technology requirements and preparation of an implementation plan for selected technologies which have economic and performance advantages.

  The study will be conducted by the Advanced Programs Department of Martin's Michoud Division in New Orleans. (Defense Daily, Vol. 113, No. 10, Monday, November 17, 1980, p 71)

- The U.S. Voyager 1 spacecraft climaxed its incredible journey to the outer planets Wednesday as it flew beneath Saturn at a distance of 77,000 miles from the planet's cloud tops, returning hundreds of pictures of the planet and its rings.

The most notable finding was the discovery of two "braided" rings within Saturn's F-ring. Scientists said the existence of the twisted rings "defies the law of pure orbiting mechanics," which should require that gravity flatten out the spirals by acting equally on all parts of them. "Obviously they are doing the right thing and we just don't understand the laws involved," imaging team leader Bradford Smith said.

Voyager did not succeed, however, in photographing the surface of the giant moon Titan, which was obscured by a dense atmosphere of methane gas. However, measurements were made of the temperature of the moon and the temperature and density of its atmosphere.

Among the objects photographed by the spacecraft, which is now heading out of the solar system, was a large crater with a central peak on the Moon Mimas, bright cobweb-like markings on the moons Rhea and Dione, and a 500-mile-long canyon on the moon Tethys. (Defense Daily, Vol. 113, No. 10, Monday, November 17, 1980, p 71)

November 18: George Low, the former acting administrator of NASA from 1970 to 1976, has been appointed the Reagan transition team leader for the agency.

Low, 54, who served as the Apollo spacecraft manager in 1964 and the Deputy Administrator of NASA from 1969 to 1970, is president of Rensselaer Polytechnic Institute in New York.

Among other transition appointments yesterday, Robert H, Kupperman, the chief scientist of the U.S. Arms Control and Disarmament Agency from 1973 to 1979, was named to head the transition team for the Federal Emergency Management Agency. Kupperman became a senior fellow at Georgetown University's Center for Strategic and International Studies and a fellow of Los Alamos Scientific Laboratory in 1979. (Defense Daily, Vol. 113, No. 11, Tuesday, November 18, 1980, p 76)

o President Carter called scientists at the Jet Propulsion Laboratory last week to congratulate them on the success of the Voyager 1 mission, calling it "a superb scientific achievement."

The President is also quoted as telling the scientists that he has proposed funds for a new mission to Venus (the Venus Orbiting Imaging Radar) in FY '82, but noted that the final decision on funding the program will be up to President-elect Reagan and the new Congress. (Defense Daily, Vol. 113, No. 11, Tuesday, November 18, 1980, p 82)

- The SBS-1 domestic communications satellite was successfully launched from Kennedy Space Center at 5:45 PM EST Nov. 15 by a McDonnell Douglas Delta launch vehicle. (Defense Daily, Vol. 113, No. 11, Tuesday, November 18, 1980, p 82)

November 19: Voyager 1, having arrived at and departed from Saturn, is now speeding out of the solar system.

The spacecraft continues to return photographs of exceptional quality of Saturn, its rings and its satellites.

On Wednesday, Nov. 12, at 5:46 p.m. CST, Voyager 1 made its closest approach to the planet - coming within 77,202 miles (124,239 km) at a speed of 56,559 mph. It sped on its journey, passing under Saturn's rings, continuing to take measurements and return photos and data to Earth.

As it travels away from Saturn, Voyager 1 gradually loses velocity. By 2 a.m. Monday it had slowed to 34,712 mph and had reached a point 3,758,269 miles from the gaseous planet.

Some of the early results of experiments indicate that the atmosphere of Titan, Saturn's largest moon, is not methane, as thought previously by scientists, but is a liquid nitrogen vapor, and that Titan's surface may have an ocean of liquid nitrogen. (Marshall Star, Vol. 21, No. 11, November 19, 1980, p 1)

- The apogee kick motor of the SBS-1 domestic communications satellite was successfully fired by Comsat ground control at 5:35 PM EST Monday, boosting the spacecraft into a near geosynchronous orbit.

Comsat said the orbit was nominal and all subsystems were working well. Deployment of the antenna reflector and solar panel skirt was planned yesterday or today.

SBS-1, the first of three all-digital business communications satcoms planned by Satellite Business Systems, jointly owned by IBM, Comsat General and Aetna, is slated to begin commercial operations early next year.

The Hughes-built, 1212-pound satellite was launched by a McDonnell Douglas Delta launch vehicle from KSC Saturday. The launch was the first to use the Payload Assist Module -- the Delta version of the Spinning Solid Upper Stage (SSUS) being developed by McDonnell for the Space Shuttle with in-house funding. Replacing the conventional third stage of the Delta, the PAM fired to inject the SBS into elliptical transfer orbit, from where the apogee kick motor was used to circularize the orbit at geosynchronous altitude.

Launch of the satellite by NASA was delayed several days after a LOX spill during fueling of the launch vehicle was thought to have damaged one of the Thiokol Castor strap-on motors, which was subsequently removed and replaced. (Defense Daily, Vol. 113, No. 12, Wednesday, November 19, 1980, p 85)

November 20: Grand jury hearings into suspected bill padding by Kennedy Space Center contractors recessed Wednesday.

The grand jury has sealed seven indictments, but it is unknown if any involve the KSC investigation. The grand jury has considered other cases.

The main subject of the two-day hearings at the U.S. District Court in Orlando was Mayfair Construction Co. of Chicago, and at least two Mayfair employees are known to have testified, according to sources close to the grand jury.

Subcontractors of Mayfair also were called to testify, according to the sources.

The subcontractors included K&S Electric Co. and New World Construction Co., both of Titusville. In all about 30 witnesses were called, and stacks of documents from the various firms were examined.

Mayfair and its subcontractors worked on five contracts at the space center between 1975 and 1977.

These jobs included work on the Vehicle Assembly Building, the Orbiter Processing Facility, the Fluid Test Complex, and the Mobile Launcher Platform. The contracts were worth a total of $13,574,610. (Today, Thursday, November 20, 1980)

o One million sightseers will crowd Brevard County to view the first space shuttle launch in March 1981, a high ranking NASA official predicted this week.

Karl Kristofferson, Deputy Director of Education and Awareness for NASA, said public attendance for the shuttle's maiden voyage will probably equal the all-time record set by Apollo 14, the only moon shot that fell on a weekend. (Sentinel Star, Thursday, November 20, 1980)

o NASA said yesterday that it is hopeful of moving the Space Shuttle Orbiter Columbia from the Orbiter Processing Facility at Kennedy Space Center to the Vertical Assembly Building at KSC on Nov. 23 as scheduled. However, paperwork involved in the reinspection of the insulating tiles on the Columbia could delay the move a day or so. The Columbia is to be mated with its External Tank and Solid Rocket Booster two days after its move into the VAB. Launch of the Shuttle is planned March 14, but two additional successful full-duration firings of the SSME Test Article Cluster remain to be achieved. (Defense Daily, Vol. 113, No. 13, Thursday, November 20, 1980, p 95)

November 21: The FLTSATCOM-D spacecraft was successfully launched into a synchronous transfer orbit by the Atlas-Centaur AC-57 at 2254 hours EST from the ETR Launch Complex 36 on October 30, 1980.

The transfer orbit parameters are:

	Actual	Nominal
Inclination (degrees)	26.3542	26.3558
Eccentricity	0.73158	0.7322
Apogee Height (KM)	35972	35963
Perigee Height (KM)	166.7	167.1

The spacecraft apogee kick motor was successfully fired at fifth apogee on November 1, 1980, injecting the FLTSATCOM spacecraft into the desired synchronous orbit. All spacecraft systems were turned on and are operating nominally. (Mission Operation Report - Office of Space Transportation Operation - No-M-491-202-80-04, p 1)

- A NASA employee was found guilty in federal magistrate's court Thursday of illegally using government postage-paid envelopes for private correspondance. (Today, Friday, November 21, 1980)

- After 20 months in its steel cocoon, the Space Shuttle Orbiter Columbia is about to emerge for flight.

What had originally been envisioned as a four month operation became a monumental effort. The thermal protection system, composed mainly of fragile silica tiles, was virtually remanufactured while the Orbiter sat in the Orbiter Processing Facility (OPF).

The problem was not so much that the tile system was insufficient for the task, but that the scope of the task had been underestimated. Wind tunnel data and computer simulations began to tell the designers that the tiles would have to be considered as individual structural units rather than as an independent coating over the orbiter's aluminum skin.

Forces on the tiles multiplied and compounded as analysis of thermal stress, acoustic loads and structural bending revealed that these effects would be greater than forecast on the tiles.

New methods of strengthening, attaching and testing the tiles were invented and perfected. Data on tile loads is still being gathered, and already the Space Shuttle is the most thoroughly wind tunnel-tested craft ever designed. So far, all recent information indicates that the tile problems of the past have been solved.

But the thermal protection system has not been the only tough hurdle to leap. The main engines were orders of magnitude more complex and difficult to perfect than previous rocket engines. That process of perfection resulted in other, lengthy delays.

Fortunately, those delays ran concurrently with those of the tiles. Nonetheless, they have been vexing and serious. In the effort to keep up with the current state of knowledge, the main engines have been removed, modified and tested several times.

They have now been installed and are nearly ready for flight. Their next critical test will come in February, when they are fired for 20 seconds on the pad. The test will serve as a full scale rehearsal for launch, and

will be the first time that all Space Shuttle systems will be working together exactly as they will for flight. The Solid Rocket Boosters will not be ignited for this test.

But before that will come the mating of the orbiter to the external tank and solid rocket booster stack in the VAB, followed by weeks of systems tests to insure that everything is operational. Rollout to the VAB and mating is scheduled to take place early on Sunday. By Monday morning, the Space Shuttle should be undergoing the first of those many systems tests leading to rollout to the pad after Christmas. (Spaceport News, Vol. 19, No. 25, November 21, 1980, p 1&4)

o Looking ahead to the time when the Space Shuttle is routinely making 30 to 40 flights a year from the Kennedy Space Center, officials have been studying the problem of how the Center should operate during that time and what changes will have to take place between now and then. "Then," in this case, is probably after the Shuttle has marked up 25 flights or so, reaching what NASA projects as operational maturity. That's expected to be about four or five years from now: 1984-85.

As a result of the studies, Kennedy Space Center will consolidate its contractor structure into three major contracts. In announcing the decision concurred in by NASA Headquarters, KSC Director, Dick Smith, pointed out in an interview with Spaceport News that implementation lies several years off and that many detailed study tasks still must be performed. He said that all affected parties are being briefed on the broad decisions already reached and on specific activities currently underway.

The broad but key decision to consolidate the contract structure was made to help achieve the operational goals of the STS program for reliable low-cost space transportation. Under the consolidation plan, the Shuttle element contracts will be combined into a single Shuttle Processing Contract (SPC). All cargo services will be provided by a single Cargo Processing Contract (CPC). In addition to these major contracts, there will also be a single Base Support Contract (BSC) for institutional support. Several small contracts will be retained for some services traditionally provided by small business set-asides and minority owned companies. (Spaceport News, Vol. 19, No. 25, November 21, 1980, p 2)

o NASA expects that it will have to replace 500 to 700, of the 31,000 Reusable Surface Insulation (RSI) tiles on the Space Shuttle Orbiter Columbia after each of its space flights, according to Aaron Cohen, manager of the Space Shuttle Orbiter Project Office at Johnson Space Center.

He emphasized that this would not affect the turn-around time for the Orbiter, now estimated at about 5 weeks. (Defense Daily, Vol. 113, No. 14, Friday, November 21, 1980, p 101)

November 22: The scheduled move Sunday of the space shuttle Columbia from its hangar at the Kennedy Space Center to the Vehicle Assembly Building has been set back by at least 12 hours, the space agency has announced.

The move had been scheduled for 1 a.m. Sunday. It has been delayed until "no earlier than Sunday afternoon," a spokesman for the National Aeronautics and Space Administration said.

