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September 1, 1983

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Chronology of KSC and KSC Related Events for 1981

National Aeronautics and
Space Administration

John F. Kennedy Space Center

NASA

KSC FORM 16-12 (REV. 8/76)

FOREWORD

The launch of Orbiter Columbia from the John F. Kennedy Space Center on April 12, 1981 heralded the beginning of a new phase in manned space activity, and the era of an operational Space Tranportation System.

Columbia was the first reusable spaceship and the first to carry a human crew on its maiden flight. The landing on the dry lakebed at Edwards Air Force Base on April 14, 1981, after a 54-hour journey, was a star spangled event which excited the national spirit. Once again American astronauts were active in space.

This Chronology presents a record of aerospace and related activities in 1981 in which the John F. Kennedy Space Center had prominent involvement and interest. Articles were selected from Aviation Week and Space Technology, Defense Daily, Miami Herald, Sentinel Star (Orlando), TODAY (Cocoa), Spaceport News (KSC), NASA News Releases, and other sources.

The Chronology was prepared as part of the KSC history program to "document KSC's role in NASA's programs" and is intended as a reference source for historians and other researchers. The document is arranged by month and items by date of the published sources. Actual date of the event may be indicated in paranthesis when the article itself does not make that information explicit.

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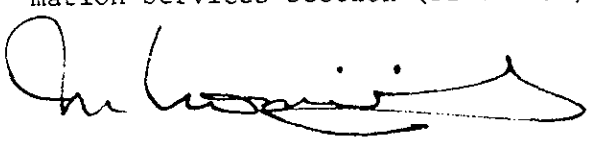
Comments concerning the Chronology are invited and should be addressed to Information Services Section (SI-SAT-52), John F. Kennedy Space Center, Florida 32899.



M. Konjevich
Information Services

January 2: To some people, a canister is a thing that looks like a mobile home standing on its head.

See photo pg. 207

To others, it is a thing that looks much as though someone looped the nose, tail and wings off of an orbiter, then installed doors, ladders and handles on what is left.

Looking very strange indeed, the space age canister actually is a moveable home for payloads and is also a painstakingly engineered airtight container that precisely duplicates the interior dimensions of the orbiter's cargo bay.

It provides the clean environment necessary while orbiter payloads are being moved around the space center. Horizontal payloads, for example, are verified on the Operations and Checkout Building, then are moved to the Orbiter Processing Facility for installation.

Vertical payloads, verified at the Vertical Processing Facility, must be moved to the launch pad for installation via the Rotating Service Structure.

The canister, 21 meters (69 feet) long, can accommodate payloads up to 18.3 meters (60 feet) in diameter, weighing up to 29,483 kilograms (65,000 lbs).

Delivering a payload to the launch pad, the canister is hoisted to the proper elevation at the Rotating Service Structure where environmental seals protect the cargo during offloading.

The canister is taken on its KSC travels by a 48-wheeled, self-propelled and highly maneuverable transporter. The speed of the 19.8 meters (65 feet) long transporter varies from a maximum of 16 kilometers (10 miles) per hour, empty, to a loaded maneuvering speed -- or "creep rate" -- of .635 centimeters (one quarter-inch) per second -- or .0228 kilometers (.0142 mile) per hour. (SPACEPORT NEWS, 1-2-81, p. 3, Vol. 20, No. 1)

<> Mr. J. A. Diggs has been named Equal Opportunity Officer at KSC. He had held the post as acting officer since July, 1979.

Prior to being appointed to the post, Diggs served as an Equal Opportunity Specialist here, as a field representative with the Office of Economic Opportunity in Atlanta, Georgia, and as Associate and Economic Director, respectively, of the Brevard County Community Action Agency in Cocoa. (SPACEPORT NEWS, 1-2-81, p.5, Vol. 20, No. 1)

<> 1981 Launch Schedule

See appendix A

DATE	MISSION	LAUNCH VEHICLE	COMPLEX
Feb 19	COMSTAR D	Atlas Centaur 42	36-A
March	GOES-E	Delta 154	17-A
March	INTELSAT V (F-1)	Atlas Centaur 56	36-B
April 23	SBS-B	Delta 155	17-A
May	NOAA-C	Atlas-F	WTR*
June 2	FLTSATCOM-E	Atlas Centaur 59	36-A
June 18	RCA-D	Delta 156	17-A
June 25	INTELSAT V (F-3)	Atlas Centaur 55	36-B
July 31	DE	Delta 157	WTR*
Sept. 15	SME	Delta 158	WTR*
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

LAUNCH SCHEDULE for 1981 also includes the first launch of the Space Shuttle from 39A, now set for late March, WTR launch operations are conducted by KSC from Vandenberg Air Force Base, California. (SPACEPORT NEWS, 1-2-81, p.5, Vol. 20, No.1)

<> While the nation's attention is focused on Launch Complex 39 for the upcoming Shuttle launch, the expendable vehicle team will look to continue its string of 31 successes with ten launches scheduled for 1981.

With six Atlas-Centaur and four Delta launches, KSC will lift a variety of commercial, scientific and defense satellites into equatorial orbit. A large part of the expendable schedule will be devoted to the remainder of the INTELSAT V communications system, as four INTELSAT V satellites will be launched in 1981.

In addition to ETR launches, three other missions will be conducted from the WTR launch site at Vandenberg Air Force Base. Two NASA scientific satellites and one weather satellite will be lifted into polar orbit aboard two Deltas and an Atlas-F. (SPACEPORT NEWS, 1-2-81, p. 5, Vol. 20, No. 1)

January 6: A private group called the Viking Fund has collected some $70,000 that it will give to NASA Wednesday to be used to continue processing data from the Viking spacecraft which landed on Mars in 1976. The budget squeeze on NASA was threatened to terminate the Viking data processing work. The Viking Fund was formed under the auspices of the American Astronautical Society (AAS). (DEFENSE DAILY, 1-6-81, p. 7, Vol. 114, No. 1)

<> Dr. Alan M. Lovelace, 51, who has been deputy administrator of NASA since June 1976, the number two spot in the agency, will step down to allow the Reagan Administration to name its own team at NASA.

NASA Administrator Dr. Robert A. Frosch announced prior to the presidential election that he would resign Jan. 20 to become president of the American Association of Engineering Societies. (DEFENSE DAILY, 1-6-81, p. 3, Vol. 114, No. 1)

<> NASA's space science spokesman Nicholas W. Panagakos, 55, died Dec. 28 of a heart attack at a hospital in Portland, Me. He has been NASA's public affairs officer for space science since 1971. He joined NASA in 1962 and worked for eight years as the information officer for the Goddard Institute for Space Studies in New York. During the 1968 presidential campaign, he was a speechwriter for Democratic vice presidential candidate Edmund Muskie. (DEFENSE DAILY, 1-6-81, p. 7, Vol. 114, No. 1)

January 7: The Intelsat Board of Governors last month approved the purchase of three new Intelsat V-A communications satellites from an international team headed by Ford Aerospace for about $100 million.

At the same time, the Board authorized Ford to proceed with long lead-time efforts in order to maintain options for up to three more Intelsat V-A's.

The new spacecraft will be basically similar to the Intelsat V spacecraft built by Ford, but will incorporate modifications and improvements that will boost their capacity from 12,000 to 15,000 telephone calls, plus two television channels.

The Intelsat V-A's are to be launched in the 1984-86 time period, augmenting the nine Intelsat V's which will be launched by the end of 1982. The first Intelsat V was successfully launched Dec. 6.

Intelsat plans to follow the Intelsat V-A series with a series of Intelsat VI satellites with a capacity of more than 40,000 telephone calls and two television channels. (DEFENSE DAILY, 1-7-81, p. 13, Vol. 114, No. 2)

<> NASA and the European Space Agency (ESA) have been unable to work out an agreement under which NASA would provide the Deep Space Network for tracking the ESA Giotto Halley's Comet mission in exchange for providing experiments on the spacecraft. Instead ESA is looking to purchase the DSN time or to barter something else in exchange for the time.

NASA had proposed to provide the DSN tracking and the Delta launch vehicle for Giotto in exchange for two principal investigator experiments on the ESA spacecraft, but use of the Delta in place of the French Ariane was vetoed in ESA. The Europeans then turned down the exchange of DSN alone for the two major experiments, feeling that this was too much to pay.

A decision on the Giotto payload is expected after ESA's Space Program Committee meets Jan. 16. The spacecraft is expected to carry six or seven major experiments. It is considered likely that the U.S. will be invited to participate as co-investigators on one or two of the experiments.

Meanwhile, NASA's Jet Propulsion Laboratory is seeking Reagan Administration's initiation in FY '82 of a $250 million U.S. Halley's mission, but there has been no indication from the Reagan camp that it intends increases in the space budget. (DEFENSE DAILY, 1-7-81, p. 14, Vol. 114, No. 2)

<> The first Space Shuttle scheduled to fly in space is currently undergoing checks of its systems while it sits at the launch pad.

Last week, the orbiter was connected to ground systems, and was powered up using ground electrical power for the first time at the pad. Validation of all connections to the Space Shuttle vehicle was complete early this week, and tests of many orbiter systems were underway.

Tests completed included the development flight instrumentation, radar altimeter, navigation radios, and the external tank to solid rocket booster connections. Also verified was the operation of the gaseous oxygen vent arm and hood, the so-called beanie cap which will remove cold oxygen vapors from the vicinity of the external tank tip to prevent ice formation.

On the Rotating Service Structure, small air leaks between the covers of the maneuvering system pod purge system and the pads themselves have prevented the purge air from reaching the desired 200 degree temperature. Engineers are checking the design of the purge covers to remedy the leaks.

A final assessment of the remaining gap filler work has determined that about 500 cap fillers remain to be installed before launch.

On Tuesday, checks of the water flow at the mobile launch platform level were begun. The water system will be used both to prevent flame and heat damage to the launch structure and also to provide sound deadening to protect the Space Shuttle from intense launch noise vibrations.....

Scheduled for the remainder of the week is the "Plugs Out Overall Test" which will test the ability of the Space Shuttle Orbiter to function without ground power, as it will after liftoff.

The strong back support for the payload bay doors will be installed in preparation for the cycling of the orbiter's doors while in the vertical position. This also checks the door fit within the Rotating Service Structure. (KSC NEWS RELEASE No. 4-81, 1-7-81)

January 8: Sen. Jake Garn (R-Utah), best known for his strong support of the nation's defense program, has been named the new chairman of the Senate Appropriations Subcommittee on Housing & Urban Development and Independent Agencies -- the unit responsible for the NASA appropriations bill in the Senate.

With the change from Democratic to Republican leadership in the Senate, he succeeds Sen. William Proxmire (D-Wis.) as chairman of the HUD-IA Subcommittee. Proxmire, while he has a reputation of being critical of the space program, has not made a major effort in recent years to take significant funding from the Space Agency.

Garn has not taken an active role on the space program but his aides confirm that the senator is a firm supporter of the Space Shuttle program, recognizing its need for the nation's defense and intelligence program, and he does not want that "critical" program to suffer as a result of the overall Federal budget cutting efforts planned by the Reagan Administration (a reduction which he fully supports).

On the House side, the HUD-IA Appropriations Subcommittee will continue to be chaired by Rep. Edward Boland (D-Mass.), with Rep. Lawrence Coughlin (R-Pa.) expected to continue as ranking minority member. The subcommittee, which has been the major adversary of the NASA program in Congress, upset over cost overruns in recent years, lost only one member in the election.

Garn, who was originally only fifth in line to take the HUD-IA Appropriations chairmanship, wanted the post to consolidate his authority over the nation's housing program. He earlier was named chairman of the Senate Committee on Banking, Housing and Urban Affairs.

Sen. Mathias (R-Md.), who was the ranking Republican on the HUD-IA Appropriations Subcommittee last year, and in line to take the chairmanship, opted instead for a position on the Senate Foreign Relations Committee, which required him to leave Appropriations.

The 11-man subcommittee is comprised of six Republicans, five of whom are conservative, including Sen. Jack Schmitt (N.M.), chairman of the NASA authorizing subcommittee and the leading proponent of the space program in the Senate, and five Democrats, four of whom are liberal. That membership is:

Republicans	Democrats
Jake Garn (Utah) Chairman	Walter Huddleston (Ky.) (ranking)
Lowell Weicker (Conn.)	William Proxmire (Wis.)
Paul Laxalt (Nev.)	John Stennis (Miss.)
Jack Schmitt (N.M.)	Patrick Leahy (Vt.)
Alfonse D'Amato (N.Y.)	James Sasser (Tenn.)
Arlen Specter (Pa.)	

(DEFENSE DAILY, 1-8-81, p. 20, Vol. 114, No. 3)

January 9: Sen. Jack Schmitt (R-N.M.), the new chairman of the Senate Subcommittee on Science, Technology & Space, has urged the Reagan Administration to place more emphasis to the general space activities and R & D program of NASA.

In a letter to David Stockman, director-designate of the White House Office of Management & Budget, Schmitt praised Stockman's comprehensive plan to restore the U.S. economy but was critical of Stockman's inclusion of NASA among "low-priority" programs which "could be cut by at least one-third...."

"NASA should not be lumped into a 'low priority' category," Schmitt told Stockman. "This hurts the credibility of your other excellent proposals."

The senator told the OMB chief that his proposed Emergency Economic Stabilization and Recovery program cannot succeed if it ignores "the erosion of our research and technology base. Without that base and its continued reinforcement we will have little to which to recover to. Our over-all productivity, our national security and the motivation of our young people are all tied directly to the growth of that base."

The senator listed 11 non-defense R & D activities that "clearly are adding basic economic strength and should be emphasized in any recovery program." including the following five involving NASA:

1) Cooperative technology development programs with industry and academies, particularly in aeronautics and energy. Provides advantages in productivity, export and national security.

2) General space activities. Provides advances in productivity, national security, national motivation and in the competition with the Soviet Union.

3) Space and terrestrial applications. Provides advances in productivity, national security, mineral resource assessment for domestic, national security and foreign policy purposes.

4) Space research and technology. Helps keep future options open.

5) Technology utilization. Adds to short-term productivity growth.

Schmitt also called for support for the traditional basic research program and science and engineering education activities of the National Science Foundation and for the basic and applied energy research programs of the Energy Department.

At the same time, Schmitt said the following R & D activities can be deferred or de-emphasized: the applied research activities of NSF, and DOE's solar information/marketing program, ocean systems program, biomass program, coal conversion program and synfuels program.

He also called for a reorganization of some Federal R & D activities to reduce costs and improve management, including:

--Spin-off the Earth resources remote sensing activities of NOAA into the private sector, with NASA retaining cooperative technology development.

--Dismantle DOE by reestablishing ERDA as a separate agency without regulatory authority; creating a Nuclear Power Administration from elements of DOE and NRC, and combining all necessary non-nuclear energy regulations in a separate independent agency. (DEFENSE DAILY, 1-9-81, p. 25 & 26, Vol. 114, No. 4)

<> High attendance figures capped the year 1980, as more than 1.5 million people travelled to Kennedy Space Center's Visitors Center, the fourth most popular Florida tourist attraction.

More than 19 million people have come to the Visitors Center since it was opened in 1966 to view its wide array of static and dynamic exhibits, rocket and spacecraft displays, space movies and space science demonstrations. (NASA NEWS RELEASE, 1-9-81, No. 5-81)

January 12: NASA Administrator Robert Frosch and other top officials from NASA-Headquarters and field centers were scheduled to meet with top Air Force officials Saturday to consider a decision on the choice of an upper stage for the Space Shuttle for NASA's planetary missions -- starting with the Galileo Jupiter Orbiter & Probe and the NASA/ESA dual spacecraft International Solar Polar Mission.

The Air Force is responsible for developing the solid-propellant Inertial Upper Stage (IUS), planned as the workhorse upper stage for the Shuttle, which includes the basic two-stage vehicle to be used by DOD and by NASA, and the three-stage IUS which will be used for NASA's planetary missions.

But a cost overrun of at least $112 million and a development completion delay on the Boeing-built vehicle has forced NASA to reconsider its plan for using the three-stage IUS for launching the Galileo in 1984 and ISPM in 1985 on two Shuttle missions each.

If the three-stage IUS is not ready in time for the Galileo launch in 1984, the next launch window for the configuration would be 1987.

The alternatives include:

1)Adapting a Centaur liquid-fueled stage to the Shuttle, which could then launch the Galileo Orbiter and Probe on a single Shuttle mission, but be delayed until 1985. Drawbacks including possible complications in modifying the Shuttle to accommodate the liquid fueled stage...and uncertainty of costs. Some say it will be cheaper than IUS; others that it will be more expensive. Centaur could also launch the two ISPM spacecraft on a single Shuttle flight in 1985 if a modified Shuttle is available.

2) Developing a new two-stage ("twin-stage") version of IUS, which would employ two of the larger IUS motors, rather than one large and one small. This configuration is designed to be able to launch Galileo and ISPM on single Shuttle launches, but would extend the Galileo flight time from two to four years.

Galileo and ISPM program officials would like to proceed with their programs as currently scheduled, with the three-stage IUS and dual launches in 1984 and 1985, respectively, although a twin-stage with a top stage could do the ISPM as a single launch in 1985 and is considered a viable alternative. They see going to the Centaur, with the changes to the spacecraft that it would require, as being the least desirable option.

But Space Transportation officials, faced with the IUS cost problems and possible further delays, see the Centaur as a strong option.

The new Boeing proposal for a twin-stage IUS offers advantages as well as disadvantages which will be part of complications of the final decision. (DEFENSE DAILY, 1-12-81, p. 35, Vol. 114, No. 5)

<> OMB director-designate David Stockman in his Senate confirmation hearings last week listed a wide range of Federal programs which he believes can be cut, not excluding NASA, which he earlier listed among agencies that could be cut by "one-third."

Under questioning from Sen. John Glenn (D-Ohio) about the NASA budget, Stockman replied, "I could probably find something in NASA to cut." (DEFENSE DAILY, 1-12-81, p. 34, Vol. 114, No. 5)

<> Nine members have been named to the Subcommittee on Science, Technology & Space of the Senate Commerce Committee, under the chairmanship of Sen. Jack Schmitt (R-N.M.). The subcommittee, headed last year by Sen. Adlai E. Stevenson (D-Ill.), who retired, is responsible for the NASA authorization bill. Senators named to the subcommittee are: (R) Schmitt (chairman), Barry Goldwater (Ariz.), Nancy Kassebaum (Kans.), Slade Gorton (Wash.) and Robert Kasten (Wis.).

(D) Donald Riegle (Mich.) (ranking), Wendell Ford (Kty.), Ernest Hollings (S.C.), and Howell Heflin (Ala.)

On the GOP side Kassebaum and freshmen Gorton and Kasten are new to the subcommittee. Former committee member Robert Griffin (Mich.) has retired.

For the Democrats, Heflin is new to the subcommittee, and Sens. Russell Long (La.) and Edward Zorinsky (Neb.) have dropped off along with Stevenson. (DEFENSE DAILY, 1-12-81, pp. 35-36, Vol. 114, No. 5)

<> The Defense Department acknowledged Thursday that an experiment with a laser "pointing and tracking" device for aiming weapons in space will be conducted onboard the Space Shuttle.

It said the experiments involved a "small laser which is not a laser weapon," emphasizing that "it is not an experiment of laser weaponry."

Development of a laser weapon to defend against Soviet ballistic missiles is not foreseeable within this decade," the Pentagon said. (DEFENSE DAILY, 1-12-81, p. 34, Vol. 114, No. 5)

<> NASA, which has put off plans for follow-on missions to Mars until the 1990's, is looking at a new proposal for a combined Mars Rover and Sample Return Mission -- the most ambitious proposed mission to Mars since the proposals for manned landings during the Apollo era.

The proposal for the Rover/Sample Return Mission, both of which separately are future mission candidates, was developed by NASA's Jet Propulsion Laboratory and Johnson Space Center. JPL, which built the Viking Mars Landers, is looking at the Rover, while Johnson is interested in the sample return. (DEFENSE DAILY, 1-12-81, p. 33, Vol. 114, No. 5)

January 15: NASA is now estimating that the total cost of developing the Space Shuttle will be $9.6 billion, an increase of 26 percent above inflation from the original estimate ($5.12 billion in FY '81 dollars). The total investment cost for four Shuttles, including development, production and facilities, is now between $14 billion and $14.5 billion. (DEFENSE DAILY, 1-15-81, p. 55, Vol. 114, No. 8)

January 16: Both the primary and backup astronaut crews for the first Space Shuttle flight got some valuable experience at the pad here last week. The four, plus other astronauts and some ground support personnel, were briefed on the use of the emergency pad escape system, known as the "slidewire."

The slidewire system might look like a thrill ride, but its purpose is to provide a quick and sure escape from the upper pad platforms in case of a serious emergency.

Five steel cables extend from the Fixed Service Structure at the level of the orbiter access arm and descend to a point about 1,200 feet to the west, just inside the pad perimeter. On each cable rides a flatbottomed basket made of Kevlar, a heat resistant, synthetic fiber. Each basket can hold up to three persons and is positioned for easy entry in event of an emergency.

Should the astronauts or ground personnel need to evacuate the tower faster than the elevator could function, they would board the baskets and release them. The descent is controlled by a friction bake, but still achieves speeds approaching 60 miles per hour on its way to the bottom.

Near the bottom, each basket engages a net, which in turn is connected to rows of heavy chains, which drag along the ground and act as a brake. The deceleration and stop is progressive, but rapid, and the system is similar to that once used to stop runaway jet aircraft.

Once stopped, persons in the baskets can run to a protective bunker or can use a tracked vehicle parked near the bottom of the cables. The vehicle can be driven away from the pad to safety.

For last week's lessons, the flight crews wore the space suits and other equipment they will wear during a mission. Such garments can make running and climbing cumbersome, and the astronauts learned where the more awkward phases of the procedures occur.

To eliminate any possible hazard to personnel during the tests, sandbags are used to duplicate the weight of riders. The system is similar to that used for Apollo flights, except that the older system used a single, large basket instead of several smaller ones. (SPACEPORT NEWS, 1-16-81, p. 2, Vol. 20, No. 2)

<> Barely showing its age, Pioneer 6 last month marked its 15th birthday - the longest lifespan of an interplanetary spacecraft to date.

Launched on Dec. 16, 1965, on Delta-35 from Cape Canaveral, Pioneer 6 has been circling the Sun between the orbits of Venus and Earth, cranking out data on the Sun's corona, solar storms, and even a comet's tail.

The tiny, 140-pound probe has circled the Sun 17 1/2 times, covering over 9 billion miles, and has sent about four billion data bits to Earth. Whenever the busy "big dish" antennas of NASA's Deep Space Network aren't tied up with other missions, they tune in for the latest report from Pioneer 6. The data received is forwarded to Pioneer experimenters and other space scientists and to "solar weather forecasters" at the NOAA Solar Disturbance Forecast Center at Boulder, Colorado. (SPACEPORT NEWS, 1-16-81, p. 4, Vol. 20, No. 2)

January 17: China is not training astronauts, but is interested in the U.S. space program, U.S. Rep. Bill Nelson reports from his trip to the Far East.

The Melbourne Democrat met this week with Chinese Vice Premier Fang Yi, minister of the state council in charge of the Science and Technology Commission.

"The vice premier said the Chinese are not training astronauts at present, although the Shanghai Daily reported last year that China had started an astronaut training program," said Nelson from Peking, one of the stops for his delegation from the House Science and Technology Committee. (TODAY, 1-17-81, p. 6A)

January 18: "It worked." That was the word from Bay St. Louis, Miss., where engineers fired a test version of the Space Shuttle's engine system for 10 minutes and 29 seconds Saturday afternoon.

The firing was the 12th and longest test of a system similar to the three engines now bolted to the Spaceship Columbia. That leaves only a final test of the flight engines on the Kennedy Space Center pad sometime in February. If that test is successful, the engines will be approved for the Shuttle's maiden flight - now scheduled for March, but more likely to take place in April or May.

A spokesman for Marshall Space Flight Center in Huntsville, Ala., the center responsible for the development of the engines, said the test went as planned.

"With today's successful firing, all main propulsion test objectives for the first flight and some objectives for later missions have been achieved," said James M. Sission, Marshall's manager for engineering and major test management office.

Saturday's test was something of a milestone in the Shuttle's development. Had the test been a major failure, it is likely that performing a retest would have delayed the launch of the Shuttle. (TODAY, 1-18-81, p. 11A)

January 19: NASA has decided to terminate development of the three-stage Inertial Upper Stage which was designed to launch the agency's planetary mission from the Space Shuttle and instead opted for the use of a modified Centaur upper stage for that role. The two-stage IUS will be retained for both NASA and DOD missions.

NASA Administrator Dr. Robert Frosch acknowledged that such a "significant change" in the agency's plans "will be subject to confirmation" by the new Reagan Administration.

The change to the more powerful, liquid propelled Centaur will allow NASA to launch its two currently approved planetary missions -- the Galileo Jupiter Orbiter & Probe and the NASA/ESA International Solar Polar Mission -- on single Shuttle flights rather than two flights each, but will require a delay in the Galileo from 1984 to 1985, ISPM will remain scheduled for 1985. (NASA's Space Science Office says that modification of the spacecraft for combined launch will not pose difficult problems, particularly since they were originally planned as combined launches.)

The agency's decision was announced Thursday afternoon by Frosch, who said the decision was based on the "rapid escalation of estimated costs" for the three-stage IUS and on NASA's conclusion that there is "a very low probability that we can prepare a three-stage IUS in time" to conduct the Galileo Orbiter and Probe launches to Jupiter in 1984.

NASA cannot use the three-stage IUS for a 1985 Galileo launch because its thrust is not great enough.

The other option open to NASA, the use of a new twin-stage version of IUS (using two large motors instead of one large and one small one), would increase the flight time for the Galileo Orbiter from two to almost five years, push back the launch of the Galileo Probe to 1986 and necessitate "an unacceptable long gap in the scientific data" from the program. Moreover, adoption of the two-stage IUS would cause a "sharp rise" in the cost of both the planetary program and the IUS, Frosch said.

Although NASA in the past had rejected use of the Centaur for the Shuttle upper stage (including a specific "directive" from the House Appropriations Committee) on the grounds of cost and the complications of modifying the Shuttle, Frosch says that NASA has no choice but to go to that vehicle now to conduct the Galileo and ISPM.

"No other alternative upper stage is available on a reasonable schedule or with comparable costs," he said.

The NASA administrator did not provide details of the costs involved in the stage decision, but said that the agency has funds in its FY '81 and FY '82 budget to begin modifications of the Centaur, integrating it with the Shuttle, and making the "relatively minor changes" to launch facilities at Cape Canaveral to accommodate Centaur. He said the agency intends to contract with General Dynamics this spring for integration of Centaur into the Shuttle.

A year ago, the cost of Centaur's development was estimated at $390 million.

"The Shuttle/Centaur would satisfy our planetary mission needs and would offer both to commercial customers and to national security interests a highly capable launch vehicle with growth potential," Frosch said.

The NASA chief said the agency will discuss with the Air Force "the best means for providing upper stages" to meet U.S. needs "in the second half of the decade" and work with them to continue development of the two-stage IUS, which remains a need of both agencies.

Boeing is prime contractor for the two and three-stage IUS, with United Technologies the propulsion subcontractor. (DEFENSE DAILY, 1-19-81, pp. 74-75, Vol. 114, No. 10)

<> NASA submitted a $7.081 billion FY '82 budget request to the White House Office of Management and Budget, which pared $355 million, or 5 percent from the request, to $6.726 billion figure.

The original OMB cut in FY '81 was $307 million, or 5 percent, but the President later cut another $200 million from the agency in a budget reduction.

Most of the major cuts made in the FY '82 NASA budget request involved work towards providing a full-capability Shuttle system. (DEFENSE DAILY, 1-19-81, p. 73, Vol. 114, No. 10)

January 21: NASA has officially approved the continuiation of Voyager 2 on a trajectory which would take it to Uranus in 1986 after flying past Saturn this summer.

Under the approved plan, the spacecraft will encounter Uranus at a distance of 107,000 kilometers (66,000 miles) Jan. 24, 1986, making measurements and taking pictures as it speeds past and heads for a possible encounter with Neptune.

The Uranus encounter will provide the world with its first close-up look at that planet.

The decision to fly past Uranus is, in effect, a decision to retain the present trajectory. If agency officials had decided against a Uranus encounter, then a retargeting of the Voyager 2 would have been required.

Voyager 2, launched Aug. 20, 1977, is a sister ship to Voyager 1, which recently provided a historical close-up encounter with the ringed planet Saturn. Voyager 2 flew by Jupiter in July 1979 and will encounter Saturn August 25, 1981. (MARSHALL STAR, 1-21-81, p. 4, Vol. 21, No. 19)

<> NASA Saturday successfully concluded its series of Space Shuttle Main Engine Main Propulsion Tests with a 10 minutes and 29 second static firing of the three-engine cluster at the National Space Technology Laboratories at Bay St. Louis, Miss. The agency termed the test highly successful. The test was conducted at 100 percent of rated power, with one engine shut down 236 seconds into the test as planned. The test also included gimballing of the nozzles and pogo simulation. The MPT program included more than one hour of engine firings.

Meanwhile at Johnson Space Center a three-day full-scale simulation of the first flight of the Space Shuttle Columbia was scheduled to begin yesterday. The prime crew for the mission, scheduled for March 14, John Young and Robert Crippen, will be in the mission simulator for the test. The test was slated to begin with a simulated liftoff at 6:30 AM CST Jan. 20 and conclude with a landing at 2:30 PM Jan. 22. (DEFENSE DAILY, 1-21-81, p. 93, Vol. 114, No. 12)

<> NASA's work toward development of a Space Station, seen for years as the next logical step in the space program beyond the Shuttle and Shuttle augmentation, will continue through FY '82 at very low level under the new FY '82 NASA budget. The Space Operations Center (SOC) concept developed by Johnson Space Center is now the prime Space Station candidate. The FY '82 budget contains some $5,000,000 to $7,000,000 for continuation of SOC Phase A studies. Initiation of the SOC Core and Modules is proposed for FY '84. (DEFENSE DAILY, 1-21-81, p. 93, Vol. 114, No. 12)

<> New World Construction, Inc., Titusville, Fl., has won a $79,657 contract to install an air ventilation system in the Vehicle Assembly Building at NASA's John F. Kennedy Space Center.

The contract, one set aside for award to a small business firm, calls for the fabrication, installation, and testing of an air ventillation system in the low bay of the VAB, the world's second largest building.

The changes provided by the new system will provide fresh air to a work area and upgrade the system's generator. (NASA NEWS RELEASE, No. 11-81)

January 22: Sen. Howard Cannon (D-Nev.), who has been closely associated with the space program almost from its inception, has called on the Senate to take up the question of U.S. space policy now that the country is about to enter the Space Shuttle era.

Cannon, former chairman of the committee responsible for the NASA authorization in the Senate, said he believes the United States should move ahead with the fifth Space Shuttle Orbiter; increase its investment in space science, space applications, and space R & D; encourage private sector investment in the space program; and move to meet the launch vehicle competition from abroad.

"We have invested heavily, and we have worked hard to attain a leadership position" in space, he said in remarks addressed to the Senate. "I would not like to see our position wither away. We should not walk away from the environment of space and leave it to others until such time as we understand fully its uses and its implications for our national well-being." (DEFENSE DAILY, 1-22-81, pp. 99-100, Vol. 114, No. 13)

<> Kennedy Space Center Workers are preparing for a major test of the Space Shuttle this morning - the loading of the Shuttle's fuel tanks with liquid oxygen and liquid hydrogen.

Although the test will begin three days later than originally scheduled, William Schick, chief of Shuttle prelaunch test and operations branch, insists the Shuttle can still be launched in March.

"We may be able to compress or do some testing in parallel to make up those three days," Schick said. "We look good at this time for mid-March."

Today's test will mark the first time the supercold fuels that power the Shuttle's three main engines have been loaded into the Shuttle's tanks. Engineers will carefully monitor for an ice buildup, Schick said.

Experts fear ice may cascade off the Shuttle's fuel tank, damaging the spaceship Columbia's fragile, heat-resistant tiles. Accordingly, they have taken a number of precautions to prevent icing, including insulation of the fuel tank and the installation of vapor catchers.

Just before an actual Shuttle launch, both the hydrogen and oxygen tanks will be filled at approximately the same time.

But for today's and Friday's test, the hydrogen tank will be filled one day and the oxygen tank the next day.

After both tests, the tank will be photographed with infrared and regular cameras to check for ice buildup. Then a team of six workers will spend an hour checking the tank and the Orbiter's tiles at five different levels.

Those who hope to catch a long-distance glimpse of the operation from Playalinda Beach will be disappointed.

The beach is closed today and is likely to remain closed Friday and Saturday.

NASA spokesman Rocky Raab said the only beach access road is being closed as a safety precaution.

The major Shuttle tests that remain include: loading of the hazardous hydrazine fuel that will power the Shuttle's two in-orbit engines, the on-pad firing of the Shuttle's three main engines, and simulated flights by the astronauts into and out of orbit.

Late Tuesday, NASA officials at the Johnson Space Center in Houston said astronauts and flight controllers ovecame a series of problems programmed into a simulated flight of the Space Shuttle Columbia.

The 54-hour simulation was designed to follow the same flight plan as the Shuttle's first orbital mission.

Malfunctions are introduced into the flight to give astronauts John Young and Bob Crippen and flight controllers practice in solving problems.

Officials said the programmed computer problems in Tuesday's test included a malfunction in one set of orbital maneuvering thrusters and failure of three inertial measuring units. (TODAY, by David Bailey, 1-22-81, p. 14A)

January 23: An area that might easily become a target for reduction in the NASA budget if the Reagan Administration carries its budget reduction pledge to NASA, but one that NASA believes is highly important, is the $300 million request in the FY '82 budget for Space Shuttle "Changes/Systems Upgrading."

This money is in fact a contingency fund to pay for potential unknown, but not unexpected, problems that may occur as the Shuttle nears the end of development and begins production and operational use. Availability of the funds allows the agency to budget the money in the most cost-effective manner without disrupting other elements of the program.

The probable need for the funds is indicated by the fact that the $150 million budgeted in FY '81 for this line item has already been earmarked for Shuttle development.

At the same time, if the money does not have to be used for unforeseen problems, NASA has identified certain areas of the Shuttle program where the money could be used effectively to enhance the Shuttle's capabilities. (DEFENSE DAILY, 1-23-81, p. 108, Vol. 114, No. 14)

<> NOAA, which was assigned the job of establishing the Operational Landsat Land Remote Sensing Satellite System, has been given a $264.8 million Satellite Services budget for FY '82, an increase of 182 percent from the $94 million FY '81 budget.

The bulk of the increase is the new line item for $123.8 million which will enable NOAA to establish a Landsat Operational System, based on an extension of the planned Landsat-D system being built for NASA. NOAA is spending about $1.2 million on Landsat planning in FY '81.

The other major NOAA satellite line item, Environmental Satellite Services, is funded at $118.1 million in FY '82, up from $78.1 million in FY '81. Funding provides for operation of the national environmental satellite system. Increases provide for a polar orbiting satellite system, reimbursement to NASA for launch vehicles and launch services, and initiation of the NOAA/NASA/DOD National Oceanic Satellite System (NOSS). The FY '82 NOAA budget reflects decreased cost of continuing the polar orbiting and geostationary satellite systems. (DEFENSE DAILY, 1-23-81, p. 108, Vol. 114, No. 14)

January 24: America's first Space Shuttle crew members said Friday they have confidence in the Orbiter Columbia and feel ready "right now" for their scheduled March 17 liftoff.

Astronauts John Young and Bob Crippen said NASA's new versatile spacecraft has pushed technology 10 years ahead and may let America build a space station within the decade.

"The Shuttle will enable us to do in space in the next five years what would take 20 to 30 years without it," Young said. "America needs a space station, and with the Shuttle, we can build it at one-tenth the cost."

Speaking to newsmen at Johnson Space Center in Houston, the astronaut's press conference was beamed via television to five other NASA centers, including Kennedy Space Center.

They were asked several questions about their confidence in the brand new and untested Space Shuttle. Unlike the former Mercury, Gemini and Apollo space programs, NASA will not launch unmanned test flights of the Shuttle.

"If we can be confident with anything, I believe it's this vehicle," Young said. "Obviously we think it's safe, or we wouldn't be doing it."

The program is three years behind schedule and has overrun cost estimates of about a billion dollars, largely because of problems installing silica tiles to protect the Shuttle from scorching temperatures of re-entry.

The tiles are four to five times stronger than they need to be.

Young said that in the next several weeks some 3,600 tests will be made on the vehicle.

One of those, a liquid oxygen fuel loading test scheduled for Friday, was canceled to allow the launch team some rest from Thursday's successful loading of the Shuttle's tanks with liquid hydrogen.

The supercold fuels power the Shuttle's main engines and will hurl the vehicle into space with more than 7 million pounds of thrust.

Instead of the fuel loading test, technicians successfully re-tested three Shuttle auxiliary power units Friday. The test loading of liquid oxygen will take place today, said NASA spokeswoman Leslie Vock.

The astronauts also talked about the tests they will make of the craft's flight systems, environmental control systems, and opening the vehicle's payload bay doors.

There also will be other more mundane tasks like "checking out the potty on board," Crippen said.

"It's a test flight to check all systems," he said. "We mainly want to get it up and get it back down. Most of our training is devoted to two phases, the launching and landing." (TODAY, 1-24-81)

January 26: Washington--Soviet Union launched 12 new spacecraft in the closing days of 1980, bringing the total number of Russian launches for the year to 89. In contrast, the U.S. launched 13 missions in 1980, nearly seven times less than the Soviets; a disparity that continues to concern U.S. space officials.

From the launch of Sputnik 1 on October 4, 1957, to the end of 1980, the Soviets logged 1,339 launches in which a payload at least achieved earth orbit. The U.S. has logged 587 launches.

Total number of Soviet spacecraft launched in 1980 is more than 100 because at least two of the 89 launches carried eight spacecraft and some other Russian launches carried piggyback payloads in addition to the primary spacecraft.

The 89 launches for 1980 is the third highest annual launch rate demonstrated by the Russians and continues the aggressive military launch pace characteristic of the Russian space program during the past several years. During 1975 the Soviets also launched 89 missions. In 1976, 1977, 1978 and 1979 they launched 99, 98, 88 and 87 missions, respectively.

Ten of the missions in 1980 were to the Salyut 6 space station. Six of these were manned Soyuz flights and other four Progress tankers. The Soyuz 35 crew established a new manned flight endurance record of 185 days aloft during the course of this manned activity.

Of the 12 new spacecraft launched between Dec. 16 and Dec. 26, when Soviet launch activity for the year terminated, two were military photo reconnaissance satellites, eight were military communications spacecraft and two others were television relay and scientific mission oriented. (AVIATION WEEK & SPACE TECHNOLOGY, 1-26-81, p. 61, Vol. 114, No. 4)

<> The two astronauts who will fly the first Space Shuttle mission told a press conference in Houston Friday that they believe that the risks in the flight have been minimized, that they have full confidence in the Space Shuttle vehicle and the Shuttle team, and that they are ready to make the flight now.

Veteran astronaut John Young, who will command the mission, reported that he and his copilot Bob Crippen were "very pleased" with the just-completed three-day full-scale simulation of the first Shuttle flight which included more than 42 hours in the simulator for the planned 54-hour flight. He said that some 40 problems were encountered in the simulation and all were solved in real time. That capability is what makes space flight "such a great thing in this country." He praised mission control for a "terrific job."

Asked again about the risks in the flight, Young pointed out that extensive tests have been designed to cover every possibility imaginable. He said it is the nature of the space flight business to find problems and fix them.

"If there is a vehicle we can have confidence in, it's this vehicle," he said on a nationwide hookup to several NASA centers.

The astronaut, who has flown both Gemini and Apollo missions, said the Shuttle has a 1.4 safety margin, which is a "higher safety margin than any airliner."

"We obviously think it is safe or we wouldn't be doing it," he said.

Asked about the NASA decision not to include the Tile Repair Kit on the first flight and the affect that would have on the mission, Crippen said that he believes that NASA took the right course in placing the emphasis on making sure that the tiles will work.

Young added that the reason that the repair kit won't be on the first flight is simple: it's not ready. He noted that inclusion of the kit would entail a weight penalty of about 1000 pounds.

Asked about the possibility of flying the Shuttle unmanned in the first flight, Young said it would cost an additional $250-$500 million and delay the program for at least an additional year.

Questioned about the objectives of the first flight, Crippen said that if they can "get up and down even in one day" they would satisfy 95 percent of the mission's objectives. Another important objective, he said, will be to open the Shuttle's payload bay doors.

He added that the Shuttle vehicle is "looking real good and John and I are looking forward to a good flight."

Questioned about a purported 5-6 week delay in the first Shuttle flight beyond the March 14 date, Young said that such a delay would probably have to involve a roll-back of the Shuttle to the VAB, which he does not anticipate. He said as far as he knows, the Shuttle is only "two or three days" behind schedule for a launch March 14. (DEFENSE DAILY, 1-26-81, p. 116, Vol. 114, No. 15)

<> Former Rep. Olin E. ("Tiger") Teague (D-Tex.), a long-time chairman of the House Committee on Science & Technology and a leading congressional supporter of the space program, died Friday of renal failure and a heart attack at the National Naval Medical Center in Bethesda, Md. Teague, who was 70, served in the Army during World War II, was in combat 6 months, wounded a number of times, decorated eleven times and was discharged as an infantry colonel in 1946. Teague was elected to Congress in 1946 and served 16 terms before retiring in 1978. (DEFENSE DAILY, 1-26-81, p. 117, Vol. 114, No. 15)

January 27: The accident that damaged a Delta rocket booster last week cost millions of dollars and will "definitely" delay the launch of a weather satellite, NASA officials said Monday.