NASA officials said they needed more time for final inspection of the shuttle and completion of paper work on the thermal tile process. (The Miami Herald, Saturday, November 22, 1980)

o The men who will ride the Columbia on its maiden flight next year visited Kennedy Space Center Friday to checkout the spacecraft and thank the workers who helped build the Shuttle.

Astronauts John Young and Bob Crippen praised the work done on the ungainly, delta-winged aerospace craft.

They especially noted the workmanship of the lightweight silica tiles pasted on the Shuttle's belly that will protect the craft from the scorching temperatures of re-entry into the atmosphere.

"The underside of the vehicle is just as smooth as a baby's bottom," Young told newspaper and television reporters gathered for a press conference outside the large, closed bay doors of Columbia's hangar.

"This is brand new technology and these workers have done a super job. I think the tiles will stay on."

Installation and testing of the 31,000 tiles has been one of the biggest headaches for NASA officials and a major factor for launch delay and cost overruns.

The current launch target date is March 14, about three years behind the Shuttle's original schedule. (Today, Saturday, November 22, 1980)

November 24: America must attract hundreds of thousands of women and minorities to science and technology in the 1980s to retain its global edge, warned speakers at a Kissimmee conference.

Appropriately, the conference's star was a woman who will go where no American woman has ever gone before -- astronaut Dr. Anna Fisher, who told the National Science Teachers Association: "This is an exciting time to be a woman because our career choices are so wide...The doors are definitely opening to women."

NSTA President-elect Sara Klein added, "We must remove these sterotypes (that women aren't suited for science). And Anna has certainly proven that to us."

A serious need for females and minorities in science has arisen partly because amazing new inventions have put a strain on the existing white male-dominated ranks of scientists, said Joseph Stevenot, who heads Procter & Gamble's research and development division in Cincinnati.

The squeeze is worsened by increased public emphasis on pollution control and work place safety, both of which require skilled scientists and technicians, he said.

Stevenot cited a presidential commission's warning that more than a million scientists, engineers and computer experts will be needed by 1990 to replace retiring and deceased engineers and computer experts.

Those gaping job holes, he said, simply can't be filled by white males.

"I've had promising talks with minorities and female students," Stevenot said. "Often these young people set their sights too low. They have very few role models."

The audience gave Fisher a standing ovation. Then a flock of pupils from Maitland Junior High surrounded the 31-year-old Seabrook, Texas, resident, who was selected as a space shuttle mission specialist in 1978. (Sentinel Star, November 24, 1980)

o The decade of the 1980s was supposed to herald, among other things, the arrival of manufacturing in space--a glamour industry capitalizing on the zero gravity of space to spawn a new generation of materials and processes.

Companies still speak rhapsodically of the long-range potential of industrial use of space. But their short-term interest has waned, partly because of repeated delays in the space shuttle program of the National Aeronautics & Space Administration (NASA).

The returnable shuttle, regarded as industry's entree into space, originally was slated to undergo its first manned test in early 1979. But problems with its thermal protection system and main engine have put it two years behind schedule. If all goes well in the next five weeks (final assembly of the first Shuttle Orbiter was to begin this week), the oft-postponed manned test will occur on Mar. 10. The first operational mission is now scheduled for September 1982.

The delays are one reason for a noticeable dropoff in the number of companies seeking to participate in NASA's "getaway special" program, which permits users to lease space aboard future shuttle missions for experiments and materials processing. The once-steady flow of applications has dwindled to a trickle, admits Chester M. Lee, NASA's director of space utilization and the shuttle's chief salesman. And several companies have canceled outright their reservations aboard the shuttle. (Industry Week, November 24, 1980)

o NASA officials again delayed the rollout of the Space Shuttle "Columbia" Sunday to do some more last-minute work inside the hangar.

The 300-yard journey from the hangar to the Vehicle Assembly Building now is scheduled for noon today, NASA officials said.

"We're almost through," promised NASA's John Yardley, an Associate Administrator for the Shuttle program. (Today, Monday, November 24, 1980)

November 25: The space shuttle Columbia, a $9 billion reluctant debutante, crept out of her hangar Monday night for the first time in 20 months.

Two years behind schedule and billions of dollars over budget, the orbiter inched out of its processing building while hundreds of space workers cheered, whistled and clapped.

"All I know is I feel pretty good," said Dennis Janisse, 30, of Titusville, who had been cutting tile patterns for almost a year. "I see a beautiful thing there. When you're working up close, it just looked like white walls to me."

Huge floodlights illuminated the black-and-white flanks of the orbiter as it taxied down the asphalt runway, towed by a small tractor. Even cynics in the press corps, who have maligned the tardy space plane as stubby, pudgy and ungainly, pronounced the sight beautiful.

"Quite impressive," said Martin Bell, Washington correspondent for the BBC, "not bad at all for a patch job."

The trip from the hangar to the Vehicle Assembly Building, where the orbiter will be stacked on its solid rocket boosters and external fuel tank, measured 300 yards and lasted only 34 minutes. But to NASA officials, plagued by cost overruns and painful setbacks, the distance seemed like light-years. (Sentinel Star, Tuesday, November 25, 1980)

- House and Senate conferees have agree on a $5.541 billion FY '81 appropriation for NASA, $23.5 million above the amount requested by President Carter in his revised budget in March. All of the additions are in Research & Development.

The Senate had originally approved a $51 million increase; the House, a $20 million reduction in Construction and Research & Program Management, while deferring action on R&D.

Congress approved a $5,578.9 million FY '81 authorization for NASA, $70 million above the President's revised request.

The FY '81 NASA appropriation as passed by Conference Committee looks like this:

Research & Development	$4,396,200,000	+$31.7 million
Construction of Facilities	115,000,000	- 5.0
Research & Program Management	1,030,000,000	- 3.2
Total:	$5,541,200,000	+$23.5

(Defense Daily, Vol. 113, No. 16, Tuesday, November 25, 1980, p 115)

November 26: The space shuttle Columbia was raised to its launch-ready position Tuesday and a spaceport official said the chances are "fairly good" for a flight in March.

"Essentially the vehicle is ready for launch right now," said Kenneth Kleinknecht, Manager of the Columbia for the Johnson Space Center in Houston. "But there is a tremendous amount of work yet to be done."

The shuttle, 122-feet long, was moved from its hangar to the nearby Vehicle Assembly Building Monday night and raised to its vertical position noon Tuesday.

Engineers then prepared to lower the rocket plane to its mobile launch platform and bolt it to two large solid propellant booster rockets and an external hydrogen-oxygen propellant tank.

James Mizell, a technical operations official at the Kennedy Space Center, said the whole assembly then will go through a detailed series of tests to make sure all systems work together properly. (Sentinel Star, Wednesday, November 26, 1980)

o The Soviet Union has agreed to pay Canada $3 million for the clean-up operations necessary after the crash of the Soviet's nuclear-powered Cosmos 1054 satellite on Jan. 24, 1978, in a remote area of northwest Canada. The cost of the clean-up was estimated by Canada at more than $14 million, but it wrote off the "normal search costs" and submitted a $6.04 million bill to the Soviets in January 1978. Canada said the $3 million was "the best deal we could get." The Soviets were obliged to pay Canada for the clean-up costs under the 1972 international convention of liability of damage caused by space objects. (Defense Daily, Vol. 113, No. 17, Wednesday, November 26, 1980, p 125)

November 30: When Buck Rogers and Flash Gordon galaxy-hopped their way across the cosmos, they never worried about such mundane stuff as budget cuts and presidential elections.

For the National Aeronautics and Space Administration, however, the story is different. The space agency has had no real advocate in the White House since the death of President Kennedy, and with a budget-cutting fever abroad in the country, it would be difficult for any leader to sell the

American public on the need for a manned space station in lower earth orbit -- viewed by many space officials as a necessary first step for any large scale projects in space.

Ronald Reagan, with his vows to cut as much as $50 billion from the federal budget, would appear to be an unlikely champion for the cause of space industrialization and exploration.

But pro-space forces in the House and Senate view President-elect Reagan as a potential convert, based on his strong military stand and his close ties to big business.

Under the Reagan administration, space may again achieve the kind of symbolism it held in the early 1960s, when the United States was waging unlimited war for supremacy in the heavens.

"The Carter administration had no policy or purpose toward space," said Harrison Schmitt, the former Apollo astronaut who now serves as a Republican senator from New Mexico. Schmitt, a contender for the chairman of the Senate Committee on Commerce, Science and Transportation, believes Reagan will pilot NASA out of the doldrums of the Richard Nixon, Gerald Ford and Jimmy Carter years.

"I'm really heartened by some of the scientific people on Reagan's transition team," Schmitt said. (Sentinel Star, Sunday, November 30, 1980)

December 1: Privately financed low-cost rocket launch vehicle program under development by West Germany's Orbital Transport-und Raketen-Aktiengesellschaft (OTRAG) has set up a launch and test site in Libya where it has already conducted three launches this year and has a fourth rocket launch test scheduled before January, 1981.

OTRAG officials in Munich told AVIATION WEEK & SPACE TECHNOLOGY that the new launch facilities were set up seven months ago about 600 mi. south of Tripoli in the Sahara Desert after Libya's leader Col. Muammar Gaddafi agreed to permit the privately run company to conduct rocket firings on Libyan territory for no charge. (Aviation Week & Space Technology, Vol. 113, No. 22, p 18)

- The mating of the Space Shuttle Orbiter Columbia to its External Tank and Solid Rocket Boosters was behind schedule at Kennedy Space Center Wednesday, but officials were expecting to complete the job by the end of the day. The schedule calls for the mated Shuttle to undergo a month-long series of checks before being moved from the Vertical Assembly Building on its tracked transporter to Launch Pad-39A some 3 1/2 miles away on Dec. 26. Launch remains scheduled for March 14. (Defense Daily, Vol. 113, No. 18, Monday, December 1, 1980, p 133)

- The FY '81 NASA appropriations bill approved by conferees includes a $5 million reduction in the agency's request for Space Flight Operations, made because of the slip in the Shuttle launch. (Defense Daily, Vol. 113, No. 18, Monday, December 1, 1980, p 136)

December 3: Important tests of the space shuttle's in-flight and ground-control systems were delayed Tuesday, increasing the chances of missing the Dec. 26 target date for moving the orbiter to the launch pad.

Dick Young, a spokesman for Kennedy Space Center, said "minor fit problems" had occurred during linkage of the space shuttle's propulsion and electrical support connections and testing could not begin until 1 a.m. Thursday. The testing was originally scheduled to start Nov. 30. (Sentinel Star, Wednesday, December 3, 1980)

- The orbiter Columbia has been mated with other Space Shuttle elements on a Mobile Launcher Platform in the Vehicle Assembly Building and preparations are underway for its first major test as a unified system - the Shuttle Interface Test.

  The Columbia was moved the 300 yards from the Orbiter Processing Facility to the Vehicle Assembly Building on November 24 and mated with the external tank and solid rocket boosters assembled earlier on the mobile launcher platform.

  The Shuttle Interface Test will run for more than two weeks and is designed to check out the mechanical and electrical connections between the various elements and the functioning of onboard flight systems.

  This is the first flow of flight hardware through KSC's processing facilities. The Space Shuttle Orbiter Enterprise - which will not be flown in space - was used in a "pathfinder" flow through the facilities in 1979 but it lacked many of the systems essential for space flight which are aboard Columbia. (NASA News Release No. 206-80, December 3, 1980)

December 4: The Solar Maximum Mission (SMM) is adjudged successful based upon the results of the mission with respect to the approved prelaunch objectives.

The SMM was launched on February 14, 1980. The six science investigations on SMM are performing a detailed study of a specific set of solar phenomena: the impulsive, energetic events known as solar flares, and the active regions which are the sites of flares, sunspots, and other manifestations of solar activity. One instrument also measures the total output of radiation from the Sun.