"It may be a total loss," said NASA spokesman Rocky Raab, who said the accident is still being investigated by a six-man assessment team.

The mishap occurred Thursday when the door of a rotating launch tower slammed into the first stage of the Delta rocket. The 74-foot rocket stage swayed six feet, almost toppling before it returned to an upright position.

Impact from the collision left a six-inch tilt in the rocket's inter-stage adaptor, a hollow 15-foot tube that links the first and second stages. Fuel tank connections in the rocket engines also appear to be damaged, Raab said.

The rocket's second and third stages were not in place at the time of the accident. A fully assembled Delta rocket is valued at about $22 million.

The door that collided with the rocket had been closed accidentally during the night, Raab said. Investigators have not revealed the name of the worker who closed the door.

Raab said the accident will "definitely" delay the planned March 12 launch of a Geostationary Operational Environmental Satellite (GOES-E). The weather satellite is the second in a series of satellites launched by NASA for the National Oceanic and Atmospheric Administration.

During hurricanes and tornadoes the GOES satellites will measure atmospheric temperatures and moistures at various layers for a three dimensional profile of severe storms. (SENTINEL STAR, 1-27-81)

<> Kennedy Space Center engineers are inspecting a leaky seal on the external tank of Space Shuttle Columbia to determine if repairs will delay its scheduled March launch.

Gas that escaped during a weekend tanking operation or moisture in the air likely caused the erosion of the tank's foam insulation used to keep the tank from overheating and improve its aerodynamics, engineers said Monday.

"The seal didn't fit good," said Terry Williams, division chief for mechanical systems in shuttle launch operations, "and that's where we had damage to the foam insulation."

But Williams stressed that fixing the tank "will be a one-man, simple operation where you spray in primer and then patch in bonding matter and put some paint on over that."

The damage occurred when aerospace workers were loading liquid oxygen into the shuttle tank Saturday. The test left an area at the top of the 154-foot high tank damaged.

Engineers have not pinpointed the problem and until the damage is assessed, cannot predict if the first launch will have to be pushed back.

The damage could alter the tank aerodynamically and cause a poor seal when the tank is loaded for the on-pad firing of the shuttle's engines next month, Williams said. (HUNTSVILLE TIMES, 1-27-81)

<> Rockwell International has named James A. McDivitt, a former astronaut, vice president, strategic management. (THE NEW YORK TIMES, 1-27-81)

<> Reagan Administration budget director Dave Stockman, who earlier included NASA among agencies and programs that could take a "one-third" budget cut, appeared to reverse his course last week by praising the space program as a valuable contributor to American technology and a source of inspiration to the public.

The Space Shuttle, which accounts for half of the NASA budget, is considered fully exempt from any potential cuts, given its importance for planned defense and intelligence missions which President Reagan has singled out as particularly important.

The space program also received a highly favorable report from the Reagan space transition team.

Among the proposals for an initial trimming of the Federal budget is a 2 percent across-the-board in non-defense programs, which could represent $134 million out of NASA's $6.7 billion in FY '82 budget.

Reagan is expected to submit his revised FY '82 budget next month. (DEFENSE DAILY, 1-17-81, p. 127, Vol. 114, No. 16)

<> NASA-Kennedy has awarded a $3.9 million contract to Frank Briscoe, Inc. to activate and modify the High Bay 2 at the Orbiter Processing Facility. Work will include providing ground support equipment for the Orbiter hydraulic system and the platform for installing the Thermal Protection System and providing access to the Orbiter's payload bay doors. Work is expected to take 14 months. (DEFENSE DAILY, 1-27-81, p. 128, Vol. 114, No. 16)

January 28: A low-level study of a revolutionary space launch system that could launch "telephone pole-size" payloads of up to one-ton into orbit around the Earth is being conducted by NASA's Lewis Research Center, Cleveland.

The concept for the new system, an electromagnetic rail launcher, has been around for some 60 years, but has become of renewed interest because of recent laboratory advances which have increased the potential velocity of the system. (The electromagnetic rail launcher is akin to the "mass driver" proposal of space colony advocate Prof. Gerard K. O'Neill.)

Laboratory tests using a tiny electromagnetic rail system able to accelerate a few grams of material have achieved velocities of 10 kilometers per second, about half of what would be needed in an operational space launch system.

A project official noted, however, that an actual operational space launch system is probably "20, 30, 50 years away."

He estimated that such a system might cost on the order of $20 billion, with much of the cost involved in providing the large amount of electrical power needed.

The electromagnetic rail launcher would be like a "lightning bolt," generating a massive amount of electrical power in approximately one second. Once built, the system could be used for multiple launches per day. One application might be to launch structural sections of a Space Station or a Space Base. The system could potentially provide enough materials for construction of a station structure in a matter of days.

The payload would have to be accompanied by a solid rocket, which would fire to circularize the orbit.

Lewis has been working on the concept for about a year, with about 1-1/2 man years of effort. A small increase is hoped for, but budget dependent.

The center is currently negotiating a contract to Battelle Columbus Laboratories to study the feasibility of electromagnetic rail launchers for space launch. Battelle will look for problems that would discourage NASA from proceding with the study, as well as provide recommendations concerning future investigations. The study will run about a year. (DEFENSE DAILY, 1-28-81, p. 133, Vol. 114, No. 17)

<> Kennedy Space Center engineers found additional problems caused by last week's loading of supercold oxygen and hydrogen into the Space Shuttle's fuel tank as they continued their inspection of the tank Tuesday.

Most serious was a 2-foot by 4-foot area on the tank where the inner coating of insulation has actually come unglued from the tank's aluminum surface.

Officials had hoped if any debonding occurred, it would be between the outer coating of foam insulation and the thin inner coating of insulation, not between the inner coating and the tank's aluminum skin.

An initial assessment indicated it will take a week to repair the area, said Brian Grigsby, section chief for external tank and solid rocket booster mechanical systems.

Workers will lower floats -- plywood platforms suspended by ropes -- into the hard-to-get-to area, near where the Orbiter's nose is attached to the external tank.

But fixing the area is not as much a concern to officials as what caused the debonding.

"Now we have to determine why it debonded," Grigsby said. "We're hoping it's something simple like a bad batch of adhesive."

Officials are worried because the tank must be loaded two more times: once for a 20-second test firing of the Shuttle's engines and once again for liftoff.

If engineers cannot determine why the insulation came unglued, there's no guarantee it won't happen again.

Because the insulation protects the Shuttle from the heat of ascent and smooths its ride aerodynamically, the insulation must be nearly flawless.

Grigsby said fixing a 1 1/2-foot-long crack on the lower section of the tank will be relatively easy. Workers will use a gun similar to a handyman's caulking gun to apply additional insulation.

Engineers are also trying to determine why an area where oxygen vents from the top of the tank eroded insulation. The best method to fix that area is still under consideration, Grigsby said.

The areas must be repaired before the tank is reloaded for the on-pad firing of the Shuttle's three engines, still scheduled for Feb. 10. Grigsby said workers will do their best to make the repairs so that it will delay neither the test firing nor the March 17 launch date. (TODAY, 1-28-81)

<> The Space Shuttle's External Tank was filled with propellants for the first time during a tank-detank test last week at the Kennedy Space Center. The test was successfully completed Saturday night, bringing the launch of Columbia one step closer.

The test, which began last Tuesday was designed to check out the ground and vehicle's hydrogen and oxygen systems, according to Pete Leberte, Deputy Manager, Shuttle Engineering and Major Test Management Office.

Marshall engineers monitored the tanking from the HOSC. Leberte said, "Although we have simulated the tanking and detanking over 30 times, this was the first chance we've had to actually monitor the vehicle with the cryogenics aboard."

Leberte said, "All the test objectives were met without any major problems." He added, "We did find a couple of problems with procedures and few leaks in the ground system, but they are not expected to cause delays in the program." (MARSHALL STAR, 1-28-81, p. 1A, Vol 21, No. 20)

January 29: Jones Machine and Welding Shop, a Merritt Island, Fla., company, has been awarded a $135,995 contract to fabricate 17 shoe retainer mechanisms for use at NASA's John F. Kennedy Space Center.

The shoe retainer mechanisms are part of the eight posts that attach the 4.4 million pound Space Shuttle to the Mobile Launcher Platform. Eight giant bolts hold the twin solid rocket boosters to the posts until lift off, when the bolts are exploded, freeing the Shuttle for flight. At lift off, the shock-absorbing springs inside the mechanisms allow the shoes to move and prevent them from being blasted away from the launch platform.

The shoe retainer mechanism will also be used at Vandenberg Air Force Base in California on the launch deck in future Space Shuttle launches.

The contract, one set aside for award to small business firms, calls for delivery of the mechanisms by July 15, 1981. (KSC NEWS RELEASE No. 17-81, 1-29-81)

<> NASA's John F. Kennedy Space Center has awarded a $233,670 contract to David Boland, Inc., a Titusville company. The contract, one set aside for award to a small business firm, calls for modification of an existing building at KSC.

The building, currently used for maintenance and storage, would be converted into a series of shops to support tile processing. The tiles, which make up a major portion of the thermal protection system of the Space Shuttle orbiter, are processed by Rockwell International employees for installation on Space Shuttle orbiter.

The contract allows 60 days for the work to be completed. (KSC NEWS RELEASE No. 16-81, 1-29-81)

<> Chairman Don Fuqua (D-Fla.) of the House Science & Technology Committee indicated yesterday that the real increase in the NASA budget in FY '82 was long overdue and that the agency should not be a target of Reagan Administration budget-cutters.

While the Congress has to fight double-digit inflation, he told the NASA leadership at budget hearings, it must make certain that it doesn't "mortgage the nation's future progress" by taking funds from an agency such as NASA which contributes to much of the nation's technology base. He said he agrees with former NASA Administrator Frosch about the need to "revitalize" NASA.

He said there is growing concern about what may happen to the NASA budget, and that this is something that "Congress must grapple with." (DEFENSE DAILY, 1-29-81, pp. 140-141, Vol. 114, No. 18)

<> A delay in the launch of the Space Shuttle is foreseen following the development of cracks in the insulation of the vehicle's External Tank earlier this week.

About 50 square feet of the spray-on foam insulation on the Space Shuttle Columbia's External Tank developed cracks following the first propellant loading and unloading test of the tank which was concluded Tuesday at Kennedy Space Center.

NASA's Acting Administrator Dr. Alan M. Lovelace said yesterday that if the cracking is confined to the surface of the foam insulation, which is employed to prevent icing of the aluminum ET structure as well as to provide thermal insulation, then it is not a major problem and is "easily correctible."

In such a case, he estimated it would take 7 to 10 days to repair the insulation, which would delay the Shuttle Flight Readiness Firing now scheduled for mid-February and probably push back the first Shuttle launch from March 17 to the end of March.

L. Michael Weeks, Deputy Associate Administrator for Space Transportation Systems, reported to the House Science & Technology Committee that the agency had a similar cracking problem 6-8 weeks ago on the instrument pylons on the hydrogen tank. He said the agency solved that problem by making smaller pieces for the structure, and intends to do the same thing on the cracked portion of the ET's spray-on foam insulation.

The cracking of the foam insulation was attributed to the temperature and environmental changes in the tank caused by the extremely low temperature LOX/liquid hydrogen propellant. (DEFENSE DAILY, 1-29-81, p. 140, Vol. 114, No. 18)

January 30: Air Force Secretary Hans Mark, called by some the leading candidate for NASA Administrator, is one of the persons that Sen. Jack Schmitt (R-N.M.), chairman of the Senate Space Subcommittee, could support for the job. However, reports that Mark is the single choice of the senator are not correct. Schmitt has urged the Administration to look for a NASA Administrator who not only has the technical knowledge of recent NASA chiefs but also a knowledge of Capitol Hill.

Mark, who headed R & D for the Air Force before getting the top job, is a former director of NASA's Ames Research Center, which developed the concept of the Thermal Protection System for the Space Shuttle. Mark said earlier this year that he believes that the nation needs a minimum of five Space Shuttles. At the same time, he has advocated development of a new expendable launch vehicle for defense needs. (DEFENSE DAILY, 1-30-81, p. 150, Vol. 114, No. 19)

<> The launch of a weather satellite will not be delayed because of the accident that dented a Delta rocket last week. And the dented first stage is being sent back to the factory for possible repairs, a NASA spokesman said Thursday.

The launch of the GOES-E mission on schedule March 12 is possible because of the substitution of the first stage of another Delta rocket. A first stage was ready and waiting in a Cape Canaveral Air Force Station hangar for the June launch of an RCA communications satellite.

Kennedy Space Center officials reported at first that the run-in the Delta rocket had with its gantry on Jan. 22 might render the multi-million dollar first stage useless. The booster however, is being sent back to the McDonnell Douglas Astronautic Co.'s Huntington Beach, Calif., factory for inspection and possible reuse.

As soon as the tottering rocket was secured in place, a board of review went to work to determine the cause and extent of the accident. The Board is headed by Andrew J. Pickett, manager of the advanced planning and technology office.

A KSC spokesman reported that "the investigation board is actively pursuing the cause of the mishap and has not yet completed its investigation for its final report...but corrective actions have been incorporated into the Delta processing operations."

Blame for the accident has not yet been assigned.

The KSC spokesman said that processing of the new Delta will begin today with the erection of the first stage. It will continue next week, he said, with the mounting of the nine assist rockets. By Feb. 16, it is hoped the mission will be back on schedule. (TODAY, 1-30-81)

January 31: We'd have been well advised at least to have mentioned Explorer I last week when we wrote about the 10th anniversary of the Apollo 14 launch and the 20th anniversary of chimpanzee Ham's flight on a Mercury-Redstone.

The same day - January 31 - but three years earlier than Ham's ordeal, the first U.S. satellite lifted off Pad 26A at the Cape atop a Jupiter C rocket and achieved earth orbit.

It transmitted back to earth its discovery of a radiation belt (named after scientist James Van Allen) it hung tough for a dozen years before re-entering earth's atmosphere.

A few readers wanted to know why we'd slighted that historic space "first."

Well, guys, we really didn't. In fact, when Explorer I had its 20th anniversary in 1978, we celebrated it with a memory by Cocoa Beacher Bob Murkshe. When the satellite was launched he was RCA's manager of metric optics.

One of the great rocket pioneers, the late Dr. Hans Gruene, was sitting in the blockhouse at the corner of the launch console. In front of him was a pile of papers. As the rocket roared into space, recalled Bob, "He did real-time computation of the trajectory with a slide rule!" Why didn't he use a computer, you ask? Ha! Who had a computer? Why, that little battery-operated device with pushbuttons that you take shopping with you would have been worth its weight in diamonds then! (Milt Salamon in TODAY, 1-31-81)

January 1981: NASA's Kennedy Space Center has awarded its largest contract ever to a small business to the W & J Construction Corp., Cocoa, Fla. The $6,689,666 agreement is for work on Pad B of Launch Complex 39 which will be used to launch the Space Shuttle in 1982, when the Shuttle becomes operational.

Under the fixed-price contract, W & J Construction, which has had previous Kennedy Center contracts, will install 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. Work is expected to be completed in 20 months. Pad B of Complex 39 is basically a duplicate of Pad A, the pad to be used to launch the first Shuttle flight.... Pad B will be used when the Shuttle begins regular operations. Complex 39 was the launch site for the Apollo moon landing missions and is being modified for Space Shuttle flights. (NASA ACTIVITIES, 1-81, p. 6, Vol. 12, No. 1)

<> Engineers at the Kennedy Space Center have begun a "grow your own" exploratory project designed to cut down on energy costs. Funded by NASA's Office of Energy Programs, the $20,000 study is aimed at finding an energy efficient method of using various plant species for use as energy sources. The study will examine plant utilization by direct combustion, digestion to methane and fermentation to alcohol. The latter is receiving the most attention at the present time, using sugar cane or cassava. The plants will be used to produce alcohol for use as gasohol or in a specially altered car which will run on pure alcohol. (NASA ACTIVITIES, 1-81, pp. 17 & 18, Vol. 12, No. 1)

<> The KSC Awareness Report is a new daily on-center radio program, the first of its kind at a NASA Center. The innovative broadcast features news reports on everything from the latest payload lofted into orbit to the problems of preserving historic but deteriorating launch site structures. Produced by the Education and Awareness Branch of the Kennedy Space Center Public Affairs Office, the broadcast airs every weekday morning from 6 to 8 at 1610 KHz on the AM radio dial -- the same frequency used later in the day to transmit visitor information to tourists driving onto KSC and Canaveral National Seashore. (NASA ACTIVITIES, 1-81, pp. 17 & 18, Vol. 12, No. 1)

February 2: Rep. Edward P. Boland (D-Mass.) has been reelected chairman of the HUD-Independent Agencies Subcommittee of the House Appropriations Committee, the unit responsible for the NASA appropriation in the House. The makeup of the subcommittee, because of GOP gains in the November election, has been shifted from 7/3 for the Democrats to 5/3. (DEFENSE DAILY, 2-2-81, p. 159, Vol. 114, No. 20)

<> Emphasis of the Advanced Programs part of the NASA Space Transportation System budget, funded at $10.8 million in FY '82, will be on four major categories:

1) Unmanned Low-Altitude Space Platforms.
2) Unmanned Geostationary Platforms.
3) A Manned Space Operations Center.
4) Various elements of orbital test and transportation to support the above.

The FY '82 budget provides funds to continue design studies to define platform and power support systems and definition studies of geosynchronous platforms and the Space Operations Center concept. A Shuttle-serviced, permanent manned low-altitude facility continues under study. Definition studies will also be conducted on large structures, satellite servicing, and advanced transportation options. (DEFENSE DAILY, 2-2-81, p. 158, Vol. 114, No. 20)

<> Cape Canaveral -- Plan to phase out expendable launch vehicles has undergone a full reversal in the past few months and there is a belief here that the McDonnell Douglas Delta launcher will remain in use for years to come.

A combination in the slippage of the commercial operation of the space shuttle and strong demand by contractors to use space as a communications relay medium has prompted the National Aeronautics and Space Administration to take two major steps:

*Reorganize the management structure of the Kennedy Space Center to recognize the growing requirement for Delta and General Dynamics Atlas Centaur launches.

*Refurbish a second Delta launch pad to increase the launch rate to 10 per year from this facility.

Charles D. Gay, director of deployable payloads operations, said: "I don't know if we'll ever do away with Delta."

Under the center organization in effect prior to Jan. 5, part of Gay's operations involved deployable space shuttle payloads. This was done in anticipation that all payloads would do into shuttle.

The refurbishment of Pad 17B is being done so it can launch the Delta with Castor 4 solid propellant strap-on motors. Hoist capacity is increased from 25,000 to 40,000 lb., decks are being strengthened and cutouts enlarged to accommodate the larger solids. Previously, the Delta was launched from this pad with Castor 2 strap-on solid motors.

There are firm commitments by contractors to use Deltas through 1985 from the Cape Canaveral launch complexes and through next year from the Western Test Range at Vandenberg AFB. Atlas Centaur launch commitments go through 1984. (AVIATION WEEK & SPACE TECHNOLOGY, 2-2-81, p. 36, Vol. 114, No. 5)

<> Cape Canaveral -- National Aeronautics and Space Administration has convened a board of review to determine the impact of an accident in which a gantry door struck in the interstage adapter on a Delta launch vehicle on Pad 17A here.

The accident occurred on Jan. 22 as the tower was being moved to permit installation of three Castor 4 solid propellant strap-on rockets on the Delta. Force of the impact caused two of three bolts securing the launcher to pull free from their mounts and the vehicle to tilt several feet.

The Delta was scheduled to launch a geosynchronous operational environmental satellite (GOES), a weather payload, Mar. 12.

The first stage of the Delta was returned to the factory for refurbishment. It was placed with the first stage of a vehicle that was scheduled to launch the RCA-D satellite June 25. (AVIATION WEEK & SPACE TECHNOLOGY, 2-2-81, p. 36, Vol. 114, No. 5)

<> To the Editors:

With the launching of the space shuttle this year, Americans will once again be migrating to a new frontier. As in California more than a century ago, the colonization of space offers the same hope for new resources, new industry and a renewed sense of national spirit. (TIME, 2-2-81)

William N. Ellis
Huron, Ohio

Some people loudly object to NASA and the shuttle, saying the money should be spent elsewhere. From the beginning of the manned space program in the late 50's until the end of Project Skylab in 1979, NASA spent approximately $60 billion. This sounds like a lot until one considers that today $60 billion would last four months in the Department of Health and Human Services. (TIME, 2-2-81)

Kenneth P. Myers
Houston, Texas

February 3: The first launch of the Space Shuttle, previously scheduled for March 17, has been delayed to the week of April 15th at the earliest because of "a number of minor problems" encountered during the first integration of the Shuttle and its ground systems at Launch Complex 39A at Kennedy Space Center.

The most serious of the problems was the debonding of the spray-on foam insulation on two areas of the Space Shuttle's External Tank during fueling and defueling. One area is 7-by-8 feet and the other, 4-by-4 feet.

At the same time, NASA has rescheduled the critical Flight Readiness Firing (FRF) of the Shuttle Columbia's three main engines from Feb. 10 to Feb. 16. The 20-second firing has to be successful if the early April launch is to be made.

The rebonding of the spray-on insulation of the ET will not be made prior to FRF, NASA said, but well before the scheduled launch date. (DEFENSE DAILY, 2-3-81, p. 164, Vol. 114, No. 21)

<> The space agency yesterday delayed the maiden launch of the space shuttle Columbia from March 17 to the week of April 5 because of the failure of insulation on part of the ship's large external fuel tank.

The delay is another in a long series of launch postponements caused by a variety of technical problems. The first orbital flight of the reusable space transport is more than two years behind its original schedule.

The insulation problem was discovered after the two-section, 154-foot-tall tank was loaded with more than a half million gallons of frigid liquid oxygen and liquid hydrogen 10 days ago. (THE WASHINGTON POST, 2-3-81)

February 4: The Multi-Spectral Scanner on the Landsat-3 spacecraft has failed after 22 months in space, leaving only the MSS on Landsat-2, which was launched six years ago, to provide the multi-spectral data until Landsat-D is launched in the later half of 1982.

NASA blamed the Landsat-3's MSS problems on a failure in the multiplex digitizing circuits. It said that the spacecraft's MSS data has degraded "below the point of general operational usefulness" and that all attempts to correct the problem had failed. Landsat-3's Return Beam Vidicon Camera continues to operate. The spacecraft was launched in March 1978 and had a one-year design life. (DEFENSE DAILY, 2-4-81, p. 174, Vol. 114, No. 22)

<> NASA's Kennedy Space Center is modifying a second Mobile Launcher Platform to adapt it for future Space Shuttle launches. The center has awarded a $2 million contract to K & S Electric, Inc. to make mechanical and electrical modifications to Mobile Launcher Platform 2, a transportable launch base that was previously used for Saturn/Apollo missions. (DEFENSE DAILY, 2-4-81, p. 176, Vol. 114, No. 22)

<> Third-term congressman Rep. Ronnie G. Flippo (D-Ala.) has been elected chairman of the Subcommittee on Space Science & Applications of the House Science & Technology Committee, succeeding Rep. Don Fuqua (D-Fla.), who has headed the subcommittee for eight years.

Fuqua, who continues as head of the full committee, has shifted to the chairmanship of the committee's Subcommittee on Energy Development & Applications. (DEFENSE DAILY, 2-4-81, p. 177, Vol. 114, No. 22)

February 5: Among more than 100 possible cuts that could be made in the FY '82 budget, the Congressional Budget Office has included the elimination of the fourth Space Shuttle Orbiter, at an estimated savings of $583 million.

However, the Reagan Administration, aware of the military potential of space and other needs, is expected to exempt the Shuttle from its budget cuts.

NASA flight projections, of course, not only show that three vehicles are not adequate, but that four will not be enough.

CBO noted that the fourth Orbiter is estimated to cost $979 million, of which $51 million has been authorized for FY '81. In addition, other costs of the fourth Orbiter cannot be separated from the common costs of the Shuttle production programs. It noted that when NASA deleted the planned fifth Orbiter, it estimated the savings to be $365 million, or 63 percent of the estimated total costs for that vehicle. Sixty-three percent of $979 million is $583 million.

CBO noted that if one of the three Orbiters became inoperable and the Shuttle flight schedule were maintained, DOD would have to purchase about $100 million worth of expendable launch vehicles to conduct its "critical missions." An alternative, it said, would be for the military missions to be given priority over civilian flights on the remaining Orbiters. (DEFENSE DAILY, 2-5-81, p. 180, Vol. 114, No. 23)

February 7: Hoping to make a name for their city, Titusville officials will hold a pre-Space Shuttle launch party for the nation's media and political heavyweights.

The only problem that has cropped up so far has been the date to be engraved on the 1,000 invitations.

Party planner Donn Searle said it's impossible to know the date of the party because NASA doesn't know exactly when the launch will be.

"We decided to put 'the afternoon preceding the launch of the Space Shuttle Columbia,'" Searle said.

Among those to be invited to the executive bash will be all U.S. representatives and senators in town for the launch, ranking military leaders, Gov. Bob Graham and the rest of the Cabinet, local officials and reporters from the big three television networks, foreign press and news wire services.

The event is being sponsored by Titusville city administrators with help from the Titusville Area Chamber of Commerce and the North Brevard Development Commission. (TODAY, 2-7-81, p. 2B)

February 9: Brown & Associates Management Services Inc., a Titusville, Fla. firm, has been awarded a $321,579 contract to continue keypunch services for a second year at NASA's John F. Kennedy Space Center. The first year contract was for $286,959 bringing the two-year total to $608,538.

The contract, one set aside for award to a small business firm, will provide the major portion of keypunch and keyverify support services for NASA and NASA contractors at Kennedy Space Center.

The contract provides continued employment for 13 keypunch operators and two supervisors in the Central Instrumentation Facility. (KSC NEWS RELEASE NO. 28-81, 2-9-81)

February 10: NASA's John F. Kennedy Space Center has awarded a $1,298,834 contract to a joint venture made up of three Central Florida firms, for the manufacture of 19 hypergolic control and checkout panels.

Each company will fulfill an aspect of the contract. Precision Fabrication and Cleaning, Sharpes, Fla., will fabricate and clean the panels; Olson Electric Co., Daytona Beach, Fla., will do the electrical work and Specialty Maintenance and Construction, Lakeland, Fla., will supply materials and make frames for the panels.

The hypergolic panels will be used at Vandenberg Air Force Base in California, to service the in-orbit propulsion systems of the Space Shuttle. Hypergolic propellants ingnite upon contact and are used for the orbiter's secondary propulsion and attitude control systems. The hypergol control and checkout panels will be used to drain and clean the hypergol modules during ground servicing.

The contract calls for the work to be completed in one year. (KSC NEWS RELEASE NO. 26-81, 2-10-81)

Feburary 11: The following is the membership of the House Subcommittee on Space Science & Applications, responsible for all but the aeronautics portion of the NASA budget, in the new Congress:

*Democrats: Ronnie G. Flippo (Ala.), Chairman; Bill Nelson (Fla.), George E. Brown, Jr. (Calif.), Maryilyn Lloyd Bouquard (Tenn.), and Ralph M. Hall (Texas).

*Republicans: Harold C. Hollenbeck (N.Y.), ranking minority member; Raymond McGrath (N.Y.), and Bill Lowery (Calif.). (DEFENSE DAILY, 2-11-81, p. 215, Vol. 114, No. 27)

<> "The 1980's promise to be a decade of significant progress in international space cooperation," stated Dr. Alan M. Lovelace, acting NASA Administrator, in recent testimony to the U.S. House of Representatives Committee on Science and Technology.

"We will see the culmination of many cooperative projects begun in the 1970's, and will be laying the groundwork for future cooperative endeavors," he said.

"Last year saw tremendous progress in the Shuttle main engine program," Dr. Lovelace said. "We have now accumulated over 105,000 total test seconds, having completed single engine certification late last year, and three-engine cluster firings early this year. Future work will continue to expand the operating envelope both in terms of thrust and engine life." (MARSHALL STAR, 2-11-81, p. 4, Vol. 21, No. 22)

February 12: 2-D. Mr. Hollinshead said that the KSC list of VIP invitees for STS-1 launch had been compiled and that the gross number was less than 400 against a quota of 300. Those who cannot be accommodated will be given car passes for the Parkway site.

Tours and visitors to the VIC continue to exceed previous marks with this February being seven percent above last year.

2-E. Mr. Page reported on STS-1 vehicle status. He said that hypergolics are on board and that his desire is to keep it loaded rather than drain and refill. He is negotiating this position with Safety. He also reported that the most recent inspection showed that there was very minor tile damage -- 1 to 4. He also stated that the prospects are marginal for the simulated FRF scheduled for February 12.

There are some problems with SAIL software. The FRF is scheduled for February 17 with the TRR scheduled for two days before the completion of the simulated FRF. Mr. Page also discussed the likelihood of having to install microphones in the nose cone of the external tank to determine vibration experienced during the tanking process.

2-F. Mr. Walton said that the Comstar should be erected on February 10 and that launch on February 19 still looks good. He also reported that there was a problem with AC-56 launch vehicle which may require a destack. He also reported on the status of the Delta-GOES. They are reworking the operating procedures and have instituted a requirement that all operations will be performed with an observer in the block house.

There are conflicts within the schedule for launch of this vehicle which will probably cause a slip from March 12 to March 19. (EXECUTIVE STAFF NOTES #5-81, 2-12-81, p. 2)

<> NASA's John F. Kennedy Space Center has awarded a $489,700 contract to the Holloway Corp. of Titusville, to remodel part of a building for computer space for future Space Shuttle users.

The contract, one set aside for award to a small business firm, calls for the renovation of the fourth floor of the Operations and Checkout Building in the KSC Industrial Area. False flooring and partitions in four rooms will be replaced with new flooring, wiring, air conditioning and a fire detection system.

The area will be made suitable for companies to house Spacelab experiment test and checkout equipment. The work will be completed in 185 days. (KSC NEWS RELEASE NO. 32-81, 2-12-81)

February 13: Officials of Rockwell International said yesterday that they are not looking at a cutoff of the Space Shuttle's Solid Rocket Boosters in planning for the Space Shuttle launches, that they assume, that once the solids ignite, they will continue to burn. Under questioning, they also said that if for some reason the SRB's cannot be separated from the Orbiter, the Shuttle cannot make orbit. (DEFENSE DAILY, 2-13-81, p. 229, Vol. 114, No. 29)

<> "Blacks are a little like the space program - very few people realize how much we owe to their contributions," says J. Diggs, KSC's Chief of the Opportunity Program Office.

Shedding light on those contributions is the idea behind the annual observance of National Afro-American History Month. The theme for the 1981 observance is "Black History: Role Model for Youth." KSC's tribute to Blacks, sponsored by the Equal Opportunity Advisory Committee, ends today.

Special events held this week included an exhibit of African art and artifacts, a special "soul" food menu in the Headquarters cafeteria, and the highlight of the week, a program featuring Dr. Julian Earls of Lewis Research Center as guest speaker.

Dr. Earls spoke to the theme of this year's observance, outlining the accomplishments of several notable Blacks. He emphasized that these Black Americans serve as outstanding role models for virtually anyone, but especially to the youth of this country, who are in need of recognizable role models. (SPACEPORT NEWS, 2-13-81, p. 4, Vol. 20, No. 4)

Feburary 17: Dr. Stephen Gorove of the Ole Miss law school is an expert on how domestic and international law applies to outer space.

He has published two books on space law - the most recent being "The Space Shuttle and the Law" - and helps put out the The Journal of Space Law, the only journal in the world devoted exclusively to the legal problems arising from trips beyond our world.

"Really, the launching of the space shuttle will probably be the most significant event that has taken place since the beginning of the Space Age," Gorove said.

"It is going to open up my field - insurance, legal problems, criminal jurisdictions, civil liability. It's an enormous field which is opening up entirely new possibilities for government and industry."

Gorove said the thorniest question of law, as it applies to the shuttle, is when and where the craft is considered a spaceship and where it might be considered an airplane.

"Space law should be applied to the shuttle," he said. "In the current state of the technology, it is a spacecraft. If it is going to someday in the future fly as an aircraft flies, then we will have to take another look at it."

The question of spacecraft or airplane is important because different laws apply to the two types of vehicles, he said.

Space law is set down in four principal treaties, which set jurisdictional boundaries and liability limits and help officials deal with problems of liability in case of accidents and in insurance coverage, Gorove said.

A fifth treaty - the moon treaty - is currently being considered by the United States. (DAILY PRESS, [Newport News, Virginia], 2-17-81)

<> A crucial countdown rehearsal began tonight that will determine if the space shuttle Columbia is ready to carry two astronauts into orbit in April on its maiden voyage.

The 2 -day test, already delayed 24 hours, was intended to exercise all elements of the shuttle's system for the first time.

Experts at the Kennedy Space Center conducted the count, while flight controllers at the Johnson Space Center in Houston - where April's flight will be controlled - monitored the activity.

At Marshall Space Flight Center in Huntsville, Ala., design specialists stood by to provide advice on the shuttle engine systems.

The test includes all aspects of the launch countdown except for the astronauts - John Young and Bob Crippen - in Columbia's cockpit. During the practice, 526,000 pounds of liquid hydrogen and oxygen fuel were to be pumped into the vehicle's external tank. (THE WASHINGTON POST, 2-17-81)

February 18: Figures provided by NASA last year, prior to recent changes in the Shuttle launch schedule, show a total direct Space Transportation System cost of $15.5 billion as follows:

(In Millions of Dollars)

Funding Through --	FY '80	Completion	Total
Shuttle Development	8,130	683	8,813
Shuttle Production	1,234	2,801	4,035
Operations Capability Dev.	122	188	310
Spacelab	125	326	451
KSC Facilities	225	30	255
Other Shuttle Facilities	185	30	215
Total	10,021	4,058	14,079
Adjustments			
Extend Shuttle Dev. Through '82	-	600	600
Shuttle Production: Real Year $	-	292	292
Changes & System Upgrading	100	450	550
Add	100	1,342	1,442

(DEFENSE DAILY, 2-18-81, p. 246, Vol. 114, No. 31)

February 19: According to preliminary NASA estimates, it would cost something over $3 billion to develop an orbiting manned space facility for launch in the late 1980's. Specifically, the agency put the cost at $2.5 billion to $3 billion in FY '75 dollars.

To launch a facility the size of Skylab (done on a single Saturn V flight in 1973) would take about four dedicated Shuttle flights at a cost of about $100 million in FY '75 dollars.

(NASA's candidate manned space facility is the Space Operations Center, funded at less than $1 million in FY '82). (DEFENSE DAILY, 2-19-81, p. 255, Vol. 114, No. 32)

<> With a countdown rehearsal running hours behind schedule yesterday, the space agency postponed a test firing of the space shuttle Columbia's main engine another 24 hours, until Friday.

"We got 11 hours behind in the count and decided to put off everything 24 hours," launch director George Page said in announcing the delay of the firing to 7:45 a.m. Friday. (PHILADELPHIA INQUIRER, 2-19-81)

<> With various tasks in the countdown for the Space Shuttle Flight Readiness Firing (FRF) taking longer than expected, NASA yesterday rescheduled the 20-second firing to 7:45 AM Friday, a 24-hour delay. The countdown was 11 hours behind schedule at 10 AM yesterday and officials added an 8 hour hold to allow workers a time to rest and catch up with lagging activities. Consideration was given to a nighttime firing today, but dropped in favor of a firing tomorrow morning. NASA said that "no major problems" had been encountered in the new countdown. (DEFENSE DAILY, 2-19-81, p. 257, Vol. 114, No. 32)

February 21: America's oft-delayed space shuttle received a much-needed boost today with a perfect, 20-second launch-pad test firing of the three main rocket engines, space agency officials said.

But the officials, while jubilant over the test, said a labor walkout at the Kennedy Space Center immediately after the 8:45 a.m. test firing, threatened the April 7 maiden launch of the reusable spacecraft. Officials said 800 aerospace workers and machinists employed by the Boeing Co. in spaceport support work had struck in a pay dispute.

James R. Thompson, Jr., manager of the shuttle's rocket engine program, termed the test "totally perfect from an engine standpoint."

But soon after the test, the jubilation turned to concern over the strike by members of the International Association of Machinists and Aerospace Workers.

An obviously angry Richard Smith, director of the space center, said the machinists went on strike with no warning and placed in some jeopardy the remaining test operations.

"We run a risk of jeopardizing some of the flight hardware," he said, adding the workers have important support jobs during the next few weeks leading up to the launch.

He said the Boeing Co. has a plan to deal with the strike and it is too early to determine if the walkout will affect the flight. Smith said the union members were within their legal rights to strike because their contract with Boeing had expired some time ago.

The workers are involved in a number of ground support operations and Boeing is a major shuttle contractor. (THE WASHINGTON POST, 2-21-81)

February 22: Boeing Services International began replacing 1,050 of its striking workers at Kennedy Space Center with management personnel Saturday to avoid any delays in the launch of the Space Shuttle Orbiter Columbia.

"We're doing everything in our power to make sure the strike doesn't interfere with the launch date," said Boeing Services official Donna Mikov.

Members of the International Association of Machinists and Aerospace Workers walked off the job Friday in a contract pay dispute. The walkout followed the 20-second successful test firing of the Shuttle's three main engines.

The walkout Friday initially jeopardized some post-test operations, such as purging Columbia's fuel tanks. But management personnel were able to fill in, officials said.

Boeing's contract with the union expired Jan. 23. Federal mediator Richard Deen said no progress had been made in bringing the two sides closer to an agreement.

Union representative Ted Maddin said Boeing and NASA were inviting a strike by making their pay offer and shouldn't have been surprised by Friday's walkout.

"They like to act like they're so naive and didn't know what was going on," Maddin said. "This could be a long strike because it was obviously planned by NASA and Boeing." (TODAY, 2-22-81)

<> After reviewing preliminary data from the test firing Friday of the Space Shuttle Columbia's main engines, NASA officials Saturday reported it was "a very clean test."

Scientists said the 20-second test, which spewed flames and steam over the launch area, did little damage to the Shuttle.

"We didn't see any damage to any of the tile on the vehicle," said Kennedy Space Center spokesman Hugh Harris. "But there was some gap filler that came loose and we still have to evaluate that. But other than some scorched paint, it looks really good." (TODAY, 2-22-81)

<> An Atlas-Centaur rocket carrying a COMSTAR satellite for use in a domestic communications system roared into space Saturday.

The 20-foot-tall satellite was launched at 6:23 p.m. EST and will join three others used by the American Telephone and Telegraph Company and the GTE Satellite Corporation, a subsidiary of General Telephone & Electronics Corp.

The satellite, which was built to be an on-the-ground spare, will keep the system's capacity at 36,000 simultaneous telephone conversations until 1983, company officials said.

The first two COMSTAR satellites were launched in 1976. They will be moved closer together to serve as a single satellite - primarily for backup - to conserve their batteries, AT & T said. (SENTINEL STAR, 2-22-81, p. 2B)

<> A historian at the University of California, Walter A. McDougall, recently observed that between the two world wars one definition of great power might have been a nation that builds its own airplanes. Today, he said, it might be a nation that launches its own spacecraft.

This definition establishes the United States and the Soviet Union as undisputed superpowers, China, Japan, France, Britain and India as aspirants to modest power, and, as an emerging third force, Western Europe, by virtue of its collaborative space effort, the European Space Agency.

The 11-nation agency is planning a new generation of communication satellites and building a manned laboratory to be launched from Cape Canaveral aboard America's space shuttle, whose test firing last week ESA representatives witnessed. At the same time, the agency is competing with its American cousin, the National Aeronautics and Space Administration, for the space-haulage business by developing the Ariane rocket, which will give Europe its own launching capability. The agency's leaders will meet March 5 in Paris to draft a new 10-year plan for even greater European traffic in space. (THE NEW YORK TIMES, 2-22-81)

February 23: First launch of the Space Shuttle is now on track for early April following the successful 20-second Flight Readiness Firing (FRF) of the three main engines of the Space Shuttle Columbia on the pad at Kennedy Space Center Friday morning.

The test firing was conducted at 8:45 AM, an hour behind schedule because of problems with three of the four ground controls for the hydraulic power for the Solid Rocket Boosters. The three systems, not needed for the FRF, were subsequently turned off by NASA.

NASA reported that early data on the Space Shuttle Main Engine firing "matched perfectly" the results obtained in the acceptance firing of the three-engine Main Propulsion Test Article.

The successful FRF was the last major test prior to launch, which is scheduled for April 7, but expected to slip at least several days.

Development of the Space Shuttle is two years behind schedule. Cost is now estimated at $9.6 billion, or 26 percent excluding inflation above the estimate made ten years ago ($5.12 billion in FY '71 dollars).

During the SSME firing Friday, after their work was done, some Boeing contractor personnel working on support tasks walked off the job in a contract dispute. (DEFENSE DAILY, 2-23-81, p. 273, Vol. 114, No. 34)

February 24: In the aftermath of Friday's Space Shuttle engine test, tiles are chipped, tile spacers are missing and the fuel tank is pockmarked.

But inspection teams at Kennedy Space Center who combed the vehicle over the weekend looking for damage resulting from the 20-second engine firing found nothing that will further delay the Shuttle's launch in April, NASA officials reported Monday.