The satellite is a three-axis inertially stabilized platform providing precise pointing to any region on the solar disk. The spacecraft orbit is circular, inclined 28.5 degrees to the equator, with an altitude of 575 kilometers. Mission support is provided by the Goddard Space Flight Center (GSFC) Space Tracking & Data Network, with the Operational Control Center located at GSFC.

On August 14, 1980, the Solar Maximim Mission (SMM) completed 6 months of orbital operations. Both primary and secondary NASA mission objectives for the SMM have been met.

Since launched on February 14, the SMM has continuously gathered data from seven experiments on board which represents the most comprehensive information ever collected about solar flares. Furthermore, project scientists have gained valuable insight into the mechanisms which trigger a solar flare and significant information about the total energy output from the Sun.

The entire payload of instruments has gathered data collectively on nearly 25 flares. Significantly, several of these full-payload acquisitions were coordinated with the world's most powerful radio and optical telescopes through the international Solar Maximum Year (SMY) Program. (Mission Operation Report - Office of Space Transportation Operation - No. S-826-80-01, p 1)

o Sen. Alan Cranston (D-Calif.), the current Assistant Majority Leader in the Senate, says in the wake of the highly successful Voyager fly-by of Saturn that the U.S. should not allow its "continuing commitment as a nation to new space exploration...lapse."

Between completion of the Voyager mission and the Project Galileo mission to Jupiter in the late 1980's, he said, "we should carefully consider other exciting, valuable steps we may take in the continuing drama of unwrapping the mysteries of the cosmos." He said, for example, that the U.S. "should consider" a mission to fly-by Halley's Comet, perhaps using equipment from the Voyager mission, as well as a radar mission to Venus (VOIR). (Defense Daily, Vol. 113, No. 21, Thursday, December 4, 1980, p 156)

o [The following are excerpts of remarks made recently by Rep. Don Fuqua (D-Fla.), chairman of the House Science & Technology Committee, following the Voyager 1 fly-by of Saturn.]

"...Many times in the past we have had occasion to marvel at the extraordinary achievements of our planetary exploration program -- achievements that are unmatched by any other nation. Yet, the spectacular discoveries such as Voyager uncovered at Jupiter and Saturn represent only incremental contributions to unraveling secrets of the cosmos as well as Earth itself.

"Future space missions will continue this process and greatly enhance our knowledge of the solar system. Such opportunities presently being considered are the Venus Orbiting Imaging Radar mission to map the surface of Venus; a mission to Halley or some other prominent comet; and missions

using orbiters and probes to further study the outer planets." [One probable target: Saturn's moon Titan. "This remarkable object," Fuqua noted, "seems bound to become a prime target for future exploration with a renewed quest for information about the circumstances that led to the origin of life."]

"The contributions of these national space efforts to human knowledge and understanding clearly justify the relatively small fraction of our resources [being spent on them]. We cannot let the momentum wane or the opportunities pass unchallenged. Long after most of our present difficulties and preoccupations are forgotten, the achievements of Voyager will be remembered as a flowering of human genius in the 20th century." (Defense Daily, Vol. 113, No. 21, Thursday, December 4, 1980, p 156)

December 5: The Soviet Union recently launched another in its series of early warning satellites. Identified as Cosmos 1223, the satellite was launched from Plesetsk on Nov. 28, and put into an orbit of 614/40,165 kilometers, 62.8 degrees, 12 hours and 6 minutes. On Dec. 1, Cosmos 1224 was launched into a medium-resolution reconnaissance/surveillance photographic mission with an orbit of 209/403 kilometers, 72.9 degrees, 90.3 minutes. Launch was also from Plesetsk. (Defense Daily, Vol. 113, No. 22, Friday, December 5, 1980, p 163)

o Rep. Edward P. Boland (D-Mass.), chairman of the House HUD-1A Appropriations subcommittee, has defended his insistence that the cost of NASA programs be closely monitored as a means of "controlling" them, saying that the action is justified by NASA's poor record on cost overruns.

The monitoring agreed to by House/Senate conferees will involve NAS/NAE review of "major program changes" by NASA. The House and Senate Appropriations Committees have stated that they do not intend to approve such changes unless the Academies concur with them. Critics say Boland is seeking a one-committee veto over NASA programs.

But Boland said that his subcommittee is not "anti-space or anti-NASA. Nothing could be further from the truth," he said. "The subcommittee and myself have supported the space program with enthusiasm for more than a quarter of a century." He added that this is demonstrated by the fact that NASA is only one of three agencies among the 23 in the HUD-IA bill that got an increase in FY '81, and that its increase ($23.5 million) is by far the largest. (Defense Daily, Vol. 113, No. 22, Friday, December 5, 1980, p 164)

December 6: INTELSAT V -- The world's largest commercial communications satellite -- is scheduled for launch at 6:25 p.m. today.

The satellite's original liftoff set for Thursday from Cape Canaveral Air Force Station was canceled because of faulty ground-support equipment.

INTELSAT is the International Telecommunications Satellite Organization, made up of 105 nations that own and operate the system.

The launch problem arose during the loading of liquid oxygen aboard the Atlas-Centaur rocket, which will carry the 4,251-pound satellite to an orbit 22,300 miles above the Atlantic Ocean.

Technicians continue to load rockets with liquid oxygen through the count-down process, said Dick Young, a spokesman for Kennedy Space Center. (Today, Saturday, December 6, 1980)

December 7: Space shuttle workers at the Kennedy Space Center donned protective masks Saturday to cope with an irritating mist that has affected about 135 miles of East Florida coastline.

The mist is believed caused by red tide, a runaway growth of a micro-organism that is present in salt water. The red tide "bloom" often colors the water red and kills off fish.

Beverly Roberts, spokesman for the Florida Marine Research Laboratory at St. Petersburg, said samples taken off the East Coast Friday showed red tide present in Brevard County from Cape Canaveral northward. (The Miami Herald, Sunday, Dec. 7, 1980)

o Still 14 weeks short of the first space shuttle launch, NASA is already planning its retirement from the shuttle program.

By the 1980s, when the shuttle has flown hundreds of missions, NASA hopes to turn the program over to private business.

The "commercialization" of the shuttle will begin in 1984-85, when Kennedy Space Center consolidates nearly all shuttle-related services under two main contractors. The shuttle currently involves about nine major contractors and hundreds of subcontractors.

NASA officials view the consolidation as the first step toward a shuttle system that may eventually be owned and operated by one or more private aerospace companies.

Consolidation plans are also under way at Johnson Space Center in Houston, and Goddard Space Flight Center in Washington, D.C. (Sentinel Star, Sunday, December 7, 1980)

o Paying his last official visit to Kennedy Space Center, retiring NASA Administrator Robert Frosch recited a long list of problems that have dogged the space agency during the past three years.

The main thing NASA lacks, Frosch said, is a strong new goal.

"I did not succeed in convincing my administration," said Frosch, admitting his own failure to steer the agency out of its post-Apollo doldrums.

"We didn't succeed in finding some kind of single, 'Let's go to the moon' kind of goal. That may never come back into the space business again." (Sentinel Star, Sunday, December 7, 1980)

December 8: The Senate last week joined the House in approving the FY '81 HUD-Independent Agencies appropriations bill, which includes $5.541 billion for NASA, and sent the bill to the White House. The bill, which includes $1.873 billion for the Space Shuttle, is $23.5 million above the amount requested by the President. It also includes a new provision requiring that panels of the National Academies of Science and Engineering review "major program changes" by NASA, i.e., significant reprogramming requests or program delays, and to concur with those changes before the House and Senate Appropriations Committees okay them. (Defense Daily, Vol. 113, No. 23, Monday, December 8, 1980, p 167)

December 9: A spacecraft motor was fired successfully early Monday to place the new Intelsat V communications satellite in a stationary orbit 22,300 miles over the equator.

The motor firing positioned the satellite off the coast of Africa. Space agency officials said it will be allowed to drift until it reaches its final outpost off the coast of Italy sometime in January.

The Intelsat V - first of a new, more powerful generation of communications satellites - is capable of handling 12,000 telephone calls and two television channels simultaneously.

The satellite was launched Saturday after a two-day delay caused by a problem with the ground equipment. (Sentinel Star, Tuesday, December 9, 1980)

o Sen. Howard Cannon (D-Nev.), Chairman of the Senate Commerce Committee, which authorizes funds for NASA, says that the agency is not bound to follow the language in the FY '81 HUD-IA appropriations bill which requires NAS/NAE approval of major program changes made in the space program.

Moreover, Cannon told the Senate prior to the passage of the HUD-IA bill that the funding limits placed on nine NASA projects in the legislation is also a violation of Senate rules.

[The appropriations committees dispute Cannon's position. One immediate response is to caution NASA that it will be proceeding at its own risk if it ignores or seeks to circumvent the monitoring requirement and funding controls included in the language of the HUD-IA appropriations bill conference report, which has now passed both houses. It was pointed out that if Cannon objected to the provisions, he could have sought to have them deleted, although this would have precluded passage of the bill, given their support in the House. Senate supporters of the provisions also cite support in the science community for the closer monitoring of the agency's activities.] (Defense Daily, Vol. 113, No. 24, Tuesday, December 9, 1980, p 175-176)

o The $5.541 billion Fy '81 NASA appropriations bill passed by Congress restores the $14 million cut in consultant's fees made by the Senate. Included in the bill is the Senate provision reducing amounts available for advertising or public relations by the agency by 10 percent. (Defense Daily, Vol. 113, No. 24, Tuesday, December 9, 1980, p 176)

o The first of nine new Intelsat V international communications satellites was successfully launched from Kennedy Space Center at 6:31 PM EST Dec. 6 by a General Dynamics Atlas-Centaur vehicle and successfully boosted into geosynchronous orbit yesterday morning by a firing of its apogee boost motor.

With a capacity of 12,000 voice circuits and two television channels, the 4250-pound spacecraft, built by Ford Aerospace and Communications Corp. (Palo Alto, Calif.), will provide communications between North America and Europe. The spacecraft, which will deploy its antenna and solar arrays today, is expected to be put in operation in May following the launch of the second Intelsat V in March. (Defense Daily, Vol. 113, No. 24, Tuesday, December 9, 1980, p 181)

December 10: The Space Shuttle main propulsion system was successfully static fired for 9 minutes, 51 seconds on Dec. 4. The test exceeded the firing time required to place an Orbiter in orbit.

This was the eleventh test of the system and the firing brought the total test time on the main Shuttle propulsion system to 53 minutes, 17 seconds. This is in addition to the more than 24 hours of single engine tests that have been conducted in a separate program.

The main propulsion system consists of three liquid fueled engines, an external propellant tank and associated systems. The test article also includes a simulated Orbiter aft section.

The test was conducted for Marshall by Rockwell International Space Operations employees at the National Space Technology Laboratories.

"Our major test objectives included performance evaluation of the engines' thrust vector control system, the liquid oxygen and liquid hydrogen pressurization systems and the low-level cutoff system, and following initial evaluation preliminary results looked very good," said Jim Sisson, manager of the Shuttle's Engineering and Major Test Management Office at Marshall. "As part of the test, we shut down one of the engines 442 seconds into the run to simulate an inflight shutdown of an engine," he added. The maximum power level of the test was 102 percent of rated power. (Marshall Star, Vol. 21, No. 14, December 10, 1980, p 1)

- The fourth and final cycle of preliminary certification tests of the Space Shuttle Main Engine first flight configuration was completed Dec. 2.

  The cycle was concluded with a 10-second static firing of engine number 0009. This final series included 13 firings of the engine for a total of 5,040 seconds. Most of the tests were run at 520 seconds (the burn time required for a typical Shuttle mission), at 102 percent of the engine's rated power level. However, during one test the engine was operated at 104 percent to demonstrate design margin; and in two others it was fired for 665 and 823 seconds to simulate the longer firing times that would be required for aborted missions.

  The Space Shuttle Main Engine Preliminary Flight Certification program required completion of four sets of test cycles (each cycle consisting of 13 tests and over 5.000 seconds of operation) using two different engine assemblies. All four of the test cycles were essentially identical except the fourth which raised the power level verification from 100 to 102 percent of rated power.