Engineers were worried that the static firing would shake off some of the tiles, which protect the rocket-plane from the firey friction of ascent and re-entry.

NASA also was worried about damage caused to the Shuttle's fuel tank when it was first filled with super-cold liquid oxygen and hydrogen on Jan. 24.

"It does not appear that the area that debonded in the first tanking test grew in size," a NASA spokeswoman said. However, an outer, foam-like insulation was damaged in two areas, she said. Both of these areas can be readily fixed, she added. (TODAY, 2-24-81)

<> The head of the Soviet Union's cosmonaut training program, Lt. Gen. Vladimir Shatalov, has accused the U.S. of developing the Space Shuttle for military purposes. He cited press reports which indicate that the "scientific and economic aspects" of the Shuttle "have been put on the back burner." The general, whose country has conducted nearly 40 anti-satellite interceptor tests in space, asserted that "space should not be used as an arena for future

confrontations, fighting or resolving questions in non-peaceful ways." (DEFENSE DAILY, 2-24-81, p. 277, Vol. 114, No. 35)

<> Boeing supervisors from Washington, Kansas, Pennsylvania and California donned hard hats Monday to fill in for 1,000 striking space workers.

Negotiations in the labor dispute were suspended indefinitely Monday afternoon, ruling out the chance for an early settlement. But Boeing officials claim the strike will not delay the space shuttle's scheduled launch in early April.

"We've told NASA that we'll meet our commitments," said Al Evenson, labor relations manager for Boeing Services International, the primary maintenance contractor at the space center. (SENTINEL STAR, 2-24-81)

February 25: The nation's space budget has to be cut for political reasons, even though it doesn't make "technical" sense to chop science spending, says the former astronaut who chairs the Senate Science, Technology and Space subcommittee.

"Frankly, I don't think it makes any technical sense to cut the (NASA) budget...but I also know that, politically, to get a general budget-cut package through the Congress, everybody's going to have to bear the burden," says Sen. Harrison "Jack" Schmitt, R-N.M.

Schmitt said that while he completely supports the budget-reduction package President Reagan unveiled last week, his subcommittee "will do what is necessary to fine-tune the administration's proposals" for trimming the budgets of NASA and other science-related agencies. (TODAY, 2-25-81)

<> Rep. Ronnie Flippo (D-Ala.), the new Chairman of the House Space Subcommittee, has criticized the cuts made in the NASA budget by the Reagan Administration, charging that the revised budget does not adequately provide for a balanced space program.

He said that the revised budget represents a major setback in space science, space applications and in development of the Solar Electric Propulsion Stage (SEPS), failing to recognize "the positive contributions which the NASA programs make" in a wide range of areas, including the nation's economy.

He said his subcommittee will carefully review the actions proposed in space science and applications by the Reagan Administration.

"We want to avoid damage to our space program by arbitrary uninformed budget cuts," he said. (DEFENSE DAILY, 2-25-81, p. 284, Vol. 114, No. 36)

<> The $63 million Ground-based Electro-Optical Deep Space Surveillance System, designed to track and catalog objects orbiting the Earth at altitudes between 3500 and 25,000 miles, has begun operating at White Sands Missile Range.

Four additional GEODSS facilities are located in South Korea, Hawaii, the Middle East and Eastern Atlantic Ocean. Site maintenance is provided by RCA.

The GEODSS system, built by TRW, employs a telescope with electro-optic tracking, a television camera and digital computer. It is expected to identify and catalog about 500 orbiting objects in deep space, providing data to the NORAD Combat Operations Center in Colorado. The data will be used in the Air Force Spacetrack satellite surveillance system. (DEFENSE DAILY, 2-25-81, p. 287, Vol. 114, No. 36)

<> The small, 63-inch-diameter solid propellant motor for the Inertial Upper Stage was successfully test fired for 51 seconds at a simulated altitude of 100,000 feet Feb. 13 at the Air Force Arnold Engineering Development Center.

The test, the 15th consecutive successful test firing of an IUS full-scale development motor at AEDC was the first firing of a 63-inch motor with a 50 percent propellant off-load. The IUS will use varying percentages of fuel,

dependent on mission needs, with duration of engine ignition controlled by the amount of solid propellant employed. The 51-second test generated a maximum thrust of 2300 pounds. The motor's nozzle was deflected plus and minus 7 degrees both in the vertical and horizontal planes throughout firing.

The motor used in the recent design was designed for the use as an upper stage on the Titan-340 expendable launch vehicle. Boeing is developing the 63-inch and a 92-inch-diameter motor for the two-stage IUS to be used on the Titan and Space Shuttle. The motors are built by Norden System's Chemical Systems Division.

A three-stage version of the IUS designed for planetary missions is being terminated by NASA. (DEFENSE DAILY, 2-25-81, p. 287, Vol. 114, No. 36)

<> Comsat's Comstar 4 communications satellite was successfully launched by NASA at 6:23 P.M. EST Feb. 21 from Kennedy Space Center by a General Dynamics Atlas-Centaur vehicle.

The 1746-pound, Hughes-built satcom was placed in a 340/22,240-mile transfer orbit over the equator. Kick stage firing to circularize the orbit at geosynchronous altitude was scheduled last evening by Comsat.

The four Comstar satellites, owned and operated by Comsat General Corp., are leased to AT&T and used jointly by AT&T and GTE Satellite Corp. to provide telephone circuits, WATS and private line services. The satellites can handle 18,000 simultaneous two-way calls and operate at 4/6 GHz.

Comstar 4, to be positioned at 127 degrees west longitude, will replace Comstar D-1 the first of the series, launched in May, 1976.

To succeed the Comstars, AT&T has ordered three advanced Telstar 3 satcoms from Hughes. (DEFENSE DAILY, 2-25-81, p. 286, Vol. 114, No. 36)

February 26: NASA's John F. Kennedy Space Center has awarded a contract modification, valued at $3,601,000 to International Business Machines Corporation, Federal Systems Division, Cape Canaveral, Fla., for additional system engineering and software development services in support of Space Shuttle checkout and launch systems at KSC and Vandenberg Air Force Base, California.

Under this contract modification, IBM will continue to provide systems and engineering and software development services in support of sophisticated Space Shuttle checkout and launch systems at KSC and Vandenberg Air Force Base, California. Computer systems are used to automatically control and perform much of the Space Shuttle vehicle checkout while the vehicle components are being prepared for launch. The systems also provide the capability for work order control and scheduling and will conduct countdown and launch operations. (KSC NEWS RELEASE No. 40-81, 2-26-81)

<> Comsat General's Comstar D-4 domestic satcom was successfully placed into geosynchronous orbit at 6:36 PM EST Feb. 23 by a firing of its apogee kick motor. The Hughes-built satellite was launched Feb. 21 from KSC by an Atlas-Centaur vehicle. (DEFENSE DAILY, 2-26-81, p. 294, Vol. 114, No. 37)

February 27: The Space Shuttle may not have left its pad but program managers are in orbit over the results of last Friday's flight readiness firing.

The orbiter Columbia's three main engines roared for the planned 20-second static firing - a major milestone leading to the first Shuttle launch.

Engine ignition came at 8:45 a.m.

The critical test received nationwide media coverage with representatives from the three television networks and science writers from major newspapers and wire services present.

In a press briefing held an hour and 40 minutes after the firing, KSC Director Richard Smith and KSC Shuttle Operations Director George Page expressed confidence that the maiden voyage of Columbia will come in April, as scheduled.

"We got through on the first try and we're extremely pleased," said Smith. "I congratulate George and all the people who work for him in getting this done."

The Center Director said he is looking forward to an April launch.

Page told reporters the only anomaly in the test was the premature shutdown of hydraulic power units on the solid rocket boosters, a problem which appeared to be computer related.

"For all that rascal had to do, for that one little error, it still deserves a hand," said Page.

Page and others had been concerned that the enormous number of tasks required of the computer in the last nine minutes of the countdown might overwork the system, triggering a hold. But the countdown went smoothly.

He also praised the professionalism of the launch team on their first Shuttle countdown. "We're very proud," said Page.

"We have a lot more confidence now that we can come close to an early April launch," he added.

Post-FRF inspections have shown some of the orbiter's thermal protection tiles suffered small nicks or chips of a type expected to occur during launches. They can be repaired by treating the surface with silica.

At press time, post-FRF inspections of the external tank's thermal protection panels and the main engines had not yet been performed.

Work on repairing the debonded external tank insulation is expected to take about two weeks.

Damage to the launch facilities at Complex 39's Pad A were described as light and it appeared ready to support the first launch in April.

While the flight readiness firing had the spotlight, other important tests were also conducted last week, including an at-sea operation for the two solid rocket booster recovery ships - the UTC Freedom and the UTC Liberty.

The ocean recovery operations - conducted in extremely rough seas - involved practicing the recovery of solid rocket booster parachutes and frustums. Also practiced was the dewatering system which will be used to drain sea water from each SRB so they can be towed back to Cape Canaveral.

Despite the rough seas, it was smooth sailing for the tests, program officials said.

In addition to the post-FRF inspections and external tank repairs, several more tests must be run before first launch.

A Shuttle Systems Test - actually a battery of tests performed on each system and sub-system - will begin this weekend to make sure everything is working properly. Then, another series of computer-simulated flights will be conducted with crew aboard the orbiter.

The final major test activity prior to launch will be the "dry" Countdown Demonstration Test - a rehearsal in which the Shuttle's tanks are not loaded with propellants. (SPACEPORT NEWS, pp. 1 & 5, Vol. 20, No. 5)

<> 2-C. Mr. Page gave an overall post-FRF status report. The beanie cap parted at the area where it had been stitched and not glued. The seal will have to be removed for rework and testing at the LETF; three of four HPU's shut down in the minus counting; on hold-down post #7 the B sides did not

fire; assessment of tile damage revealed only minor problems with some chipping and a few gap fillers moved out (would not have affected flight). The External Tank had some minor cracking with no apparent additional separation or debonding.

Mr. Utsman stated that assessment of the pad revealed that there was no damage.

Mr. Parker also reported no major problems with the FRF and few problems with the strike with BSI immediately afterwards. Pickets are at Gates 2 and 4 and the County has motorcycle policemen at both gates.

Mr. Utsman and Mr. Lohse discussed further on the strike and reported that work was continuing and that Boeing had brought in 210 personnel from other areas to assist in continuing essential work. Temporary hires are also being considered by BSI and sub-contractors are continuing to come in. Most strike related impacts are in the work arounds. Mr. Utsman also reported he is running a 24-hour civil service assessment log of strike-impacted work and contractor management personnel are working 12-hour shifts.

Mr. Page reported that a new launch schedule for STS-1 is being assessed.

2-E. Mr. Neilon stated that the Administration budget reductions would have impact on the cargo programs and that schedule impacts on Spacelab were being assessed.

2-F. Mr. Walton stated that the Comstar launch went extremely well with good orbital parameters with final move of the spacecraft scheduled for Monday night.

He also reported that there is still a problem with the Intelsat spacecraft; i.e., the solar panel deployment gear train must be removed and returned for rework. A three to six week slip is expected.

2-G. Mr. Hollinshead said that there had been several breaking and entering incidents at the VIC this past weekend and that Security will probably increase surveillance in that area. (EXECUTIVE STAFF NOTES #6-81, pp. 1-2)

February 1981: Johnson Controls, Inc. of Dallas, Texas, has been awarded a $2,642,000 contract by NASA's John F. Kennedy Space Center for an electronic security system.

The new security arrangements are to include door alarms, motion detectors, video boths to allow verification of personal identify and area authorization before premitting entry, and conversion of the present method of allowing access by badge display to an electronic check of personal identification codes.

With the electronic system it will be possible, for example, to quickly count and identify individuals in a building or a section of a building at a given time. Elements of the system will be located on KSC and at Cape Canaveral Air Force Station facilities to protect critical flight hardware and Space Transportation System payload preparation and handling. (KSC NEWS RELEASE No. 42-81, 2-81)

March 2: National Aeronautics and Space Administration has elected to keep hypergolic propellants in the space shuttle orbiter as a means of reducing launch preparation time for the shuttle by 8-10 days.

The hypergolics -- monomethyl hydrazine fuel and nitrogen tetroxide -- fuel the orbital maneuvering system and reactor control engines. Tanks for both systems are located aft. The reaction control system has additional tanks forward in the orbiter.

It was throught the tanks would have to be emptied to allow workmen access to the external tank for insulation repairs because the hypergolic propellants are hazardous. They are storable and do not boil off and it was decided to leave them in the tanks.

It would have taken about four days to detank the hypergolics after the flight readiness firing and 4-4.5 days to reload them.

Because of the hazardous potential, the launch pad would be cleared during both operations.

The nose section holds 1,369 lb. of oxidizer and 856 lb. of fuel.

Each of the two aft modules holds a total of 2,905 lb. of nitrogen tetroxide and 1,815 lb of fuel. (AVIATION WEEK & SPACE TECHNOLOGY, 3-2-81, p. 19, Vol. 114, No. 9)

<> Sen. Strom Thurmond (R-S.C.) has urged support for the Space Shuttle program, which he says will initiate "a new era not unlike the beginning of aviation 75 years ago."

With its reusable and versatile capabilities, the Space Shuttle "cannot help but enhance the free world's defense capability, assure continued U.S. technological leadership and promote international cooperation in scientific and industrial use of space," Thurmond said.

Asserting that the U.S. space program is at "a critical turning point," Thurmond charged that this country has "all but retreated from space." Meanwhile, "Russian and Soviet bloc cosmonauts come and go like weekend tourists at Salyut 6 (and) the Russians, West Europeans and Japanese will visit Halley's Comet while we sit home and watch."

Beyond just having the Space Shuttle, Thurmond said, "we must make sure that we keep its flight manifest full with the military and scientific payloads that will help to make America first in the world again and keep America first." (DEFENSE DAILY, 3-2-81, p. 5, Vol. 115, No. 1)

<> Boeing Services International supervisory personnel moved the Complex 39A rotating service structure back into place and did a number of other post-firing supporting functions to safe and secure the launch pad following the walkout of the International Association of Machinists and Aerospace Workers here 15 minutes after the flight readiness firing Feb. 20.

The supervisors last week were installing scaffolding on the rotating structure to enable access to the external tank for repairs on the insulation. The tank will undergo two more cryogenic propellant test loadings to determine whether the insulation will hold. Platform modifications began Feb. 24 and were scheduled to be completed March 1.

Repairs on the tank are to begin March 2 and a goal of 13 days has been set for completion.

The key activity Boeing supervisor personnel performed was supporting, draining and purging of the external tank following the test firing. This was accomplished within 24 hours after the firing to prevent corrosion in the tanks and plumbing.

Approximately 130 non-union Boeing International Services supervisors have been detailed here since the walkout in accordance with the company's strike contingency plan. Less skilled employees are being hired locally. (AVIATION WEEK & SPACE TECHNOLOGY, 3-2-81, p. 17, Vol. 114, No. 9)

March 3: While burly guards with automatic weapons may be enough to keep human saboteurs from the Space Shuttle, an M-16 doesn't stop black belly plovers and tree swallows.

These feathered Brevard residents, along with other bird species, are becoming a "real problem" at the Kennedy Space Center because of potential damage they may inflict to the Shuttle as well as the hazard they pose to training jets used by Shuttle pilots.

It appears birds enjoy nesting around the three-mile long Shuttle runway. NASA officials fear the birds may become feathered missiles and collide with a landing Shuttle or T-38 jet trainers.

The problem is serious enough that NASA is spending $10,000 to research it. The study, which should be completed by the end of the year, is being conducted by the Merritt Island National Wildlife Refuge Center.

NASA has solved one bird problem, caused by the infamous leas tern. This bird liked to nest at the end of the Shuttle runway. But every time jets revved up their engines for takeoff, the nests of the terns were blown away.

Being a compassionate agency, NASA decided it would be better to get rid of the birds rather than have them engaged in a constant state of home building.

NASA had considered setting up a water piping system to drench the nesting birds. But after studying the problem, the wildlife center recommended painting the end of the runway black, because terns prefer a white decor. The plan worked. (TODAY, 3-3-81)

<> Maybe it's just as well the Space Shuttle won't be launched in March. Much of the runway it would have landed on in California is under water.

The Shuttle's spaceship Columbia is supposed to land on a massive dry lake bed at Edwards Air Force Base after its maiden voyage into space -- still scheduled for the first week in April. But the "dry" lake bed is wet.

"We're getting drizzled upon," said Sharon Wanglin, a public information specialist at Dryden Flight Research Center.

If the Columbia were in the air today, it could not land at Edwards tomorrow because of the base's soggy runways. "The lake bed is really an intermittently dry playa (a desert basin)," said T.K. Gwin, Edward's airfield manager. "What that amounts to is the lowest-lying area in the valley. When it rains, all the water runs there and sits.

"The wind blows the water back and forth and smooths out a clay base that's as much as 150 feet deep in the middle...if it dries out, it makes an excellant runway," Gwin said.

"Right now, it's wet," he said. Puddles 40 to 50 feet across are standing on the runway, but it's not covered from shore to shore, he said.

What about next month, when April showers bring May flowers, and when the Shuttle is scheduled for launch and landing? Excusing the pun, Wanglin said, "It's still up in the air." (TODAY, 3-3-81)

<> A special team of technicians and engineers arrived at Kennedy Space Center on Monday to begin repairing the Shuttle's fuel tank.

But that work has already been delayed at least six days because the specially sealed scaffolding is not ready.

Two dozen workers with Martin Marietta Aerospace, the company responsible for the Shuttle's external tank, arrived from National Space Technology Laboratories, Bay St. Louis, Miss.

There, they have been practicing repair procedures on a fuel tank similar to the Shuttle's mammoth 154-foot long external fuel tank.

The repairs at KSC, which could begin Saturday if work stands on the Shuttle's launch pad are ready, involve 17 panels of cork insulation in three areas. The insulation came unglued when the tank was filled with liquid oxygen and hydrogen on Jan. 24.

Both Martin and NASA have said the Shuttle cannot be launched until engineers are sure they know why the insulation came unglued. That's because the panels protect the tank's aluminum skin from the heat generated by air turbulence.

That heat can reach temperatures of 1,000 degrees Fahrenheit before the ablative cork insulation starts burning away. (TODAY, 3-3-81)

March 4: 2-A. Mr. Smith extended his congratulations to everyone involved in the successful Shuttle FRF and said that he had received a congratulatory note from Hans Mark and a letter congratulating all involved from Dr. Lovelace.

Mr. Smith said that a revised STS-1 launch schedule would not be published until the two tanking tests scheduled for March 22 and 25 had been completed. A launch date of not earlier than April 6, 1981, may be used for support planning purposes. The dry CDDT is scheduled for March 17.

2-E. Mr. Utsman reported on progress being made on the external tank access modifications. While they are proving to be very costly, he believes we can make the schedule for a Saturday RSS rotation.

He also reported that there were no new developments in the BSI strike situation and that there are no major impacts.

2-F. Mr. Minderman stated that BSI had been responsible for minor wall rearrangement prior to office moves and while due to the strike some of the changes could not be made affected organizations had given good cooperation in proceeding with moves without these wall modifications which will be performed later. He requested a continuation of everyone's understanding and cooperation. (EXECUTIVE STAFF NOTES, #7-81, 3-4-81, pp. 1-2.)

March 5: Eighteen percent of the U.S. public believes that too little is being spent on space, while 34.5 percent think the space budget is about right and 39.1 percent believe that too much is being spent, according to a national opinion poll taken by the University of Chicago. This from the National Space Institute, which points out that only seven years ago only 7.5 percent of the public thought too little was being spent on space, while 58.5 percent thought too much was being spent. (DEFENSE DAILY, 3-5-81, p. 39, Vol. 115, No. 4)

<> State officials have decided to invest in a special $650,000 advertising blitz aimed at luring more tourists here during the spring.

NASA could provide a big boost to the April tourism effort if it can keep the launch of the Space Shuttle Columbia on schedule. The launch - first U.S. manned space flight in nearly six years - is expected to draw several hundred thousand people to Brevard, many of whom will be out-of-staters.

Another reason for us to pull for an April launch. (TODAY, 3-5-81)

March 6: The chairman of the Aerospace Safety Advisory Panel has told Congress that there is "no open issue that is a real safety concern" in the first Space Shuttle flight, that he believes the Shuttle is in "good shape" and will have "a good flight next month."

At the same time, chairman Herbert E. Grier told the House Space Subcommittee that there are still some areas of concern about the Shuttle which will have to be further evaluated after the first flight. That flight will "provide a variety of data that should substantially reduce many of the uncertainties and wide variations in predictions now confronting designers," he said.

Asked about the fixes on the insulation of the Shuttle External Tank, Grier said the panel is satisfied with the fixes and believes that the insulation is "perfectly adequate for the first flight."

While there are no unresolved safety issues for STS-1, Grier said there are limitations on the flight, e.g., the astronauts cannot use their ejection system for the first few seconds of the flight because they would "eject into a fireball."