  Tests of the Shuttle's main engine are being conducted in test stands once-used for Saturn engines at the National Space Technology Laboratories.

  Rockwell International's Rocketdyne Division, Canoga Park, Calif., developer of the engine, is responsible for conducting the tests for Marshall's Space Shuttle Projects Office.

  A cluster of three main engines, and two Solid Rocket Boosters, will provide the thrust for the Shuttle's flight to orbit. (Marshall Star, Vol. 21, No. 14, December 10, 1980, p 2)

- In a message to MSFC Director Dr. William R. Lucas and other key officials, Dr. Alan M. Lovelace, NASA Deputy Administrator, complimented all involved with Space Shuttle Main Engine test programs.

  His message read:

  "This has been an outstanding week for the Shuttle Main Engine and the Orbiter Propulsion System. Please extend my congratulations to the teams who successfully completed the engine certification test program on Dec. 2, and successfully conducted the main propulsion test SF11-02 on Dec. 4. These tests made a major contribution to our programs toward FMOF." (Marshall Star, Vol. 21, No. 14, December 10, 1980, p 2)

December 11: Mr. Page gave a hardware status report and stated that the SIT started Thursday. Our review of the paper work on the tiles has been completed and it is hoped that all the work necessary to support a December 26 rollout can be accomplished.

There was a general discussion on the manpower survey call issued by the Comptroller for the operation time frame and it was agreed that the timing was bad.

Mr. Malaga stated that Mr. Gunn had agreed to a slip of at least 45 days for its completion. Mr. Smith asked that Mr. Malaga work with the KSC managers to arrive at a reasonable completion date.

There was a discussion regarding visitors to the operational areas and their presence versus operational space restraints on workers. Mr. Smith stated that a balance would have to be worked which would allow reasonable viewing of the hardware but no interference with ongoing operations. He asked Mr. Parker to give him a rundown from the safety standpoint. (Center Director's Staff Meeting Notes #42-80, December 8)

o An X-ray astronomy satellite which had been out of commission since an unexplained failure in August has inexplicably resumed operation, scientists announced Wednesday.

The resumption means the NASA satellite, known as the Einstein Observatory, should provide another four to six months of data on X-rays from space, said Dr. Harvey Tananbaum of Harvard-Smithsonian Center for Astrophysics.

Launched in November, 1978, the satellite has already outlived its design life of one year. But scientists had hoped to extend it to three years by a careful hoarding of its gas propellant.

Its future was thrown in jeopardy when two of its four gyroscopes would not restart after they were shut down by an on-board computer error Aug. 27, Tananbaum said. At least three gyroscopes are needed to point the satellite's X-ray telescope. (Today, Thursday, December 11, 1980)

o The three Soviet cosmonauts launched Nov. 27 aboard a new model Soyuz T-3 Spacecraft, were returned to the Soviet Union yesterday after a 13-day mission to repair and prolong the service life of the Salyut 6 space station.

The three cosmonauts, Leonid Kizim, Oleg Makarov, and Gennady Strekalov, the first three-man Soyuz flight since 1971, departed Salyut 6 at 2:26 PM Baikonur launch complex time, completing a landing 130 kilometers east of the town of Jezkazgan.

Moscow says all the planned repair work for prolonging the Salyut 6 station's service life was completed by the cosmonauts, assuring "the further active functioning of the station in orbit." The station, with a design life of 18 months, has been operating in orbit for three years.

"Serious repair work on the programming and timing device (of the station) has been accomplished," the Soviets report. Other work included the incorporation of a new hydraulic unit into the circuit of the temperature control system, the replacement of an electronic unit in the station's telemetry system, and a new transducer for the compressor power supply was installed in the refueling system of the station's propulsion plant.

Among those assisting the T-3 cosmonauts from the ground were cosmonauts Leonid Popov and Valeriy Ryumin, who completed a 185-day mission aboard the station on Oct. 11, and are now resting from that mission.

The Soviets state that the T-3 repair mission has "opened up new prospects" for the future use of the Salyut program. (Defense Daily, Vol. 113, No. 26, Thursday, December 11, 1980, p 190)

- The chances for the U.S. to participate as a partner on the European Space Agency's planned Giotto mission to fly by Halley's Comet in 1986 by providing a Delta launch vehicle are now considered very low. ESA will probably stick with the French Ariane launch vehicle.

  However, ESA is still very much interested in having NASA provide tracking for the mission via its Deep Space Network and in providing some experiments as co-investigators with European scientists. Continued talks on Giotto cooperation are tentatively planned later this week between the two agencies.

  Meanwhile, there has been some congressional support for the U.S. to conduct its own Halley mission, but it would take a major decision by the Reagan Administration to provide funding, estimated at $300 million to $750 million, for such a mission. (Defense Daily, Vol. 113, No. 26, Thursday, December 11, 1980, p 194)

December 15: Sen. Jack Schmitt (R-N.M.), who met for the first time with President-elect Reagan Friday, said that he found Reagan to have a wide ranging interest in science and technology policy issues, particularly as they relate to space and strategic defense activities.

The senator, who will be chairman of the Senate Space Subcommittee and who is one of the few scientists in Congress, said he found Reagan to be strongly committed to utilizing science and technology to reduce the risk of nuclear war.

While seeking to eliminate waste in all Federal programs, Schmitt said, Reagan supports an expanded science and technology base in government, in particular, to find a way through technology to move humanity away from the brink of war.

Schmitt said that Reagan "expressed hope that we eventually could concentrate on perfecting ways to defend against attack rather than continue to hold tens of millions of people hostage to the threat of nuclear annihilation."

Not discussed during the meeting: candidates for the post of NASA administrator. (Defense Daily, Vol. 113, No. 28, Monday, December 15, 1980, p 208)

o The name of Frank Borman, former Apollo Astronaut and now President of Eastern Airlines, is among those being mentioned as candidates for the position of NASA administrator in the Reagan Administration. There is nothing official from the Reagan camp.

Others mentioned are the NASA transition team leader, George M. Low, long time Deputy Administrator of NASA who is now President of Rensselaer Polytechnic Institute, who was listed as a possible candidate in previous changes at the top of NASA. The same is the case for two others, Rocco A. Petrone and Samuel C. Phillips, former heads of the Apollo program. Phillips, a former Air Force general who headed SAMSO, is now a Vice President of TRW. Petrone is head of the National Center for Resource Recovery. (Defense Daily, Vol. 113, No. 28, Monday, December 15, 1980, p 208)

December 16: The sometimes cantankerous Space Shuttle main engine is doing so well that the space agency is proving it can operate with slightly damaged parts.

It also has passed its fourth and final certification test for the first Shuttle mission. Overall engine test time is approaching 100,000 seconds, or almost 28 hours.

Certification tests started in mid-1979 were completed with a 10-second firing Dec. 2. Each of four test cycles totaled more than 80 minutes.

This will lead to preliminary flight certification for the engine's first Shuttle launches. (Today, Tuesday, December 16, 1980)

o Kennedy Space Center's launch crew has successfully completed the first portion of tests necessary before the Space Shuttle can leave the Vehicle Assembly Building for its launch pad, a NASA official said Monday.

"The testing went very well," said Don Phillips, KSC's Integrated Operations Division Chief, "and we're essentially on schedule.

"Our launch team has gotten a lot of training, and it has made them a more cohesive unit."

Phillips said a major deficiency that surfaced during testing was a problem with two valves. The valves control the speed of the turbines that drive the hydraulic system on one of the Shuttle's two assist rockets. The valves are being replaced, he said.

"Our current assessment is that we'll roll out (to launch pad 39A) on Monday morning, Dec. 29", he said.

The tests conducted during the past three weeks were designed to check out the electrical and mechanical connections between the Shuttle's three major elements - the Orbiter Columbia, its fuel tank and its two assist rockets.

The three elements were connected for the first time after the Columbia was taken from its hangar to the VAB Nov. 24. Testing immediately began to make sure that workers hooked up everything correctly.

Now that engineers know the subsystems will work, the launch crew and the Shuttle's astronauts will begin running simulated missions beginning today. (Today, Tuesday, December 16, 1980)

- The more than $100 million increase in the cost of developing the Inertial Upper Stage for NASA's planetary missions is forcing NASA to consider dropping the IUS for its Galileo Jupiter Orbiter/Probe mission in 1984 and International Solar Probe Mission in 1985 and substituting the Centaur.

  If NASA has to switch from IUS "to something else," then the Galileo and ISPM missions will probably have to be postponed, NASA Administrator Robert Frosch has acknowledged. (Defense Daily, Vol. 113, No. 29, Tuesday, December 16, 1980, p 217)

December 17: Two instruments that may make it easier for scientists to locate oil and minerals below the Earth's surface are being readied for flight on the Space Shuttle at Kennedy Space Center.

The largest Earth resources antenna ever to go into space was one of the experiments included in a Shuttle pallet of instruments that NASA scientists were showing off Tuesday.

The pallet, or rack, of instruments will be carried into orbit on the second flight of America's reusable Space Shuttle, now set for August 1981. The instruments are being checked out on a model of the Shuttle's payload bay in the superclean environment of KSC's Operations and Checkout Building.

According to Gerald Kenney, Johnson Space Center's Project Manager for the payload, the 30-foot-long radar antenna will be able to read the Earth's surface and pinpoint significant geological features and faults.

"The hope is eventually to develop the technology to the point that it could help in locating minerals," Kenney said.

The antenna will direct a beam of radar from space to the ground at such an angle that vertical objects will create a shadow, providing a two-dimensional image.

"It gives you a higher reflection angle, and you're able to pick up topographical features. If you look straight down, everything looks flat," Kenney said.

A similar radar antenna hasn't been carried into space before because of its size and power requirements, Kenney said.

The instrument pallet only takes up about one-fourth of the Columbia's massive cargo bay and the antenna extends a little more than one third of its length.

Another experiment included on the mission could be useful in identifying mineral resources, Kenney said. NASA calls it an multispectral infrared radiometer. The device will help to classify rock types with two cameras, Kenney said. (Today, Wednesday, December 17, 1980)

o A University of Iowa physicist told a scientific meeting Voyager 1 detected high concentrations of electrically charged gas from Saturn's largest moon, Titan, which may extend all the way around the planet.

Donald Gurnett joined other scientists at a San Francisco meeting of the American Geophysical Union in making a major presentation of information gleaned from Voyager 1's November "fly-by" of Saturn.

Gurnett said the Voyager's plasma wave instrument detected unusually high levels of dilute, electrically charged gas, called plasma, as it passed through the orbit of Titan.

At some points, he said the plasma concentrations "downwind" of Titan were as much as 100 times as great as those in the magnetosphere surrounding Saturn. He theorized the extra plasma must be coming from Titan.

Gurnett said the sphere of plasma that makes up Saturn's magnetosphere rotates at the same speed as the planet and at a rate much faster than that of Titan.

"We are interpreting the high plasma levels as part of the atmosphere of Titan being blown away by this high speed plasma as it hits Titan," he told the scientists.

Gurnett said some scientists believe the plume coming from Titan may extend all the way around the planet.

Voyager also detected strong turbulence as it passed through Titan's path. The data suggests the moon behaves something like a stationary smokestack by creating ripples in the wind that races past it, he said. (The Miami Herald, Wednesday, Dec. 17, 1980)

o After several delays, astronauts John Young and Robert Crippen flew the Space Shuttle into simulated orbit Tuesday evening within Kennedy Space Center's Vehicle Assembly Building.

"It looks like we have had a successful flight," said George Page, KSC's Director of Shuttle Operations. "We will be retrieving and studying the data for some time yet."

The first of a number of simulations was to begin early Tuesday morning, but two separate problems delayed blastoff, a KSC spokesman said.

The first problem involved a hydraulic system that enables the nozzles on the Shuttle's two assist rockets to change directions.

The second problem involved a fuel valve on one of the Shuttle's three main engines. The valve failed to open as rapidly as specified just before lift-off.

Although a back-up valve opened, the system was shut down because the computer will not allow the Shuttle to blast off using a back-up system.

During the simulation, the Shuttle's engines and assist rockets responded to commands from the Spaceship Columbia's computers.

About 46 minutes after lift-off, the two orbital engines got a computer signal to boost the Columbia into a mythical orbit.

Three simulated runs originally planned to be performed in the VAB have been eliminated, a NASA spokesman said. The runs were not mandatory for the first mission, and were eliminated in an effort to stay on schedule.

NASA now plans to move the Columbia from the VAB to the pad Dec. 29. (Today, Wednesday, December 17, 1980)

o The first of seven scheduled flight simulations for the Space Shuttle Columbia in the Vehicle Assembly building at KSC was postponed twice yesterday because of ground support equipment and engineering problems, probably forcing delay of the rollout to the launch pad to around the first of the year.

Prior to the postponement, NASA has announced that the rollout had been pushed back from Dec. 26 to Dec. 29. The agency has been about two days behind schedule since reaching the VAB.

The initial problem occurred in the ground hydraulic system that maneuvers the Solid Rocket Booster nozzles during ground test. The system was not responding quickly enough and computers automatically shut down the test. The second problem, which took longer to fix than expected and caused the second postponement, involved an indication that a fuel valve in one of the Space Shuttle Main Engines failed to open as rapidly as required.

The pilots for the first Shuttle Flight, Cmdr. John Young and Robert Crippen, were in the cockpit of Columbia for the simulated Shuttle launch and ascent into orbit when the postponement was called.

Six more tests of ascent, descent and abort procedures are scheduled to be conducted prior to rollout of the Shuttle from the VAB to Launch Complex 39A. Launch of the Shuttle is aimed at March 14, but a slip of a few weeks is a better bet. A key event will be the on-pad Flight Readiness Firing, which has been scheduled for Feb. 7. (Defense Daily, Vol. 113, No. 30, Wednesday, December 17, 1980, p 227-228)

December 18: Fifty-two seconds into a simulated flight Wednesday, an auxiliary power unit aboard the Space Shuttle Columbia malfunctioned, forcing the spaceship to abort its mission and glide to a landing back at the Kennedy Space Center.

The malfunction, too, was simulated.

It was part of a series of dress rehearsals getting the shuttle ready for its first launch early next year.

Space officials said the rehearsal, with backup astronauts Joe Engle and Dick Truly at the controls, appeared to have gone well.

The make-believe launch took place at 9:30 a.m. and the "failure" occurred 52 seconds later. The trouble was in one of the power units that help control the shuttle's engines and wing flaps.

Because the shuttle's two powerful solid-fueled boosters, which cannot be stopped once started, were firing at the time of the fake failure, the astronauts had to wait until 3:21 into the flight before taking any action to return to base.

They then dropped the boosters and the liquid-fueled main tank and made a diving 180-degree turn back toward the Cape, gliding to a landing on a 15,000-foot runway.

The lead team of Cmdr. John Young and pilot Robert Crippen was at the controls of the Columbia during the first 46-minute, make-believe liftoff Tuesday. (The Miami Herald, Thursday, December 18, 1980)

o The U.S. Government's budget for space activities will exceed $10 billion for the first time in fiscal 1981, with NASA accounting for 50 percent of the total, and the Defense Department 49 percent.

Since the inception of the space program two decides ago, the Federal budget authority for space has been as follows:

(in millions of dollars)

FY	NASA	DOD	Total*
1959	260.9	489.5	784.7
1960	461.5	560.9	1,065.8
1961	926.0	813.9	1,808.2
1962	1,796.8	1,298.2	3,294.8
1963	3,626.0	1,549.9	5,434.5
1964	5,016.3	1,599.3	6,831.4
1965	5,137.6	1,573.9	6,955.5
1966	5,064.5	1,688.8	6,969.8
1967	4,830.2	1,663.6	6,709.5
1968	4,430.0	1,921.8	6,528.9
1969	3,822.0	2,013.0	5,975.8
1970	3,547.0	1,678.4	5,340.5
1971	3,101.3	1,512.3	4,740.9
1972	3,071.0	1,407.0	4,574.7
1973	3,093.2	1,623.0	4,824.9
1974	2,758.5	1,766.0	4,640.3
1975	2,915.3	1,892.4	4,914.3
1976	3,225.4	1,983.3	5,319.9
T.Q.	849.2	460.4	1,340.5
1977	3,440.2	2,411.9	5,982.8
1978	3,622.9	2,728.8	6,508.7
1979	4,030.4	3,211.3	7,419.2
1980 E	4,696.6	4,003.4	8,872.1
1981 E	4,989.1	4,910.7	10,073.7

* In addition to NASA and DOD, includes space funding by five other agencies -- Energy, Commerce, Interior, Agriculture and NSF. Largest expenditures have been by Commerce, which averaged $94 million annually since FY '79, and Energy, which averaged $55 million. (Defense Daily, Vol. 113, No. 31, Thursday, December 18, 1980, p 232)

- President Carter on Dec. 15 signed the FY '81 appropriation for the Department of Housing and Urban Development and certain Independent Agencies, which includes the $5,541,200,000 appropriation for NASA. (Defense Daily, Vol. 113, No. 31 Thursday, December 18, 1980, p 234)

- Indonesia on Dec. 9 signed an agreement with NASA for the launch of two Indonesian communications satellites on the Space Shuttle or, at Indoinesia's option, by McDonnell Douglas Delta expendable vehicles. Under the agreement, the Palapa B-1 satcom will be launched by the Space Shuttle in January 1984 or by a Delta in January 1983, and the Palapa B-2 will be launched by the Shuttle in March 1984 or by a Delta backup in January 1984. Two earlier versions of the Palapa were launched by NASA in 1976 and 1977 aboard Thor-Delta vehicles. The new launches will utilize the Spinning Solid Upper Stage-Delta class (SSUS-D). (Defense Daily, Vol. 113, No. 31, Thursday, December 18, 1980, p 234)

- NASA Tuesday successfully completed the first launch and ascent simulation of the Space Shuttle Columbia at KSC and followed that yesterday with a successful mission abort simulation.

  The prime crew for the first Shuttle launch, Bob Crippen and John Young, were at the controls for the first simulation, with the backup crew of Joe Engle and Richard Truly manning the second test.

  At the same time, NASA officials said they had decided to conduct a total of only four Shuttle mission simulations instead of seven as planned. Eliminated were an abort mission following one orbit and three simulations involving backup systems. An agency spokesman said that this decision was made last week and not directly related to the current delay in the rollout schedule.

  The agency is continuing to shoot for a rollout of the Shuttle from the Vehicle Assembly Building to the pad Dec. 29, three days behind the schedule planned last month.

The first simulated mission got underway at 5 PM Tuesday after two postponements and was completed 46 minutes later when the Orbiter Columbia was placed in a simulated orbit.

In yesterday's test, failure of an auxiliary power unit a few minutes after launch was simulated, with the astronauts simulating a 180-degree turn downrange and gliding back to an emergency landing near the launch site at KSC. (Defense Daily, Vol. 113, No. 31, Thursday, December 18, 1980, p 236)

December 19: Kennedy Space Center scored another flawless launch record in 1980 with six successful satellite liftoffs as the spaceport's 39-month string of consecutive launch successes grew to 31.

It was also a year of major advances towards the Space Shuttle's first orbital flight, targeted for March, and a spectacular planetary encounter with Saturn as Voyager 1 continued its long journey three years after launch from Cape Canaveral.

A successful liftoff of the INTELSAT V (International Telecommunications Satellite) communications satellite atop an Atlas Centaur rocket on Dec. 6 finished the year for KSC's Deployable Payloads Directorate, which lofted three other communications spacecraft, a weather satellite and a solar research satellite into orbit during 1980. (Spaceport News, Vol. 19, No. 27, December 19, 1980, p 1)

o A prototype of Spacelab, the versatile scientific laboratory that will be carried aboard NASA's Space Shuttle beginning in 1983, has arrived at KSC.

The first major components of the Spacelab engineering model were delivered to the Space Center Dec. 5 by an Air Force C-5 Galaxy, the world's largest aircraft.

The delivery came one week after NASA's formal acceptance of the engineering model from the European Space Agency (ESA), Spacelab's developer. The transfer took place during a major ceremony at the VFW-ERNO plant in Bremen, West Germany. ERNO is ESA's prime contractor for Spacelab.

Remaining components of the Spacelab engineering model and support equipment were delivered last week. It is being assembled in the High Bay of the Operations and Checkout Building.

The deliveries are a major milestone in the Spacelab program, marking the first arrival of major Spacelab hardware to American shores since ESA's development program, costing nearly $1 billion, began in 1973.

Under the program, ESA will later furnish a flight version of Spacelab, associated mechanical ground support equipment, and some computer software. The flight unit is scheduled for delivery this summer, according to John Thomas, NASA's Spacelab Program Manager, at the Marshall Space Flight Center.

The engineering model, while not intended for spaceflight, will be used as a "pathfinder" to verify equipment and procedures that will be used at KSC to process the flight unit, and for launch crew training, said Thomas. The engineering model was also used in Europe to assist ESA in the design and development program, and to verify the system's design.

Men and women of many nations who need to go into space to conduct important scientific and technical experiments will be provided that opportunity through Spacelab. Spacelab supplies experimenters with a fully furnished laboratory adapted for the weightless environment of space and pressurized for working without spacesuits.

Spacelab development is financed by 10 European nations under agreements concluded with ESA.

It will be carried in the cargo bay of the orbiter.

There will be two operational Spacelabs. The first one, including the necessary research and development work, was funded by ESA. NASA is purchasing the second one.

A highly versatile assembly, each Spacelab can be launched with the pressurized core and experiment segments and one or more unpressurized pallets.

Spacelab will be the principal scientific payload of the Space Shuttle throughout the 1980s. One mission--which can last for seven to thirty days--may be devoted entirely to astronomy, with telescopes and other instruments performing a variety of functions.

Another mission may be dedicated to life science, or biological, experiments. Spacelab can be equipped with oxygen, food, water and handling facilities to support several types of living creatures.

Spacelab is expected to make significant contributions to science, medicine, industrial processing and many other valuable fields.

In perspective, however, the most important result of this international space laboratory may well be the great step forward that it represents toward global cooperation in space.

It is an outstanding example of how peoples of many lands can unite their talents and resources in future space projects to benefit humanity. (Spaceport News, Vol. 19, No. 27, December 19, 1980, p 6 & 7)

o Astronauts John Young and Robert Crippen, prime crew for the first Space Shuttle flight, presented 98 Silver Snoopy Awards to KSC contractor and civil service employees at a Dec. 10 ceremony held in the Training Auditorium.

The Silver Snoopy, an unofficial emblem of the Astronauts since early in the Apollo Moon exploration program, is awarded annually to NASA workers in recognition of their outstanding efforts on a manned spaceflight program.

Center Director Richard Smith opened the program by welcoming the recipients and their families and congratulating them "for jobs well deserving of the recognition."

STS-1 Commander Young then stepped up to the brightly lit podium and expressed his feelings about the prestigious award and the Shuttle program.

"You know, the Space Shuttle is a giant leap forward in space technology, just like going to the Moon was a giant leap forward." Young told the audience, "It's hard for people to realize when they are standing in the middle of history, and making history, that that is what they are doing."

"This is a tough job," he continued. "Back in 1972 I told folks that routine access into space was going to be as tough as going to the Moon. Now we are starting to move toward that goal. You can all be proud of the contributions which you've made. And you can be proud of the Silver Snoopy."

Young ended his speech on a more humorous note. "If nothing else comes out of it, and everything I've said is wrong, and it's not a historical fact that you are all making history right now, save that Silver Snoopy because it's made out of sterling silver, and one of these days...."