Grier told the Subcommittee that he believes that "funding economies" have adversely impacted the STS-1 mission.

"While this is not directly related to safety, it may create an environment in which the best solutions to problems are not always pursued and may result in the acceptance of more risk than necessary." (DEFENSE DAILY, 3-6-81, p. 43, Vol. 115, No. 5)

March 7: Space Shuttle launch preparations and repairs are on schedule for a launch on April 7, said Don Phillips, a Kennedy Space Center division chief.

But that is based on a success-oriented, very optimistic work schedule, he said. And Phillips is of the opinion that a mid-April launch is more likely.

"My personal opinion, and it does not reflect the opinion of the agency, is somewhere around mid-April, but we have an outside shot at the week of April 6. But admittedly it is an outside shot because one small hit (problem) there, and obviously it will have a schedule impact." (TODAY, 3-7-81)

March 9: In addition to its reductions in the NASA budget, the Reagan Administration continues to leave nine top jobs at the agency, including that of administrator, filled on an acting basis.

Former NASA Administrator, Dr. Robert A. Frosch, resigned effective Jan. 6 and was replaced on an acting basis by Dr. Alan M. Lovelace, the former deputy administrator, who is expected to leave the agency when the Reagan Administration gets around to naming its NASA team.

Lovelace's current two-month stint as acting administrator is the longest the agency has been on an acting basis since George Low served as acting administrator from Sept. 16, 1970, to April 26, 1971, seven months and ten days, during the Nixon Administration.

In addition to the nine posts being filled on an acting basis, the deputy administrator post, the number two job in the agency, remains unfilled, although Dr. Anthony J. Calio, associate administrator for space and terrestrial applications, has been named special assistant to Lovelace, responsible for general management of the agency. That, of course, leaves the Applications Office without a full time chief.

Another NASA official, Dr. Walter C. William, chief engineer, while he is not serving on an acting basis has been assigned to work at Rockwell International for "an indefinite period." (DEFENSE DAILY, 3-9-81, p. 53, Vol. 115, No. 6)

<> Planners of advanced space mission are narrowing the issues on how to establish the first U.S. long-term operating bases in space while they await the Reagan Administration's policy on a possible new space initiative beyond introduction of the shuttle.

The Administration is attempting to cut the National Aeronautics and Space Administration's science and applications budgets severely, but prefers that large cuts not be made to the space shuttle program. Defense Dept. shuttle requirements are a prime factor in this approach.

There is a faction in the Administration that hopes to convince President Reagan to declare the objective of a major new space initiative immediately after the first successful shuttle flight. Decision on a new initiative will have to be made by the Administration, since it will govern space policy for the first four and possibly eight years of the shuttle era.

The development of a large platform capability or manned space station structure are the strongest candidates for such a goal. NASA and industry planners are finding that determination of the most appropriate way to proceed toward these goals will be a difficult task.

The head of advanced programs in NASA's Office of Space Transportation, Ivan Bekey, believes a Reagan statement that "our next major step in space should be establishment of a permanent presence in space" would suffice, leaving NASA to determine the details of the goal after further study. (AVIATION WEEK & SPACE TECHNOLOGY, 3-9-81, p. 75, Vol. 114, No. 10)

March 10: Jointly evading hot air pockets from the press corps, astronauts John Young and Robert Crippen hinted Monday that the first flight of the Space Shuttle may be sweet and low -- an abbreviated version of the scheduled 54-hour flight.

In their last official press conference before the launch of the Shuttle, scheduled next month at Kennedy Space Center, they said the chances of pulling off the entire 36-orbit mission in the Spaceship Columbia is probably unrealistic. A successful mission may be redefined as getting up and getting back, said Crippen.

And don't be surprised if the landing site is changed, Young cautioned. With the previously parched Mojave Desert lake basin at Edwards Air Force Base in California now standing in water, Northrup strip in New Mexico is looking better and better all the time.

Much of the questioning, in fact, centered on what would happen if the astronauts ran into problems. And when a man with a Henry Kissinger accent still had trouble coming to grips with the intricacies of bailing out, Young just blinked and said, "You just pull the little handle."

But for the soggy runway at Edwards Air Force Base, Young had no such snappy answers: "I've heard it from a unreliable, unauthoritative, unofficial source that the lake bed could take a month to six weeks to dry.

"One of the things about landing on a lake bed is if you veer off to the side, you haven't done anything. Whereas if you land on a runway and veer off to the side at a place like Kennedy, you might be swimming with the alligators." (TODAY, 3-10-81)

March 11: It didn't hurt the space shuttle, but NASA's revised 1982 budget drew angry protest Tuesday from the space agency's European partners.

As expected, the $6.122 billion budget for the National Aeronautics and Space Administration guarantees full funding for the shuttle but slashes scientific and exploratory space programs to the bone. Bearing the brunt of the budget cuts, many of NASA's cooperative programs with the European Space Agency were delayed or scrubbed.

The worst news was the cancellation of the joint "Solar Polar" mission, scheduled for launch in 1985. The mission was to include two spacecraft: one furnished by NASA and one by the ESA, circling the sun in opposite directions.

The new budget eliminates the American spacecraft and leaves Europe holding the bag. NASA hopes to pack most of its instruments aboard the European probe, but the withdrawal has disturbed NASA's European partners.

Representatives of 11 nations cooperating in the ESA protested the cutbacks in a formal message to the State Department.

"We certainly knew this was coming," said Ian Pryke, a spokesman for ESA's Washington headquarters. "We've been working two weeks to get the mission reinstated; obviously we haven't succeeded."

"Until this problem is solved, we're going to be very wary about future cooperation (with NASA)," Pryke said.

The revised budget also postpones the first three missions of spacelab, a modular laboratory that will ride piggyback in the shuttle's cargo bay. The first mission will be delayed three months; the second two missions for more than a year. (SENTINEL STAR, 3-11-81, p. 8-A)

<> "My opinion is that NASA's program of planetary and astronomical research is the most productive and exciting element of contemporary science. We now have superb technical and scientific capability for actually doing the investigations that have been the dream and hope of mankind for centuries. As a citizen of the United States, I would be grieved to see this nation deny its capability and its historical destiny." -- Dr. James A. Van Allen, discoverer of the Van Allen Radiation Belts, March 5, 1981. (DEFENSE DAILY, 3-11-81, p. 70, Vol. 115, No. 8)

<> Repair of the 17 debonded insulation panels on the Space Shuttle Columbia's External Tank got underway Monday at Kennedy Space Center, with the agency expecting the job to take 13 1/2 days. NASA continues to hold to the April 7 launch date, but a slip of a week is not unanticipated. The 3-day launch readiness verification test is scheduled for Friday. Meanwhile, the prime landing site for the STS-1, the "dry" lakebed at Edwards AFB is not dry now after the recent rains, but is drying and expected to be in condition for the STS-1 landing. White Sands is the backup landing site. (DEFENSE DAILY, 3-11-81, p. 70, Vol. 115, No. 8)

March 12: Vice President George Bush will tour Kennedy Space Center on Tuesday afternoon, March 17, as part of a visit to Brevard County.

Accompanied by NASA Acting Administrator Alan Lovelace and Kennedy Space Center Director Richard Smith, the Vice President will visit the Launch Control Center where Space Shuttle checkout and launch activities are being controlled. In the Control Room the Vice President is expected to say a few words to the Kennedy Space Center team responsible for preparing the first Space Shuttle for launch next month.

The Astronaut crew for the April launch, John Young and Robert Crippen, will brief the Vice President at the launch pad and lead him on an inspection of their spaceship. (KSC NEWS RELEASE No. 45-81, 3-12-81)

<> The Reagan Administration has clamped a lid on the future U.S. space and aeronautics program by not only eliminating basically all new starts and most advanced technology and industry-supporting programs from the FY '81-82 NASA budget but by providing virtually no new start funds in its budget estimates for the agency in the FY '83-85 period.

It has however, provided all the funds necessary for development and production of the Space Shuttle and its supporting systems, including a $60 million addition for the Shuttle in FY '81.

NASA's Acting Administrator Dr. Alan M. Lovelace told DEFENSE DAILY Tuesday that there is "little or no wedge for new starts" in the President's estimated NASA budgets for FY '83-85. Reagan's adjusted figures for FY '81-82 and for the three out-years are as follows:

FY '81	$5.523 billion
FY '82	$6.122 billion
FY '83	$6,492 billion
FY '84	$5,859 billion
FY '85	$5,599 billion

Asked by DEFENSE DAILY if the restrictions on the NASA budget were made because of the Reagan Administration's belief that it is not important to move ahead in space or because of the Administration's emphasis on balancing the budget by 1984, Lovelace said it was the latter, i.e., the Administration's "priority" to reduce the nation's budget.

He said that in talking with Reagan officials, "I did not get the feeling that there was no tomorrow."

The acting NASA chief said that in light of the cuts made in the federal budget that he did not think that NASA was treated "unfairly," or that the cuts would have been less if Reagan had already chosen a NASA administrator and science adviser. (DEFENSE DAILY, 3-12-81, p. 76, Vol. 115, No. 9)

<> Look for the first Space Shuttle mission to be launched April 8-9 at the earliest, Acting NASA Administrator Dr. Alan M. Lovelace told the Senate Space Subcommittee. April 7 has been the target date. Officially the mission remains scheduled for the week of April 5.

The acting NASA chief also said that NASA has not made a decision to move the landing site from Edwards to White Sands because of the rain which has caused standing water on the "dry" lakebed landing site at Edwards. He indicated that a final decision on the landing site will not be made until two days in advance of the mission at the earliest, adding that the site can, in fact, be changed in virtually real time if necessary. (DEFENSE DAILY, 3-12-81, p. 79, Vol. 115, No. 9)

March 13: Rep. Ronnie G. Flippo (D-Ala.), chairman of the House Space Subcommittee, has told NASA that the subcommittee will take a careful look at NASA's plans to reprogram $60 million in FY '81 to support the Space Shuttle program, pointing out that the subcommittee told the agency earlier that it wanted to see no more supplementals for the Shuttle.

Flippo expressed concern about NASA's management control over the Shuttle program. He was told by Michael Weeks, deputy associate administrator for STS, that the major single reason for the cost increases on the Shuttle program in the recent past was the discovery 18 months ago of problems with the adhesion of the Thermal Protection System tiles and the subsequent need to undertake a major change of design of the tiles.

Flippo is concerned also about NASA's plans to adapt the Centaur as a Shuttle upper stage and will hold a hearing on that matter, including the competitve aspects of the project. (DEFENSE DAILY, 3-13-81, p. 84, Vol. 115, No. 10)

<> The KSC Hispanic Working Group is a new representative body established here to help management formulate policy decisions as they relate to Hispanic issues.

The group is composed of volunteers selected from various Directorates and other work areas on the center. Hispanic Working Group Chairman Emilio Mola does the initial searching and screening for likely group members.

If the persons agree to participate, their supervisors and the Center Director review and approve them for the task.

In actual operation, the group works to maximize employment possibilities for Hispanics, serves as a sounding board for the center's Hispanic population and attempts to widen the appreciation of the Hispanic contribution to the nation.

To do the latter, the group works closely with IMAGE of Cape Canaveral, a branch of the national organization dedicated to advancing the Hispanic culture and its appreciation. On KSC, the Working Group arranges the various activities associated with Hispanic Heritage Week and other special holidays with high Hispanic interest, such as Puerto Rico Discovery Day on Nov. 19.

Mola is the Hispanic programs monitor in KSC's Equal Opportunity Program Office.

The other five members of the group are: Fernando Esparza, TI-CSD-4, 7-8520; Manuel Virata, PM-STF, 7-3625; Raul Reyes, CS-MVD, 7-2395; Juan Rivera, TG-FLD-22, 7-7048; Alicia Thompson, DF-PEO, 7-3210; and Augusto Venegas, DL-NED-23, 7-9172. Each is available at any time.

Kennedy Space Center has approximately 70 full-time NASA employees who classify themselves as Hispanic, although this category includes numberous nationalities. In addition, the

various contractors at KSC have many Hispanic employees who are also encouraged to contact a member of the working group. (SPACEPORT NEWS, 3-13-81, p. 6, Vol. 20, No. 6)

<> Problems with sagging insulation on the Shuttle's fuel tank is probably not the fault of the tank's prime contractor, Martin Marietta Aerospace, and NASA is likely to foot the $2.6 million bill for the repairs, a NASA spokesman said.

Cork panels of insulation, which protect the Shuttle's tank from heat generated by air turbulence during ascent, first came unglued when the tank was filled with super-cold fuel on Jan. 24.

The repairs to the tank and associated tests at National Space Technology Laboratories in Bay St. Louis, Miss., are estimated to cost about $2.6 million, said Brad Marman, a public information officer in NASA's Washington headquarters. The first panel was glued back to the tank on Thursday, a Kennedy Space Center spokesman said.

NASA also will probably pay $700,000 more to make sure that tanks on future Shuttles will not have the same problem, Marman said. (TODAY, 3-13-81)

<> NASA's FY '82 request for Shuttle production has been reduced $36 million by the Reagan Administration -- reducing the planned long-lead material procurement for a fifth Orbiter and deferring the delivery of the Orbital Maneuvering System payload bay kit.

The cut in the fifth Orbiter option was from $25 million to $5 million. However, NASA says the remaining funds "still provide for the option of a subsequent decision on starting the fifth Orbiter without incurring substantial gapping in the production flow." With these funds, the fifth Orbiter could be delivered in 1987 if a production decision is made on or before the FY '83 budget request.

The OMS package is needed to allow the Shuttle to maneuver to a higher orbit for the Space Telescope mission, which has now been delayed 15 months, allowing a concomitant delay in the OMS. (DEFENSE DAILY, 3-13-81, p. 84, Vol. 115, No. 10)

<> Final systems tests on the first Spacelab flight unit began in Europe this week as KSC's processing team continued to build experience with an engineering prototype of the versatile orbiting science laboratory.

The Spacelab engineering model that arrived here in December has been in the Operations and Checkout Building's low bay undergoing trial-run processing operations.

"The engineering model is almost identical to the flight unit," said Rudig Selg, the European Space Agency's (ESA) Spacelab representative at KSC.

A joint program of ESA and NASA, Spacelab will fly aboard the Space Shuttle to provide a fully furnished laboratory adapted for the weightless environment of space. It will be pressurized so scientists may work without spacesuits.

The first Spacelab flight is scheduled for 1983.

A team of more than 100 NASA and MDTSCO employees are currently working on Spacelab activities here at KSC, according to Roger Gaskins, KSC's division chief for Spacelab and horizontal payloads.

"With the limited hands-on experience we've had, I think it's going extremely well," he said of the processing on the engineering model.

One of the engineering model's primary uses will be to verify that facilities and equipment designed to process flight units will do so as planned.

"It's a full blown electrical and mechanical pathfinder which will be pretty active for the rest of this year and a good part of next," said Gaskins.

Meanwhile, the first flight unit is being readied in Bremen, Germany, for delivery to the United States later this year.

Gaskins returned early last week from a 10-day visit to the ERNO plant in Bremen, where Spacelab is being assembled. ERNO is ESA's prime contractor on the project.

"ERNO performed a stowage review and NASA conducted a safety walkdown of both segments of the flight unit," said Gaskins.

He said astronaut Owen Garriot - science pilot on the Skylab 3 mission - participated in a crew station review to ensure that man and machine will work in harmony. Part of the review, for example, involved checking to see that controls can be easily reached and are readily visible.

NASA also began the process of turning over four of the Spacelab's 16 racks to European researchers who have experiments flying on the first Spacelab flight.

Selg said that some modifications and mechanical rework remains to be finished but that the flight unit is essentially completed.

A series of final systems tests are underway this week.

Delivery of the unit to KSC is expected to be accompanied by a five-fold increase in the ESA resident team here.

Selg said the four-member resident team currently at KSC will probably swell to 20 with the arrival of more engineers.

NASA and ESA will share equally the payload space available on the first Spacelab flight. European experiments will be integrated in Europe.

One of three European payload specialists will fly aboard the Shuttle with a crew of American astronauts on this first voyage of the orbiting laboratory.

A second Spacelab - being purchased by NASA - is already under production, said Selg.

Spacelab will be the principal scientific payload of the Space Shuttle throughout the 1980's and is expected to make valuable contributions to science, medicine, industrial processing and other related fields. (SPACEPORT NEWS, 3-13-81, p. 4, Vol. 20, No. 6)

March 16: Because of delays in developing the Space Shuttle, along with delays in developing the IUS upper stage and constructing the Shuttle launch facility at Vandenberg AFB, the U.S. may have to increase its buy of expendable launch vehicles in the near term, and Space Shuttle Orbiters in the long term to meet its launch capability needs.

This is the conclusion of a new General Accounting Office study centered on the Space Shuttle's ability to meet the payload needs of the Defense Department. (DEFENSE DAILY, 3-16-81, p. 89, Vol. 115, No. 11)

<> Delivery of the first shuttle era space suits to Kennedy Space Center for integration into the Columbia culminates a difficult five-year development that will enhance U.S. extravehicular capability but at a cost double what Johnson Space Center here originally intended to pay.

The two extravehicular mobility units (EMU's), consisting of both the pressure suits and portable life support systems, will be mounted in the orbiter's airlock. Astronauts John Young and Robert Crippen will use the suits only in the event of a serious emergency requiring extravehicular activity (EVA).

The possibility Crippen could be forced to conduct an EVA to close malfunctioning payload bay doors is the primary reason for carrying the new suits on the first shuttle mission.

Young and Crippen will not wear the suits for launch and reentry, but rather use ejection escape pressure suits similar to the systems worn by USAF/Lockheed SR-71 crews.

Unlike Apollo, when suits were custom tailored to each astronaut, in the shuttle a limited number of modular components are used to form suits that can serve the entire astronaut corps. NASA used Air Force specification charts and developed a sizing system covering individuals from the fifth to the 95th percentile. Small, medium and large sizes were planned to cover the range for both male and female astronauts, with the plan to procure and update female sizes as women joined the astronaut corps. When new astronauts were added to the program and old astronauts underwent fit checks with the new hardware, NASA found some individuals could not fit into the new suits. This resulted in adding extra-small and extra-large sizes to the program and readjusting the spread among sizes. Other fit problems caused additional redesign requirements. (AVIATION WEEK & SPACE TECHNOLOGY, 3-16-81, p. 69, Vol. 114, No. 11)

<> Estimated development costs for the Space Shuttle have increased by $275 million in FY '81 due primarily to problems encountered in readying the Shuttle Columbia for flight, including the rebonding of the thermal insulation tiles.

As a result, NASA has reprogrammed $75 million from STS Operations, $55 million from Shuttle Production and $150 million from Changes & Systems Upgrading in FY '81 for Shuttle development.

The production funds were made available by rephasing of the procurement of initial operational spares and ground support equipment for simultaneous launch processing of two Orbiters and the deferral of support activities for the production program.

Michael Weeks, NASA deputy associate administrator for Space Transportation Systems, told Congress Wednesday that the $55 million transfer from production "leaves us with no reserves, so it does increase the risk to our already tight delivery schedule, although the $60 million added to the Changes and Systems Upgrading line items could provide added schedule confidence."

In other STS areas, Weeks:

--States that development of the Solar Electric Propulsion System (SEPS), added to the FY '81 budget by Congress, has been cancelled, with $7 million in FY '81 and $18 million in FY '82 funds deleted. Acting Administrator Lovelace told DEFENSE DAILY that there is little likelihood of reinstitution of the program in the near term because the user community has not identified a firm need date for the system.

--Pointed out that the Centaur upper stage is capable of boosting 13,000 pounds to geosynchronous orbit, compared to 5000 for the IUS, which has a military as well as civil use. For NASA it could accomodate TDRSS growth, he said.

--Said it costs about $6 million in FY '75 dollars for each External Tank (about $9.6 million in current dollars).

--Noted that NASA hopes to make the second Shuttle flight in August or September.

--Said it costs about $6 million to refurbish the Solid Rocket Booster, including several hundred thousand dollars to tansport the SRB's from Florida to Utah and back.

--Reported that NASA plans to complete three Shuttle Main engines in FY '82 and would like to produce about one engine every four months through 1985 in order to support four Orbiters.

--Said the third and fourth flight External Tanks will be readied for shipment to KSC in 1981 and 1982, respectively, but that future deliveries "are under assessment, pending review of technical and budgetary issues and considering likely flight needs." (DEFENSE DAILY, 3-16-81, pp. 92-93, Vol. 115, No. 11)

March 17: The panels of cork insulation that came unglued from the Space Shuttle's fuel tank during fueling exercises Jan. 24 have been placed back on, an official at Kennedy Space Center said Monday.

"The work is moving right along pretty close to schedule," said Thomas Wirth, Martin Marietta's director of external tank operations. "All the panels we took off are either bonded down on the ship or are under vacuum cure."

In all, 32 panels have been glued back onto the tank. The panels of insulation protect the aluminum skin of the Shuttle's fuel tank from the heat generated by friction during ascent.

Wirth said the team of Martin technicaians, who are working on two shifts around the clock, still has plenty of work to do. They must conduct two tests to make sure the panels will stay on the tank. Then they will trim and smooth all the rough edges and finally apply a coating of silica foam insulation.

Wirth said the technicains hope to start spraying on foam sometime Wednesday.

"Barring any tremendous weather problems, we intend to have it done in time to support the propellant loading test on the 23rd," Wirth said. (TODAY, 3-17-81)

March 20: An employee of Rockwell International working on the Space Shuttle Orbiter Columbia at Kennedy Space Center died Thursday after he and five other workers entered the aft end of the Orbiter after it had been purged with nitrogen gas. Five of the men lost consciousness in the nitrogen-rich environment. In addition to the man who died, another was listed in critical condition. An investigation has been ordered. (DEFENSE DAILY, 3-20-81, p. 122, Vol. 115, No. 15)

<> Rockwell International was awarded a two-year, $158.8 million contract modification by Kennedy Space Center Thursday for processing of the Space Shuttle Orbiter through launch and landing. The award, which runs to April 1982, brings Rockwell's Shuttle processing contract to $286 million. (DEFENSE DAILY, 3-20-81, p. 122, Vol. 115, No. 15)

<> A Rockwell employee, John Bjornstad, 50, of Titusville, died shortly after noon, March 19, as the result of an accident earlier that day at the Kennedy Space Center, Fla.

Six people were exposed to a pure nitrogen gas atmosphere while working on the Space Shuttle at approximately 9:30 a.m. The group had entered the aft section of the orbiter following completion of the two-day long dry-countdown demonstration. This was the final major simulation prior to the first Shuttle launch in early April.

At the time they entered the orbiter structure, the area was being purged with gaseous nitrogen. Although nitrogen is not toxic, it does exclude oxygen in the normal air from the area, causing loss of consciousness.

All of the men were treated at the scene by the Kennedy Space Center's Occupational Health team and transported to the Health Facility in the KSC industrial area.

One person, Forrest Cole of Merritt Island, was intitially transported to Jess Parrish Hospital in Titusville and later was taken by helicopter to Shand's Teaching Hospital in Gainesville, where he was placed in the intensive care unit.

A third person, William L. Wolford of Rockledge was taken to the Wuesthoff Hospital in Cocoa for observation. Three others were treated and released.

Both NASA and Rockwell International have formed investigation boards. The NASA Board is being headed by Charles Gay, Director of Expendable Vehicles. Charles Murphy, Launch and Landing Director for Rockwell, is heading their board.

The other people who were treated and released are: Nicholas Mullon, Merritt Island; J.L. Harper, Titusville; and Don Largent.

All of the men except Largent were technicians working for Rockwell International. Largent is an employee of Wackenhut Services, Inc. (NASA NEWS RELEASE No. 81-42, 3-20-81)

March 23: Primary runway for the space shuttle landing here should be in condition to support the first shuttle mission scheduled for early next month, barring any significant rainfall in the vicinity of the lakebed runway prior to launch. Edwards is the main landing site for the shuttle orbital flight test series.

Last week seasonal rains resulted in some water on the approach end of Runway 23 in the area where the orbiter is expected to touch down, but the moisture is expected to dry completely by the end of the month.

Backup runway at Edwards for the shuttle mission is Runway 15, which is dry but currently undergoing needed repair work in preparation for the mission. Other lakebed runways designated as possible alternatives are runways 18 and 36.

A microwave scanning beam landing system has been positioned for use on Runway 23 and is not capable of being moved on short notice in the event of a runway change, but NASA officials said the system is not a requirement for the initial flight.

Precision approach path indicator (PAPI) lights will be operating on Runways 23, 15 and 04, which is a hard surface runway. The lights are designed to provide shuttle crewmembers with a visual reference during their rapid descent to let them know if the orbiter approach is too high or too low. (AVIATION WEEK & SPACE TECHNOLOGY, 3-23-81, p. 24, Vol. 114, No. 12)

<> Thirty-three-hour countdown demonstration test was completed on the space shuttle Mar. 19, clearing the way for the final critical tests before launch.

The tests are high and low pressure loadings of the cryogenic propellant tanks scheduled to be done later this week.

The demonstration last week covered virtually all aspects of the countdown except propellant loading and included the astronaut crew as an integral part of the launch preparation procedures.

Among key events that took place were the warming of the inertial measuring unit, pressurization and checkout of the main engines, loading software in the main engine controller, loading software in the orbiter computers and closing the payload bay doors.

The doors, closed Mar. 18, will remain closed until flight.

Other activities in the countdown demonstration included activating flight control systems, verifying that development flight instrumentation and orbiter instrumentation was functioning, powering up the star tracker and putting all switches in the proper position.

The crew cleared the orbiter at midnight, Mar. 18, and returned at 4:15 a.m. Mar. 19. John Young and Robert Crippen were in the cockpit for the final 2 hr. of the count. (AVIATION WEEK & SPACE TECHNOLOGY, 3-23-81, p. 27, Vol. 114, No. 12)

March 24: The $604 million cut from NASA's FY '82 budget by President Reagan will mean the loss of 15,000 expected contractor jobs.

The agency's contractor employment stood at 113,000 last September and was projected to rise to 123,000 by September 1982 under the Carter Administration's budget. The estimate has been pared to 108,200 under the Reagan budget.

NASA's employment, at 22,613 last September will be cut to 21,873 by September 1982, 840 people less than planned under the Carter budget. (DEFENSE DAILY, 3-24-81, p. 141, Vol. 115, No. 17)

<> The 33-hour Dry Countdown Demonstration Test of the Space Shuttle Columbia was successfully completed last week George Page, Shuttle launch director, said "everything in general went very well...I think everybody was pleased with today's run." (DEFENSE DAILY, 3-24-81, p. 141, Vol. 115, No. 17)

<> Acting NASA Administrator Dr. Alan M. Lovelace reiterated last week that NASA's projected budgets for FY '83 and FY '84 provide "little or no funding wedge" for new starts and, moreover, assume an inflation rate that is substantially below what it is now.

He told the Senate Subcommittee on Science, Technology and Space that the Reagan Administration is using an inflation estimate of 8.3% for FY '82, 7% for FY '83 and 6% for FY '84. NASA is currently experiencing an inflation of about 11 or 12 percent, he said.

Subcommittee Chairman Jack Schmitt (R-N.M.) indicated that he believes the 8.3 percent estimate is too low, citing a congressional study which calculated that the rate would be closer to the present figure.

In his opening remarks, Schmitt, who has already said that he will not oppose the Reagan FY '82 funding level for NASA, said, "It's time for the United States to recognize the relationship between our science and technology foundation and our national economy." He said that NASA must do its part in the needed budgetary restraint but it also must be part of the "appropriate investment for the future."

He said the FY '82 NASA budget is "not a budget representative of the world's first space power and it has not been for the past ten years."

Citing the global competition for exploiting the space environment, particularly from the Soviet Union, he said that as the Russians "continue to see America's support for a strong space program diminish, Soviet dominance will become even more evident." (DEFENSE DAILY, 3-24-81, p. 141, Vol. 115, No. 17)

March 25: Working under funding from Pennsylvania State University and several aerospace companies planning to build Space Shuttle-related space systems, a Penn State aerospace engineering professor is examining the problems involved in launching a satellite from the Shuttle, as well as a vehicle to dispose of space debris.

Prof. Marshall H. Kaplan said the launch, maintenance and retrieval of satellites from the Shuttle will involve "tremendous problems."

To launch a satellite, the Shuttle has to release the spacecraft, which must drift for about 45 minutes until it's far enough away to fire its booster rockets without endangering the Shuttle.

Because the satellite is not simultaneously pointed in the right direction, forced to spin, and thrust upward (as in an expendable vehicle launch), the chances of its going into a tumble, losing its orientation and missing its precise final orbit "are substantially increased," Kaplan said.

This is a major problem, he said, since not only is the planned orbit at stake, but requires that consideration be given to such things as a satellite's size, shape, weight and fuel needs in designing a spacecraft to insure that it will go into the correct orbit.

Kaplan said that one of the major objectives of this study is to provide the satellite with the "intelligence" it needs to direct itself to its final orbit. He is also looking at what type of propulsion system would best serve the needs of shuttle-launched satellites, particularly from the standpoint of safety.

Kaplan's study also includes an investigation of ways to remove man-made space debris, e.g., remnants of launch vehicles and old, non-functioning satellites, from Earth orbit.

In particular, he is studying the design, docking capacity and other details of remotely controlled space vehicles that would orbit for a period of months, maneuver to a number of objects, and then either pick them up for return to Earth, or attach a retro-rocket to them to propel them into the Earth's atmosphere where they would burn up. (DEFENSE DAILY, 3-25-81, p. 146, Vol. 115, No. 18)

<> 2-A. Mr. Griffin reported that Vice President Bush's visit to KSC on March 17 was considered a success and KSC's handling of the event was very professional.

Mr. Griffin requested a brief status report after the Senior Staff meeting on the investigation of the Pad A accident. Dr. Buchanan stated that Mr. Cole, one of the accident victims, remains hospitalized in critical condition, but that he is showing improvement of his vital functions (heart, lungs and kidneys). Mr. Page indicated the personnel at Pad A are asking for an ambulance to be stationed at the pad. Mr. Griffin stated that Dr. Buchanan should determine the resources required to provide an ambulance at Pad A when the Shuttle vehicle is there.

2-F. Mr. Hollinshead announced that KSC has been requested to participate in the SHARP Program (Student High School Apprentice Research Program) again. KSC has sixteen students to place in meaningful jobs in scientific/research fields. (EXECUTIVE STAFF NOTES, #10-81, pp. 1-2)

March 26: Acting NASA Administrator Dr. Alan M. Lovelace told the Senate Space Subcommittee yesterday that the agency has asked Congress to allow it to proceed with development of a wide-body Centaur upper stage for the Space Shuttle and asserted that "a sole source contract with General Dynamics for the development and production" of the stage is essential to meet the 1985 launch date for the Galileo Jupiter Orbiter/Probe.

However, subcommittee chairman Jack Schmitt (R-N.M.) did not commit himself in any way to support for the NASA plan, emphasizing that the important thing is to select the best upper stage that can meet the long-term needs of both NASA and the Defense Department, not just to satisfy the requirements for Galileo.

Asked by Schmitt what the savings would be from dropping the three-stage inertial Upper Stage and going to Centaur for Galileo, allowing a single launch in 1985 instead of a dual launch, Lovelace said the costs would be "about equal."

The savings from the single launch would be offset by the higher development costs for Centaur. (DEFENSE DAILY, 3-26-81, p. 153, Vol. 115, No. 19)

March 27: NASA Wednesday successfully conducted the fueling test on the Space Shuttle External Tank, with no indication of separation of any of the thermal insulation tiles on the tank. In the initial fueling of the tank in January, some 35 insulation tiles were debonded and had to be rebonded. Wednesday's test began at 10:30 AM and concluded at 9 PM after several technical problems were encountered and overcome. A final fueling test, to check out fueling procedures, is scheduled today. Maiden launch of the Shuttle remains scheduled for the week of April 5, with April 10 considered a good bet. (DEFENSE DAILY, 3-27-81, p. 167, Vol. 115, No. 20)

<> "There was a certain Walter Mitty excitement factor out there. It was like meeting Lou Gehrig when I was 12 years old. It was a thrill, a tremendous thrill."

That's how Vice President George Bush described his introduction to the Space Shuttle Columbia and prime crew astronauts John Young and Bob Crippen here last week.

After climbing into the orbiter's cockpit, Bush eased into the commander's seat and received a first-hand report on America's new spaceship from the crew who will pilot the craft on its first voyage into space.

"Hey listen, I looked over at Crip and John...and for the first 30 seconds I was a little dizzy lying there with the blood rushing to my head. To see that panel...and obviously just begin to comprehend the tip of the iceberg in terms of the technology, why it came home to me rather dramatically how impressive this whole thing is."

Obviously enthused by his visit to the launch pad, Bush later addressed the KSC workforce from the Launch Control Center, giving a hearty endorsement to the Shuttle program and heaping praise on the men and women who are making it a reality.

"I just can't tell you how impressed I am with what I've seen and what I know to be the sense of mission that all of you have," said the Vice President. "This program is going to go forward. I don't believe the American people have yet begun to fully understand what your efforts mean, not just to this generation but to future generations."

Bush, in comments broadcast around the center over the public address system, said the new administration in Washington views the space program as having "tremendous national importance" and he commended KSC employees for their "selfless work for this country."

The Vice President told space center workers that he believes the Shuttle's first mission will re-awaken the nation's sense of pride.

His praise for the KSC workforce was echoed by acting NASA Administrator Dr. Alan Lovelace, who flew down from Washington to accompany Bush on his tour of the space center.

"You can't say too much to compliment the NASA-contractor team down here," Lovelace told SPACEPORT NEWS. "I think this is a super event for the Vice President to come down here," he added.

Bush and his wife met the prime crew astronauts on the deck of the Shuttle's mobile launcher platform, were the special visitors were presented with a model of the Shuttle and two Landsat photos -- one of Houston, Texas, where they resided prior to moving to Washington, and another of Mrs. Bush's hometown in Maine.

Bush met with reporters at the new Complex 39 press site and reiterated the administration's support for the Shuttle program.

"We're committed to the Shuttle," he said. "We think it has an extraordinarily useful role to play. This program will have the opportunity of recharging the country, of getting its optimism up. I love it when something good happens to the United States." (SPACEPORT NEWS, 3-27-81, p. 1 & 7, Vol. 20, No. 7)

<> Above all else, we must be a team - and Joe Fitzsimmons, who has been with the space program at KSC since the Mercury and Gemini years, sees the Shuttle team growing stronger, day by day.

Fitzsimmons has seen a lot of changes here since he reported to work for NASA two weeks after John Glenn's historic orbital space flight in 1962.

In those days, he was a co-op student from Georgia Tech, working in operations support. Later, he was test conductor for the lunar module which carried astronauts to the surface of the Moon during the Apollo program.

Today, he's a test conductor for the Shuttle, manning a console in the Launch Control Center's Firing Room 1.

KSC's a different place these days -- there's a different launch vehicle and a different way of doing things.

But one important ingredient hasn't changed, he says.

"The enthusiasm we had with the earlier manned programs is still here," says Fitzsimmons. "Launch fever? These people have got it. I see T-shirts, badges, stickers everywhere I look, ever since the vehicle rolled out of the OPF."

In the "old days," he recalls, engineers watched their consoles intently, ready to sing out if problems arose. Now computers monitor the systems, sound the alarm, or even initiate an automatic shutdown.

The sparse population of engineers in Firing Room 1 during a Shuttle mission simulation is in sharp contrast to the "crowd scenes" of the Apollo days but the comparison is deceptive, he says.

"There are fewer people actually sitting at consoles," he points out, "but there are a lot more writing programs for the computers behind those consoles."

But in spite of all the automation, words exchanged from person-to-person remain critically important, he adds.

In the early stages of Apollo, he recalls, there was a lot of explaining of terms, until everyone learned what the other fellow was saying and until the same words meant the same thing to everybody.

"It's been similar in the early Shuttle program," says Fitzsimmons. "But it's all coming together. I see it blending, solidifying day by day."

For KSC workers like Fitzsimmons, who cut their teeth on the early manned flights, the gap between the last Apollo flight they worked and the first Shuttle mission has been a long one.

With the wait now almost over, Fitzsimmons and his teammates in Firing Room 1 are "go" for launch. (SPACEPORT NEWS, 3-27-81, p. 4, Vol. 20, No. 7)

<> Dave Moja gazes out towards Complex 39 from his window in the Operations and Checkout Building and sees a lot more than the Space Shuttle Columbia.

His eyes return to the colorful transparencies on his desk.

"We're looking some years into the future," says Moja, of KSC's Future Aerospace Projects Office.

He's part of a team at KSC which coordinates advanced planning with other NASA centers, performing pioneer studies to determine KSC facilities and operations support requirements for a broad range of candidate projects.

Orbiting way stations supporting spaceflight to geosynchronous orbit and beyond, space platforms where science and applications research is performed, enormous satellites to beam solar power toward an energy-hungry world - these are the types of missions Moja deals with.

It's a study not of what will be, but of what might be.

"We are the focal point at KSC for the agency's advanced planning efforts.

"As studies at the other centers progress, we initiate our own to concentrate on ground operations planning. We're going to have studies starting this fall on what would have to change at KSC for any of these options which may one day be pursued," he explained.

Moja represents KSC on future project studies managed by the Johnson Space Center. Tom Feaster is KSC's representative for projects managed by the Marshall Space Flight Center. And Dr. Gerry Sharp works advanced planning for future scientific payloads.

Some of the nearer term possibilities involve orbital aids which would be employed aboard the Shuttle, says Moja. These would be things like the Power Extension Package that would allow extended Shuttle power and duration or the graphically named "cherry picker" -- essentially an open work station attached to the end of the orbiter's remote manipulator arm.

Other future possibilities the KSC office is involved in studying are new launch vehicles derived from the current Space Shuttle. One concept of a Shuttle-derived rocket employs all the existing propulsion elements of the Shuttle but replaces the orbiter with a cylindrical cargo vehicle which would not be manned. Such a configuration could substantially increase payload capacity.

But one of the most exciting prospects under preliminary study is the Space Operations Center - a permanently manned station which would serve as an orbital depot.

"This would be a base for orbital transfer vehicles - a way station for travel to geosynchronous orbit and perhaps for planetary flights," explained Moja. "These are what we call habitation modules," said Moja, pointing with the back end of his pen at several can-shaped appendages on an orbiting structure depicted before him.

The Space Operations Center would be a shuttle-launched, shuttle-serviced facility which would be re-supplied every 90 days to permit continuous operation.

An advantage of such an orbital base, Moja said, would be the capability to support integrating a number of satellites onto a single structure where they would, perhaps, share a common power source and be launched toward geosynchronous orbit as one unit.

A beam builder device at the center could facilitate the construction of other large structures.

Another prospect - the Science and Space Applications Platform - would be an unmanned orbiting laboratory from which experiments in a range of scientific disciplines would be conducted.

Whatever's in store over the next 20 years of space travel, it's a sure bet KSC's Future Aerospace Projects Office will have visited it before the rest of us. (SPACEPORT NEWS, 3-27-81, p. 5, Vol. 20, No. 7)

March 30: Return of the space shuttle to Kennedy Space Center after its first flight to begin preparations for the second orbital flight test mission could require up to one month if the shuttle is forced to make an emergency landing at the White Sands backup recovery site, and up to two months if the orbiter has to land at one of three designated contingency airfields overseas.

National Aeronautics and Space Administration officials are prepared to rush some of the most essential shuttle recovery equipment to Northrup Strip at White Sands Missile Range, N.M., on short notice in USAF/Lockheed C-5 aircraft should the shuttle abort its mission on the first orbit, or have an underburn when its orbital maneuvering system (OMS) engines are fired for deorbit. The underburn would result in the shuttle landing at White Sands, about 700 miles southeast of Edwards.

The essential recovery equipment - called a mini-convoy - includes a 132,000-lb. purge transporter to disperse propellant fumes from the aft end of the orbiter, a large ground coolant transporter to cool shuttle avionics gear and other electronic components, two vehicles used to connect the purge and cooling umbilicals to outlets on the aft end of the orbiter and crewmember egress vehicle. (AVIATION WEEK & SPACE TECHNOLOGY, 3-30-81, p. 72, Vol. 114, No. 13)

March 31: The External Tank of the Space Shuttle Columbia successfully passed the second of two fueling tests Friday and NASA today, following a flight readiness review at Kennedy Space Center, is expected to set Friday, April 10, as the launch date for the first Space Shuttle flight.

The fuel loading tests Wednesday and Friday which involved loading of 526,000 gallons of liquid oxygen hydrogen, were designed to test the adhesion of the ET's cork and foam insulating panels, some 35 of which came loose during an earlier fueling test.

Shuttle launch director George Page reported that the two fueling tests "were successful. We have absolutely no debonding problem."

As a result, "we feel the 10th is a viable launch date," Page said Sunday. (DEFENSE DAILY, 3-31-81, p. 178, Vol. 115, No. 22)

April 1: NASA's space science chief Andrew J. Stofan reiterated last week that NASA plans to launch the Venus Orbiting Imaging Radar (VOIR) and Gamma Ray Observatory in 1988 instead of 1986 because of deletion of new start funds for the programs by the Reagan Administration, leaving open the question of where the money will come from to fund the programs in FY '83-85 -- years where NASA is projected to have new start funds. (DEFENSE DAILY, 4-1-81, p. 189, Vol. 115, No. 23)

<> All seventeen Republican members of the 40-member House Committee on Science & Technology, whose responsibility includes authorizing funds for NASA, have informed committee chairman Don Fuqua (D-Fla.) that they will oppose increases above the Reagan Administration request for all agencies in the committee's purview in FY '82.