Crippen, the pilot on Columbia's initial voyage, said the old adage "they just don't make 'em like they used to" just isn't true about the Columbia and its associated external tank and solid rocket boosters.

"We make them better," said Crippen. "That is a fantastic vehicle, and each and every one of you can be very proud of your contribution."

Snoopy Awards, which include a lapel pin of the cartoon dog "Snoopy," a personal letter of thanks from Astronaut Young to the individual award winner and an Aerospace Awareness Certificate from the Center Director, were presented to employees of NASA and the following companies: Boeing Services International; Computer Sciences Corporation and RCA Service Co.; Expedient Services Incorporated; Martin Marietta; McDonnell Douglas Technical Services Company; McGregor & Werner; New World Services, Inc.; Planning Research Corporation; Rockwell International; United Space Boosters, Inc; and Wackenhut Services Inc.

THE SILVER SNOOPY AWARD RECIPIENTS were (in alphabetical order): Lyle Adams, Charles Albright, Henry Anderson, Cheryl Armstrong, Otto Baker, Howard Baxter, Glenn Beatty, Ronald Blackard, Robert Bradley, John Brewer, Lee Bridgeman, Bill Bruce, John Brunson, Niel Buchanan, Larry Butt, Debra Caldwell, Dick Carlson, Phyllis Carter, Charlie Chambers, Bill Cheatham, Jr., Vince Coffman, Harrell Cunningham, Margaret Davis, Holland Dresser, Bob Drury, John Echegoyen, Ray Enriquez, Marilynn Farnham, Mike Ferguson, Orman Gambill, Donald Garceau, James Hamilton, Robert Hamilton, Glenda Hanchey, Wayne Heath, Phillip Heiland, Bill Helms, Cheryl Herndon, Paul Hess, Bob Hibdon, Jean Hope, Joe Horvath, Jr., Albert Houston, Floyd James, George Judson, Warren Kicklighter, Ann Kuchta, Bob Lawhead, Bob Likon, Bill Lipscomb, Jim Lovan, Pamela Lund, George MacGregor, Mark Matis, M. E. Miller, Frank Mohme, Wayne Morse, Lee Moss, Paul Nawrocki, Barbara O'Connor, John Outing, Wayne Pate, Cloyce Perkins, Donald Peters, Donald Philipson, Debbie Potthast, Charles Pound, Jr., Betti Pratt, Thomas Quinn, Joan Rife, Gene Ross, Alvin Scheving, Joseph Schneider, Ruth Schroeder, Gerald Sheehan, Anne Sheridan, Walter Shifflett, Sharon Sprouse, Lola Spurgeon, Jim Smith, Bill Smith (not pictured), Bill Tanner, Sharon Teerawatananont, Lois Thompson, Edward Tobin, Terry Tolbert, Jocille Travis, Richard Tresher, Evelyn Trindle, James Trindle, Julie Triola, Charles Vickers, Rick Weismiller, William Wierenga, Jim Williams, Shirley Wyle and Henry Youngblood. (Spaceport News, Vol. 19, No. 27, December 19, 1980, p 6 & 7)

- The KSC Visitors Center is adding a major new outdoor exhibit this week with the installation of a Saturn 1B rocket.

  Saturn 1Bs carried the Skylab and Apollo Soyuz Test Project astronauts into space in the mid-1970s. The rocket on display is the one that was loaned for 18 months to the Space Science Exposition in Tokyo.

  Another new exhibit highlights communications satellites and features a model of Intelsat V, launched in early December. The exhibit is on loan from Ford Aerospace and Communications Corporation, builder of INTELSAT V, the largest commercial communications satellite in both size and capacity. (Spaceport News, Vol. 19, No. 27, December 19, 1980, p 6)

- NASA yesterday successfully completed the third of four planned mission simulations of the Space Shuttle Columbia at KSC and was preparing to conduct the last test, which will be a simulated descent from orbit and landing at Edwards AFB, Calif.

  Yesterday's test, with astronauts Joe Engle and Richard Truly at the controls, was a 22-minute Return to Launch Site Abort. The prime crew of Bob Crippen and John Young will man the final test.

  NASA is moving toward a rollout of the Shuttle from the Vehicle Assembly Building to Launch Complex 39A at 7 AM Dec. 29. Confidence in that schedule is evidenced by the fact that workers have been given a two-day holiday Dec. 25-26.

  Among the remaining tasks is the installation of about 1500 gapfiller insulation tiles on the Columbia, which are currently being installed at the rate of about 275 a day. (Defense Daily, Vol. 113, No. 32, Friday, December 19, 1980, p 238)

- While the Federal Government's budget authority for space activities will pass $10 billion for the first time in FY '81, Federal outlays for space will top the $9 billion mark for the first time.

Federal space program outlays for the FY '79-81 period are as follows:

	(in millions of dollars) FY '79	FY '80 E	FY '81
NASA	3,743.9	4,471.4	4,675.1
DOD	2,891.8	3,472.7	4,277.3
DOE	54.7	58.4	50.7
DOC	97.4	89.8	91.9
DOT	9.9	11.2	11.8
NSF	2.4	2.4	2.4
DOA	8.2	13.1	15.7
Total Space Outlays:	6,808.3	8,119.0	9,124.9

(Defense Daily, Vol. 113, No. 32, Friday, December 19, 1980, p 242)

o A non-profit educational organization, "United For Space," designed to promote space exploration by informing the nation of the benefits of space has been established by the Citizens For Space Political Action Committee (Washington, D.C.).

The Citizens For Space PAC was formed earlier this year by Harrell Graham to raise funds to support political candidates supporting the space program. [The committee made only a few, small contributions to candidates. It says recipients included Presidential candidate John Anderson, Sen. Mac Mathias (R-Md.) and Rep. Don Fuqua (D-Fla.).] The most notable members of the committee's board of advisors are former Sen. Frank Moss (D-Utah), and Frank Hammill, counsel for the National Space Club.

Unlike the PAC, the new non-profit group can accept contributions of larger than $5000 from an individual and contributions to the organization are fully tax-deductible. In addition, United For Space will be a membership organization and will seek to establish local chapters.

While there are other non-profit educational organizations involved with space, the new group says that its mission will be to fill the "desperate need in the space movement for effective and professional advertising, public relations and educational campaigns." (Defense Daily, Vol. 113, No. 32, Friday, December 19, 1980, p 242)

o Satellite Television Corp., a subsidiary of Comsat, has asked the FCC for permission to start development of the nation's first satellite-to-home pay television service.

The company proposes to start the system in 1985-86 in the Eastern U.S. and to expand to cover the entire nation after that. The company said the timetable for the expansion would depend on whether it can find a partner to help finance the project.

However, the company said it is committed to building the entire system, which will include four on-orbit satellites and two backups.

Transmissions from the spacecraft would be received via 2-1/2-foot dish antennas installed on the customers' rooftop. STS plans to offer three channels of television programming. (Defense Daily, Vol. 113, No. 32, Friday, December 19, 1980, p 244)

o The Soviet Union launched one of its medium-resolution photographic recovery reconniassance/surveillance satellites on Tuesday, Dec. 16 from Plesetsk. It was put into an orbit of 209/325 kilometers, 72.9 degrees, 89.5 minutes, and tagged Cosmos 1227.

Other recent Soviet space activity:

* Cosmos 1225, a military navigation mission on Dec. 5, from Plesetsk, with an orbit of 967/1041 kilometers, 82.9 degrees, 105.0 minutes.
* Cosmos 1226, the second of the usual paired military navigation missions, on Dec. 11, from Plesetsk, with an orbit of 982/1025 kilometers, 83.0 degrees, 105.0 minutes.
* Progress 11, the latest resupply spacecraft, after boosting the Salyut 6 into a new orbit of 290/374 kilometers, 51.6 degrees, 90.9 minutes, was separated from Salyut 6-Soyuz T-3 complex on Dec. 9 (Soyuz T-3 was returned on Dec. 10) and thrust into destructive reentry.
(Defense Daily, Vol. 113, No. 32, Friday, December 19, 1980, p 244)

December 20: Astronauts finished the last of four simulated Space Shuttle flights at the Kennedy Space Center Friday at the controls of the orbiter Columbia in preparation for its first mission.

John Young and Robert Crippen concluded the 59-minute test of the system that will manuever the orbiter as it circles the Earth.

"The data is still being analyzed but they seem pretty happy with it," said NASA spokesman Dick Young. "We're still scheduled for rollout on Dec. 29."

After the test, astronaut Young said, "It was a good run." (Today, Saturday, December 20, 1980)

December 22: Through 1979, a total of 2037 successful space launchings were conducted by the nations of the world -- 1250 by the Soviet Union and 743 by the United States.

Japan is credited with 15 launchings, France 10, China 8, Italy 8 (6 involving U.S. spacecraft), and Australia, the U.K. and ESA, 1 each.

The U.S./Soviet record in the decade of the 1970's is as follows [Note: some launchings involved multiple spacecraft]:

Year	U.S.	USSR
1970	28	81
1971	30	83
1972	30	74
1973	22	86
1974	22	81
1975	27	89
1976	26	99
1977	24	98
1978	32	88
1979	16	87
Total:	258	866

(Defense Daily, Vol. 113, No. 33, Monday, December 22, 1980, p 249)

December 23: Final preparations are underway for moving the Space Shuttle vehicle from the Vehicle Assembly Building to Launch Complex 39's Pad A. The move is scheduled for Monday, December 29.

Stacking of the first Space Shuttle vehicle was completed with the mating of the Orbiter Columbia to the other Shuttle components - the external propellant tank and solid rocket boosters - on November 24 in the VAB's High Bay 3.

Extensive tests have been conducted on the STS-1 vehicle to verify the various mechanical and electrical connections between the Shuttle's flight elements and the ground support systems used to checkout, fuel and launch the Shuttle.

Another major test was also performed - the Shuttle Interface Test - which was the first large-scale checkout of the Space Shuttle as an integrated flight system. The SIT included four simulated missions involving the prime and backup crews for the first Shuttle flight. The simulations were conducted to validate primary and backup computer programs to be used by onboard flight systems during the STS-1 mission, scheduled for no earlier than March, 1981.

The Shuttle Interface Test ended on Dec. 19 with the completion of the last simulated flight, a descent from orbit to a make-believe landing at the prime landing site for the first shuttle flight, Edwards Air Force Base, California.

With the SIT finished, ordnance work began. Ordnance includes all the explosive devices installed on the STS-1 vehicle which are used to separate various components - such as the solid rocket boosters and external tank - from one another during the flight. Installation and checkout of ordnance was completed December 23. (NASA News Release No. 275-80, December 23, 1980)

o The director of Space Shuttle operations at KSC, George Page, says in the wake of the four successful Shuttle mission simulation tests, that he is optimistic about making the first Shuttle launch this spring, although he says that the March 14 date probably won't be met, with a two month slip possible.

"After analysis of the data from the Shuttle Interface Tests, including the four manned flight rehearsals, we're looking forward to a rollout Dec. 29 at 8 AM, unless some unforseen problem arises," Page said.

"Now that the thermal tile problems on the Columbia have been solved and a major Shuttle test completed, I feel a little more confident about making a launch this spring." However, "March 14 is optimistic although I am well pleased with the way the team is operating together, but there probably will be problems which will develop to cause delays and I think May is not out of the question." (Defense Daily, Vol. 113, No. 34, Tuesday, December 23, 1980 p 258)

December 24: The People's Republic of China, which had been planning to send astronauts into space using modified versions of their recently tested ICBMs, has now shelved such plans, for at least this decade, due to economic reasons.

The Secretary General of the New China Research Society, Wang Zhuanshan, said the planned manned space flight program was too costly and not of an immediate priority and, therefore, would no longer be considered for this decade.

Wang said it was not a question of not having the hardware and the technology -- the rocket "is strong enough."

The economic squeeze will affect the entire Chinese space program, he said, with all programs moving ahead slower than originally planned.

A plan for orbiting dogs or monkeys, instead of astronauts, was rejected, as was the plans for developing unmanned spacecraft for planetary missions.

The only programs that will continue are those projects that are beneficial to the Chinese economy, such as satellites for weather research and Earth resources monitoring.

There is also expected to be a slowing down or delay in the country's communications satellite program.

Only recently, the Chinese released photographs of astronauts training for future space flight at a secret research center. (Defense Daily, Vol. 113, No. 35, Wednesday, December 24, 1980, p 261)

o India has picked ten Air Force officers who will soon be sent to the Soviet Union as candidates for joint space missions with Soviet cosmonauts aboard Soyuz-Salyut space flights. Four of the ten will be selected by the Soviets--two for flight and two for backup--for a maximum of two years cosmonaut training. (Defense Daily, Vol. 113, No. 35, Wednesday, December 24, 1980, p 261)

o To help reduce mission weight, a 798-pound NASA-Marshall Space Flight Center experiment has been removed from the manifest of the first Space Shuttle flight.

The experiment, known as the Induced Environment Contamination Monitor, was designed to determine how much pollution exists in and around the Shuttle during operations.

With the Space Shuttle's cargo bay doors open during missions, possible contaminants could enter the Orbiter payload area and might affect optical surfaces or the operation of various scientific instruments, with a subsequent degrading of data. The experiment would have analyzed the amount and source of any contamination.

The monitor experiment is expected to be flown on latter Shuttle flights.

December 25: Kennedy Space Center's launch team responded well under pressure during the Shuttle's simulated flight tests, said Darrell New, the man who directed the tests.

"(Astronaut) John Young made the comment to me that he was impressed with how well the test team recovered from problems that were time critical," New said.

Overall, New said, the two weeks' worth of Shuttle testing in the Vehicle Assembly Building went well. The only thing that could delay the trip to the pad Dec. 29 is some tile work that must be completed in the VAB, a NASA spokesman said.

New said the launch team learned that the connections between the Shuttle's various elements are solid and that the connections between the Shuttle and its mobile launch pad are good.

The team also verified the ability of the Shuttle's various elements to respond to the spaceship Columbia's four computers. "We want to be sure that it will all play together," he said.

Although some problems, mainly with ground computers, did surface during the tests, New said that the problems should be resolved in time to support a test firing on the Shuttle's three main engines sometime in February.

New said that the test brought the launch team closer together.

"I think we're getting back to that old Apollo spirit of a team effort to get a launch off on time," New said. (Today, Thursday, December 25, 1980)

December 26: More than a month before a major union contract expires at the Kennedy Space Center, management and labor have begun the complicated negotiating they say is necessary to avert a possible strike close to the first Space Shuttle launch.

Involved in the potential strike would be about 1,000 Boeing Services International employees in such crucial areas as supply delivery, dispatching, ground support and maintenance. (Today, Friday, December 26, 1980)

December 28: NASA has been bragging for years about its reusable Shuttle and how it will be millions of dollars cheaper than those old fashioned throwaway rockets.

But now as calculators are beeping and grinding away in NASA's Washington headquarters trying to determine just how much it will cost to fly the Shuttle, it's becoming increasingly clear to top officials that the reusable Shuttle won't be nearly as thrifty as was once claimed.

In fact, a single flight of the Shuttle in 1983 will probably cost more than $100 million. And that's as much as four throwaway rockets cost. (Today, Sunday, December 28, 1980)

o Columbia, the reusable rocket freight plane that the United States hopes will turn space into an industrial and scientific park, takes a big step toward launch Monday.

The event -- two years behind schedule -- is the rollout of the Space Shuttle to the Apollo moon rocket launch pad.

The 3 1/2-mile move of the fully assembled shuttle and its crawler transporter, a 10-million-pound package from the mammoth Vehicle Assembly Building, is scheduled to begin at 8 a.m. and take about 7 1/2 hours.

"We are 'go' for Monday. We expect no problems in being ready to move," said John Yardley, Director of the Rollout, after a meeting Saturday in which every aspect of the vehicle was reviewed. (Sentinel Star, Sunday, December 28, 1980)

December 29: Jesco Von Puttkamer is fond of quoting a not-so-old NASA proverb he invented: "The space shuttle makes money by shuttling."

For Von Puttkamer, a future planner at NASA Headquarters in Washington, D.C., the proverb offers a purely pragmatic reason why the United States must orbit a manned space station by the end of the decade.

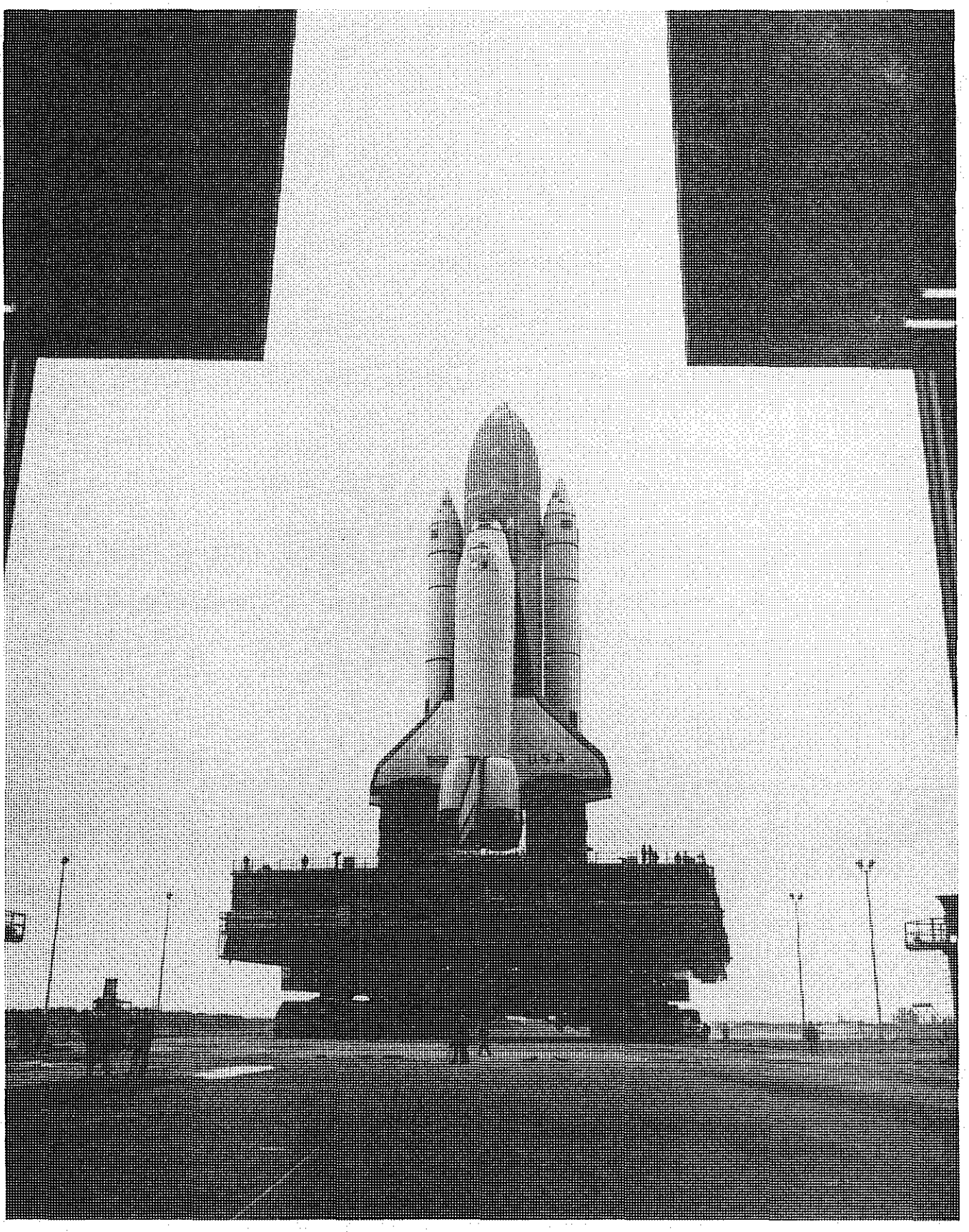
"There is no alternative," Von Puttkamer states bluntly. "The rationale is not to beat the Russians or because it's fun, but in order to free the shuttle for what it does best: going up and down and making money."

Without a space station the shuttle is destined to lie dormant for weeks during extended scientific missions. For every day the shuttle floats "quiescently" in space, it will not be shuttling and it will definitely not be earning money.

"It's like having an airliner and parking it on the runway as an overnight trailer," the planner laments.

Not just the number but also the size of shuttle paylaods is expected to increase during the 1980s, leading inevitably to huge satellites that must be assembled in space. It will become economical to establish a shuttle "service station" where astronauts can live, work and store their tools while the shuttle travels back and forth to earth.

The service station would eventually become a base camp for space travel to upper earth orbit, some 22,000 miles above the modest 155-mile orbit of the space shuttle, as the need for high-flying geostationary satellites increases.



The STS-1 rollout to Pad 39A was on December 29, 1980

There are even plans for a reusable space tug that will commute between lower and upper earth orbits, docking at the space station to refuel and pick up cargo transferred from the space shuttle.

"It is no different than workmen building a road in the Amazon," Von Puttkamer asserts. "You don't transport men and machinery to the work site every day; you establish base camps in the field." (Sentinel Star, Monday December 29, 1980)

o The space center will give a coming-out party today for the space shuttle, and NASA is taking steps to ensure there won't be any unexpected fireworks to mark the event.

For instance, guards take away visitors' matches and cigarette lighters as they enter the mammoth Vehicle Assembly Building.

Inside that 716-foot-tall technological cavern rests the shuttle--brimming with millions of pounds of fuel and explosives. It's awaiting an 8 a.m. trip that will take it 3 1/2 miles to launch pad 39A.

What are the chances that a careless smoker could blow the shuttle--and all the space dreams that go with it--to bits? About 1 million to 1, according to NASA spokesman Mark Hess. "But...." He shook his head.

"Loaded" is stamped in several places on the shuttle's two solid rocket boosters, as if any NASA employee could possibly forget that each one contains 1.1 million pounds of a rubbery looking substance that doesn't tolerate sparks.

Or as if the workers could forget that the shuttle has been armed with explosives to blow off the solid rocket boosters. Later, just before the shuttle's March 17 launch, another 1.6 million pounds of liquid hydrogen and liquid oxygen will be poured into its huge external tank.

And, at a guard shack beside the Vehicle Assembly Building, a red-lettered sign warns "Matches and lighters are prohibited beyond this point."

Nearby, a guard peers warily inside vans full of news representatives from Paris and Iowa, England and Wisconsin, Tampa and New York, all visiting to photograph the shuttle on the night before rollout. (Sentinel Star, Monday, Decmeber 29, 1980)

December 30: Even the dismal weather that enveloped the Space Coast on Monday couldn't diminish the sense of achievement by the hundreds of workers and news media observers who were watching as the Space Shuttle Columbia crept from its mammoth assembly building to historic launch pad 39A, man's jumping off place for the moon.

Rollout Day has been a long time in coming. (Today, Tuesday, December 30, 1980)

o Space Shuttle astronauts Bill and Anna Fisher were credited by officials Monday with saving the life of a Cocoa Beach man.

The two astronauts helped ambulance attendants revive an apparently lifeless motorcycle accident victim on SR 528 shortly after 2 p.m., said A.C. Jones, a Florida Highway Patrol trooper.

The couple, both physicans, were being driven to Kennedy Space Center to catch a flight to Houston when they spotted the accident victim lying in a westbound lane of the Bennett Memorial Causeway, Jones said.

Bill Fisher, 34, is an instructor of emergency medicine at Tampa's University of South Florida. Both he and his 30-year-old wife are training to be Shuttle astronauts.

The motorcyclist, Daniel E. Duncan, 65, of 760 S. Brevard Ave., had turned blue from lack of oxygen and was without a pulse when the astronauts stopped to aid three county emergency medical technicans.

"He's alive now, but he was deader than hell when I got there," Jones said.

"I've seen a lot of dead ones. Believe me, he was dead," Jones said. "There was no pulse. He was blue. His eyes were rolled back into his head."

The Fishers arrived moments after Jones and the emergency medical crew.

"They saw the commotion and stopped," the trooper said. "A lot of the doctors will stop and a lot of them won't. They kind of go out on a limb when they stop."

Together, the astronauts and other rescuers used equipment from the ambulance to force Duncan's heart to begin pumping blood again, Jones said.

The trooper said he didn't have a chance to speak with the astronauts because they were busy saving Duncan.

"They were working like mad on this guy. They were really going to town," he said.

The Fishers remained with Duncan until he was delivered to the emergency room of Cape Canveral Hospital in Cocoa Beach, Jones said, noting the driver of their car followed them to the hospital. (Today, Tuesday, December 30, 1980)

o The first Space Shuttle destined to fly in space was moved from the Vehicle Assembly Building to Launch Pad A at Complex 39 on Monday, December 29.

The Mobile Launcher Platform (MLP) was harddown on the pedestals at the pad at 8:01 p.m. after portions of a small steel access tower on the pad which provides egress from the second level of the MLP were removed.

Once in position, the Orbiter Access Arm was extended and crew module hatch opened. The Rotating Service Structure was also moved into place around the vehicle on December 30.

For the next week, activity at the Pad will be centered around the Shuttle Launch Pad Validation, a major test to verify connections between the Mobile Launcher Platform and ground systems at the Pad. All interfaces between the MLP and the Pad to supply power, propellants, gas, communications and water to the Shuttle are being made. Also, sophisticated Launch Processing System equipment in the Launch Control Center is being hooked up to the STS-1 vehicle so that power can be applied and tests can be conducted. A series of extensive tests will be performed to verify the MLP is properly mated to the Pad and instrumentation onboard the Shuttle flight elements - the orbiter, external tank and twin solid rocket boosters - will also be checked to verify test data can be received back at the Launch Control Center.

1981 NASA EXPENDABLE LAUNCH VEHICLE SCHEDULE

DATE	MISSION	LAUNCH VEHICLE	COMPLEX	COMMENTS
Feb. 19	COMSTAR D	Atlas Centaur 42	36-A	COMSAT General Corp.--commercial communications satellite
March	GOES-E	Delta 154	17-A	Geosynchronous Operational Environmental Satellite--weather satellite
March	INTELSAT V (F-1)	Atlas Centaur 56	36-B	International Telecommunications Satellite Organization--commercial communications satellite
April 23	SBS-B	Delta 155	17-A	Satellite Business Systems--domestic business communications satellite
May	NOAA-C	Atlas-F	WTR*	National Oceanic and Atmospheric Administration--weather satellite
June 2	FLTSATCOM-E	Atlas Centaur 59	36-A	Fleet Satellite Communications-military communica--tions satellite
June 18	RCA-D	Delta 156	17-A	RCA--domestic commercial communications satellite
June 25	INTELSAT V (F-3)	Atlas Centaur 55	39-B	
July 31	DE	Delta 157	WTR*	Dynamic Explorer--NASA scientific satellite
Sept. 15	SME	Delta 158	WTR*	Solar Mesospheric Explorer--NASA scientific satellite
Sept. 17	INTELSAT V (F-4)	Atlas Centaur 58	36-B	
Oct. 29	RCA-C1	Delta 159	17-A	
Dec. 10	INTELSAT V (F-5)	Atlas Centaur 60	36-B	

*Designates launches from NASA facilities at the Western Space and Missile Center, Vandenberg AFB, California. All other launches are from the NASA facilities at the Eastern Space and Missile Center, Cape Canaveral Air Force Station, Florida. (NASA News Release No. 269-80, Decmeber 30, 1980)

The next major test after Shuttle Launch Pad Validation will be the "Plugs Out Overall Test" scheduled from January 7-15. During this test, all Pad ground support equipment will be disconnected to verify that all Shuttle systems can operate on internal power after liftoff.

The STS-1 vehicle is scheduled to be powered up December 30 to support retesting of four Multiplexer/Demultiplexers (MDMs) and the Input/Output Processors (IOPs). The MDMs and IOPs, part of the orbiter's complex avionics system, were removed prior to rollout to enhance their reliability and will be reinstalled before power is applied to the vehicle.

Most other Shuttle related work accomplished during the past week was in support of the rollout.

On the orbiter, the major activity has been the reinstallation of the MDMs and IOPs. All thermal protection system work has been completed except for insertion of gap fillers that will be installed at the Pad.

Some thermal insulation on the left side of the external tank was repaired in the VAB prior to rollout after receiving some minor damage during retraction of a work platform.

The schedule for repairing Nozzle Plug No. 2, which broke into two pieces during sea trials is being reviewed with the estimated completion date of the end of February. The requirement for a full-up sea retest is also being assessed.

December 31: The Shuttle is on its launch pad, and workers are busily making the connections between it and the systems that are necessary for its launch.

The Shuttle's portable launch platform was lowered on its support pedestals at Pad 39A at 8 p.m. Monday night, 12 hours after it left its assembly building. Workers are now putting into place the various structures that provide access to the Shuttle, a NASA spokesman said.

After a gangplank was extended, workers opened the pressurized hatch the crew will pass through. Next, the primary access structure was put into place, which NASA calls the rotating service structure.

This massive five-level work platform is 50 feet wide and 102 feet long. Its height is 130 feet. As its name implies, the structure rotates 120 degrees so that it covers most of the Space Shuttle's Orbiter. After the structure is in place, the Shuttle will be almost hidden from sight by its launch pad.

From the various levels of the rotating structure, workers will connect the lines that carry oxygen, hydrogen, nitrogen, helium and the fuels that power the Spaceship Columbia's in-orbit engines. The structure also has an environmentally controlled "clean room," where payloads can be loaded into the Columbia's payload bay. (Today, Wednesday, December 31, 1980)

December 1980: More that 67,000 visitors toured the nation's Spaceport in November as engineers and technicians here prepared for the first launch of the Space Shuttle and its crew in March, 1980.

Visitors taking guided bus tours totaled 67,568 for the month, .6 percent higher than the 67,139 bus patrons logged in November 1979. This was the third straight month that tour totals have been higher than for the comparable period last year.

The November bus tour figure pushed the cumulative total for the year to 1,156,207, or 2.8 percent below the 1,189,299 visitors for the first 11 months of 1979. During the first six months of this year attendance ran behind 1979 by 6.8 percent, but since June, except for one month, the number of visitors has surpassed the number last year. (NASA News Release No. 208-80, December 1980)

o Neither sleet, nor hail, nor rain, nor snow should stay Santa from his appointed rounds in Florida on Christmas Eve.

But the Kennedy Space Center's Shuttle Landing Facility stands open for an emergency landing by Old Saint Nick should the Florida weather stray from the high standards set by the chamber of commerce or if one of his reindeer throws a shoe.

The Spaceport's Shuttle landing strip is one of the largest airfields in the world--measuring 15,000 feet long and 300 feet wide. Designed to handle landings by the Space Shuttle orbiters on high-speed glides from missions in space, it is equipped with sophisticated electronic landing systems capable of overcoming the toughest set of weather conditions.

"We can handle the shuttle, C-5A, 747s--anything with wings," emphasized Joey Noel, pro tem manager of the Spaceport's Shuttle Facility. "We're sure we can handle Santa, his sleigh and his reindeer. (NASA News Release No. 273-80, December 1980)

o Federal employees in Brevard County increased their contributions to the Combined Federal Campaign this fall by more than 6% over last year despite the fact that their number has dwindled from last year by about 1,000, Colonel Russell Rubeor, County Chairman, announced today.

This year Federal employees gave $216,999, compared to $204,577 last year. The total, according to preliminary figures, was also 111% of the CFC goal of $195,000.

The Combined Federal Compaign is a once-a-year charitable drive for the United Way of Brevard County, National Health Agencies and International Service Agencies. Also included this year were four local agencies, which received only money specifically directed to them. (NASA News Release No. 210-80, December 1980)

o International Business Machines Corporation, 7900 N. Astronaut Blvd., Cape Canaveral, Fla., has been awarded a contract by the Kennedy Space Center for improvement and operation of an existing computer.

Under the $380,500 contract, IBM will make improvements to KSC's Ground Processing Simulator Enhancement System, a computer which is used to study the preparation of payloads for Space Shuttle missions and to calculate when they will be ready for flight. The goal of the GPS system is to develop improved methods for planning and scheduling of Space Shuttle missions.

The fixed-price contract will extend through September 30, 1980. (NASA News Release No. 211-80, December 1980)

o Kennedy Space Center scored another flawless launch record in 1980 with six successful satellite liftoffs as the spaceport's 39-month string of consecutive launch successes grew to 31.

It was also a year of major advances towards the Space Shuttle's first orbital flight, targeted for March, and a spectacular planetary encounter with Saturn as Voyager 1 continued its long journey three years after launch from Cape Canaveral.

A successful liftoff of the INTELSAT V (International Telecommunications Satellite) communications satellite atop an Atlas Centaur rocket on December 6 finished the year for KSC's Deployable Payloads Directorate, which lobbed three other communications spacecraft, a weather satellite and a solar research satellite into orbit during 1980.

Here's a chronological summary of the year's launches:

January 17 -- FLTSATCOM 3 - a military communications satellite, rode into orbit aboard at Atlas Centaur following liftoff from Complex 36 at 8:26 p.m. Stationed in geosynchronous orbit over the Atlantic Ocean, the spacecraft provides two-way communications for U. S. Armed Forces and Department of Defense users.

February 14 -- The solar research satellite SMM (Solar Maximum Mission) was carried into a low Earth orbit by a Delta which was launched from Complex 17 at 10:57 a.m. The spacecraft's scientific instruments were designed to gather data about solar phenomena during a peak of the Sun's 11-year activity cycle.

September 9 -- The weather-observing satellite GOES-4 (Geostationary Operational Environmental Satellite) was launched from Complex 17 at 6:27 p.m. on a Delta to replace a predecessor. Onboard is a new instrument which enables forecasters to measure atmospheric temperature and moisture at various altitudes.

October 30 -- FLTSATCOM-4, the second military communications satellite launch for the year, rose into orbit after a 10:54 p.m. liftoff from Complex 36 stop an Atlas Centaur.

November 15--Satellite Business Systems-1 (SBS-1), the first spacecraft designed exclusively for business-to-business communications, was launched aboard a Delta from Complex 17 at 5:49 p.m. and received its final boost into an elliptical transfer orbit from a new independent rocket stage called the Payload Assist Module, developed for use on both expendable vehicles and the Space Shuttle.

December 6 -- INTELSAT V, the newest spacecraft in a series that provided the first high-quality and reliable worldwide satellite telecommunications system in 1968, thundered into orbit on an Atlas Centaur which lifted off from Complex 36 at 6:31 p.m.

It was the third year in a row that KSC achieved a flawless launch record. The Deployable Payloads Directorate's string of 31 consecutive launch successes includes 19 Deltas and 12 Atlas Centaurs. Two of the Delta launches were conducted from Vandenberg Air Force Base, California.

The Delta has become the workhorse of the space program. Since it was first launched in 1960, it has carried over 140 scientific, weather, communications and applications satellites into space.

The Atlas Centaur is currently NASA's standard launch vehicle for intermediate payloads too heavy to ride on Delta.

Launches of both vehicles are already slated into 1982 as a gradual transition is made to dependence on the Space Shuttle.

This year marked a major turning point in the shuttle's development as manufacturing of the first flight orbiter, Columbia, was completed in the Orbiter Processing Facility and the spaceship was moved to the Vehicle Assembly Building for launch processing.

The Voyager 1 spacecraft, launched from KSC in 1977, flew past Saturn in November and astounded planetary scientists with spectacular and puzzling images of the ringed planet and its moons. (NASA News Release No. 265-80, December 1980)