The action is a break with the previous bipartisan nature of the committee's actions. With Democrat and Republican support, the committee has tended to boost the NASA budget several tens of millions of dollars in previous years.

In a letter to Fuqua last week, the 17 GOP members of the committee stated: "We intend to support fully the overall budget levels proposed by the Reagan Administration for each of the agencies under the committee's jurisdiction. This is not to say that we are unanimous (in) our support for the exact dollar amounts for various programs within each agency. Clearly, we have some reasonable differences here, both among members and between ourselves and the Administration. However, we do agree that it is absolutely essential once subcommittee and full committee mark-ups are concluded that the 'bottom line' figure for each agency not exceed the President's proposal, even by small amounts.

"...During our authorization hearings, we have all heard pleas for funding for some programs above the President's request. Taken in isolation, many of these pleas have merit. But what the minority members wish to emphasize is the overriding importance of approving the Administration's funding levels as a means to national recovery. Exceptions, no matter how limited, will inevitably lead to a flood of further budget additions." (DEFENSE DAILY, 4-1-81, p. 190, Vol. 115, No. 23)

April 2: During the past three years, the funds appropriated for construction of Space Shuttle facilities for the Air Force have totaled $364.1 million, including $286.7 million for facilities at Vandenberg AFB, Johnson Space Center, and Cape Canaveral, and the reprogramming of $77.4 million to cover launch complex cost overrun at Vandenberg. Another $38.2 million is requested for FY 1982, including $19.9 million for Vandenberg and $18 million for solid rocket booster retrieval and disassembly facility at Port Hueneme, Calif. The initial operational capability date at Vandenberg is August 1984, with an initial capability of about 10 launches per year. It is planned to increase that rate to a maximum of 20 per year. (DEFENSE DAILY, 4-2-81, p. 196, Vol. 115, No. 24)

<> Grumman Aerospace Corp. is being awarded a contract by NASA's Johnson Space Center to study simulations to verify the conceptual designs of Space Shuttle Orbiter-based construction equipment. (DEFENSE DAILY, 4-2-81, p. 196, Vol. 115, No. 24)

<> NASA announced yesterday that the Space Shuttle Columbia is ready to fly and set Friday, April 10 as the date for the maiden Shuttle flight. If all goes as scheduled, the launch will take place 45 minutes after sunrise. Astronauts John Young and Robert Crippen will be at the controls of the Orbiter for the planned 36-orbit, 54-1/2-hour flight, which will land at the dry lake bed at Edwards AFB, California. The maiden launch is two years and a month behind the schedule set a decade ago. (DEFENSE DAILY, 4-2-81, p. 199, Vol. 115, No. 24)

April 6: Ten years of research and development, schedule slips, underfunding, cost growth and vacillating political support are behind the space shuttle. A new decade is about to open for the reusable space launch system that has absorbed a dominant share of NASA's budget since its inception.

While the confirmation and appointment process plodded on for the agency's new politically appointed leadership last week, the acting heads of the agency and shuttle program managers sat down at the Kennedy Space Center and committed as firmly as possible under the circumstances to a realistic launch date for the first shuttle flight -- April 10.

Launch preparation work for the initial trip of the four-flight orbital test program for the shuttle is two shifts behind -- less than a full day. That is a far cry from the black days of the tile bonding problems when the schedule delays were measured in weeks or months. Barring some unforeseen accident or critical unexpected failure, the shuttle is ready to go.

Weather is now the biggest foreseeable hazard to the launch schedule. Mission requirements for the Kennedy launch site and abort runway there, the planned landing site at Edwards AFB, California, and Northrup Strip at White Sands, N.M., are no more than 50% cloud cover, no more than 10 kt. tail- or crosswind or 25 kt headwind. April weather records show there is only an 11% chance to get these weather conditions on any given day.

There is a 6-hr. 30-min. launch window after sunrise, but clearly plenty of opportunity for recycling from one day to another waiting for the right meteorological conditions. It will be a familiar uncertainty to veteran launch watchers. (AVIATION WEEK & SPACE TECHNOLOGY, 4-6-81, p. 11, Vol. 114, No. 14)

<> Discipline over areas with controlled access and communications procedures are being tightened here in the wake of a space shuttle launch pad accident March 19 that killed two Rockwell International employees and injured four others. Rockwell employee John G. Bjornstad died the day of the accident and Forrest Cole died April 1.

The Rockwell International work team entered the aft fuselage section of the shuttle orbiter Columbia and were overcome by a 100% nitrogen atmosphere that deprived them of oxygen. The aft fuselage area houses the space shuttle main engine propellant manifold and engine power heads. It is commonly maintained in a 100% nitrogen purge to prevent buildup of any possible leaking oxygen or hydrogen gas.

"We have spruced up a lot of the discipline control areas and we are now doing fewer things in parallel than we were before," according to George F. Page, Kennedy shuttle operations director. Final report of the accident investigation team has not be released, but a high NASA official said cause of the accident was largely a

communications problem. "Communications and understanding of the overall pad team was less than perfect," according to preliminary information, the official said. "The safety guys who give the all-clear for work mean the all-clear for areas of normal work or areas that are explicitly not closed for access.

"The access area to the aft fuselage had a rope and a sign, but the sign used was the same kind of sign used to basically control access as opposed to hazards. They were not using the hazards sign, so the rope was taken down by people who thought it was okay to enter when in fact it was supposed to have been taken down by safety monitors after they had sampled the area for gas. The sign was taken down by an access monitor, preliminary information indicates," he said.

"It was a communications problem. Now they are going to make sure everybody understands the rules and will probably announce over the intercom the specific exceptions involved in pad access."

The accident investigation team has been interviewing numerous individuals at Kennedy Space Center. Managers say no pressure is being applied to finish the final accident report in order to enhance schedule to first shuttle launch. The accident report is not expected to affect scheduling. (AVIATION WEEK & SPACE TECHNOLOGY, 4-6-81, pp. 18-19, Vol. 114, No. 14)

<> NASA has awarded contracts worth $96 million to Honeywell Information Systems to provide computers for the central data system of the Space Shuttle Launch Processing Systems at Kennedy Space Center and Vandenberg AFB. The LPS automatically checks out the Shuttle while it is being prepared for launch. For FY '82 the contracts are valued at $30 million, and carry options valued at $66 million through FY '86. (DEFENSE DAILY, 4-6-81, p. 215, Vol. 115, No. 26)

<> U.S. space shuttle project management has taken measures to prevent the shuttle's air-to-ground command links from being interfered with by the Soviet Union or terrorist organizations.

Protection of the air-to-ground command capability will be achieved manually for the first shuttle mission and will involve a data encryption capability by the fifth shuttle flight.

During early flights, before the tracking and data relay satellite system is available, Soviet or terrorist groups would have to make interference attempts while the shuttle is within line of site. TDRSS, however, would provide an additional line-of-sight target for would-be forces of interference. TDRSS will be protected against unwanted radio penetration.

The space shuttle has so much onboard autonomous capability that harmful interference would probably be unsuccessful if attempted. Such attempts could, however, deprive ground stations of data.

During launch and emergency, abort calls should be made from the Mission Control Center in Houston, but the spacecraft itself has displays to show the abort modes available to the crew. (AVIATION WEEK & SPACE TECHNOLOGY, 4-6-81, p. 17, Vol. 114, No. 14)

April 7: The Soviet Union charged Saturday that the United States plans to use the Space Shuttle for "turning outer space into an arena of battle for America's dominance of Earth."

The Tass News Agency said the Pentagon is "intensively preparing for using outer space for military purpose," using the so-called "Soviet threat" as an excuse for building up the military aspects of the space program.

"Having failed to achieve a military superiority on Earth, the U.S. strategists are switching to outer space," it said. Tass also charged that the U.S. wants to break the agreement barring deployment of nuclear weapons in space. (DEFENSE DAILY, 4-7-81, p. 233, Vol. 115, No. 27)

<> The 73-hour countdown for the maiden flight of the Space Shuttle Columbia at 6:50 AM this Friday began at 11:30 PM Sunday. The countdown includes six "holds" totaling 30 hours and 20 minutes.

NASA yesterday expected to fix a short circuit that developed Sunday in a wire between a control box and a "pogo" suppression valve in the Space Shuttle Main Engine system which caused the valve to pop open. NASA yesterday also replaced a leaky oxygen valve in ground equipment supporting Columbia's fuel cell generator. The replacement delayed work by about three hours, but the lost time is expected to be made up by late today. (DEFENSE DAILY, 4-7-81, p. 223, Vol. 115, No. 27)

April 8: Acting NASA Administrator Alan Lovelace has acknowledged that it is likely that the Space Shuttle will not be able to handle all of the payloads on its manifest over the next four years and said NASA is looking at increased use of expendable vehicles, such as Delta, for some civilian payloads.

The problem, cited by Chairman Edward P. Boland of the House HUD-IA Appropriations Subcommittee, is that NASA now believes it can build only 32 to 40 External Tanks per year by the end of 1985 rather than the 48 that are required for the missions on the manifest. Lovelace cited the need to draw manpower from ET production to deal with the ET's rebonding problem at KSC. (DEFENSE DAILY, 4-8-81, p. 229, Vol. 115, No. 28)

April 9: The Space Shuttle Columbia remains on schedule for its maiden launch at 6:50 AM tomorrow morning from Kennedy Space Center. At 4 PM EST Wednesday the countdown for launch was a hold at T-23 hours, with four hours remaining in the hold before countdown was to be resumed. (DEFENSE DAILY, 4-9-81, p. 233, Vol. 115, No. 29)

April 11: A puzzling computer breakdown forced postponement of the launching of the space shuttle Columbia Friday, and space agency officials pressed to reschedule it for Sunday.

The earliest the orbital test mission could blast off is 6:50 a.m. Sunday. But until the computer problem in the spaceship could be corrected, officials were unable to say when the reusable winged Columbia would be cleared for another launch attempt.

Friday night, engineers at Johnson Space Center in Houston identified the source of the malfunction as a timing fault in one set of spaceship computers that disrupted communications with the backup computer.

What repairs were required and what effect they would have on launching plans would not be decided until officials at the Johnson Space Center held a telephone conference with officials of the Kennedy Space Center at Cape Canaveral at midday today.

Arnold D. Aldrich, the shuttle deputy program manager at the Johnson Center, said the problem was a "time skew" traced to the operating instructions programmed into the Columbia's primary computers. It caused the primary computers to reject communications from the backup computer because they did not arrive when expected.

Launching crews at the Kennedy Space Center planned to keep the spaceship ready through today so the countdown could be resumed at 6 p.m. today, aiming for a Sunday morning lift-off.

The crews were not to begin refueling the shuttle later today until they received a favorable report on the computer problem from engineers and electronics experts at the Johnson Center.

After the launch postponement was announced at 9:56 a.m. Friday, crews went to the launching pad and helped Young and Crippen out of the cockpit. They had been confined to their couches, lying with their faces skyward, for more than six hours. The lift-off had been scheduled for 6:50 a.m.

Young appeared grim as he returned to the astronaut quarters at the space center. He and Crippen have been in training three years for the mission, which already is more than two years behind schedule because of development problems with the shuttle's propulsion system and heat-shielding tiles. The computers, ironically, relatively had been free of problems during the $10 billion development program.

Friday was the first time in 15 years that U.S. astronauts had encountered such a frustration on the launching pad. Having a launching "scrubbed," as it is known in space vernacular, was a frequent occurrence in the initial manned flight program of Mercury.

But the last time it happened was May 17, 1966, when the Gemini 9 astronauts, Thomas P. Stafford and Eugene A. Cernan, had to walk away from their spacecraft after the Agena target craft they were to rendezvous with failed to reach orbit. They did not finally fly until June 3. (THE NEWS AND OBSERVER, (Raleigh, N. C.), 4-11-81)

<> A simple failure to communicate among computers that would not "talk" to each other delayed the maiden flight of the space shuttle Columbia Friday morning.

The ship carries five computers in a data-processing system that runs almost every aspect of operation. It is designed to keep working even if one fails.

Four of the computers have identical programs, or detailed lists of instructions for specific operations. The fifth has a simpler backup program for emergency use.

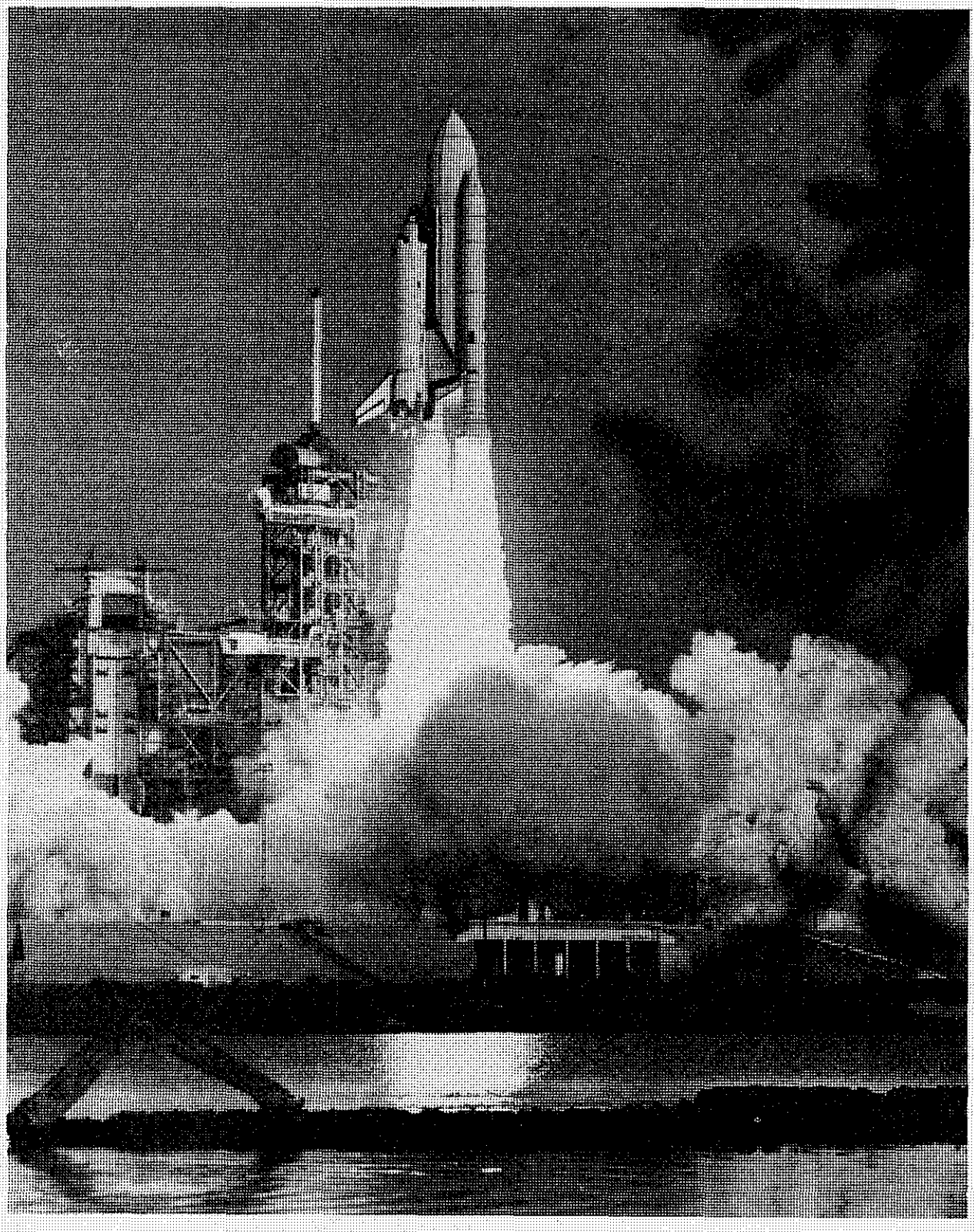
Late in the countdown, the launch crew discovered that the backup computer was not trading data -- "talking," in computer parlance -- with the four main computers. This left the potential for a complete computer-system failure should the four main units somehow go awry.

Mission Control would not let the spacecraft take off without the entire computer system in working order.

The source of trouble seemed to be in the program written for the backup computer. The launch was delayed while technicians made a painstaking line-by-line check of its program. (THE CHARLOTTE OBSERVER, 4-11-81)

April 13: On his first full day back in the White House since he was wounded in an assassination attempt, President Reagan arose at 6:50 A.M. today to watch the televised launching of the space shuttle Columbia on its first orbital flight.

"It's a spectacular sight," Mr. Reagan exclaimed, according to Larry Speakes, the deputy White House press secretary.



Space Shuttle Columbia launched into history at 0700 EST, April 12, 1981; STS-1 concluded successfully with the landing at Edwards AFB, California, on April 14.

In a message read to the Columbia astronauts by George F. Page, the mission director, Mr. Reagan said, "May God bless you and may God bring you safely home to us again."

TEXT OF STATEMENT

You go forward this morning in a daring enterprise and you take the hopes and prayers of all Americans with you. You go in the hand of God and draw on the courage of life.

Our countryman and poet, William Cullen Bryant, said America is where "mankind throws off its last fetters." With your exploits we loosen one more.

"Who," he said, "shall place a limit to the giant's strength, or curb his swiftness in the forward race." Through you, today we all feel as giants once again. Once again we feel the surge of pride that comes from knowing we are the first and we are the best and we are so because we are free.

For all Americans, Nancy and I thank you and the 50,000 others who have worked to make this day possible. As you hurtle from earth in a craft unlike any other ever constructed, you will do so in a feat of American technology and American will. May God bless you and may God bring you safely home to us again. (THE NEW YORK TIMES, 4-13-81)

<> House opponents of the Halley Intercept Mission say that the $5 million added to the FY '82 budget by the House Science Committee for further study of the mission is inadequate to carry out the project on the required schedule for the 1986 return of Halley's Comet. They say $30 million would be needed in FY '82 if the $250-$300 million mission is to be conducted. NASA did not request funds for the project from the Carter Administration because it had higher priority projects. (DEFENSE DAILY, 4-13-81, p. 252, Vol. 115, No. 31)

<> A Chinese news report late last week said the Space Shuttle's principal objective is military operations, with reconnaissance from synchronous orbits beyond the range of Soviet antisatellite devices. Because of this mission, the Soviets have always been against the Space Shuttle type of vehicle, the report said. (DEFENSE DAILY, 4-13-81, p. 253, Vol. 115, No. 31)

April 14: The Space Shuttle Columbia, piloted by astronauts John Young and Bob Crippen, which flew into history Sunday in the maiden launch in the Shuttle program, is scheduled to land on the dry lake bed at Edwards AFB, Calif., at 1:28 (EST) this afternoon, ending a near-perfect 54 1/2 hour mission.

The major anomaly in the mission is the loss of an estimated 15 insulation tiles on the Columbia's two OMS pods -- an area which will not be subjected to maximum heat loads and an area not critical to bringing the spacecraft through reentry.

Despite speculation about the possible loss of critical "black tiles" on the underside of the vehicle, flight director Neil Hutchinson said, "We're not worried about any others (tiles) being loose." As for what caused the 15 tiles to debond, he said, "It's fairly obvious the phenomenon was shock waves in the ascent that we didn't anticipate."

Top secret Air Force telescope cameras in Hawaii and Florida were scheduled to "inspect" the underside of the Shuttle -- flying at an altitude of 170 miles -- yesterday to see if any tiles had, in fact, come off.

Deputy flight director Gene Kranz said the return could be handled a little differently if some underside tiles are missing, e.g., turning off some electrical lines in the underside of the Orbiter and some of the coolant pipes in the spacecraft's wings.

However, he said, "I want to emphasize that we are not concerned about the tiles." (DEFENSE DAILY, 4-14-81, p. 256, Vol. 115, No. 32)

<> It's the number one song 172 miles above the Earth.

Aboard the Space Shuttle, Jerry Rucker's "Blastoff Columbia" served as a country-western alarm clock Monday for astronauts John Young and Bob Crippen.

Rucker, a 36-year-old technician for Martin-Marietta at the Kennedy Space Center, said it was his love of the space program that inspired the song.

"I thought it needed a song," he said.

Sung by Roy McCall, of Titusville, "Blastoff Columbia" was published by Silver Pelican Co. in Maitland.

For now the song, like the Shuttle, is in the spotlight.

"According to my publisher, the song is being played all over the United States. I have a feeling the record will get notice after the landing. This is something America can be proud of," said Rucker, who lives in nearby Geneva and writes gospel music as a hobby.

"This means more to me than any I've written so far. It really came from the heart," he said.

The words to the song are:

We have liftoff. It's beautiful. It's leaving the pad.

Well, many, many hours went into this thing. A job well done by the Shuttle space team. We can't say that she's sleek and lean, but I'll tell you right now, she's a mean machine -- The Columbia.

Not the kind you smoke, this here bird. She's high on herself.

Rockwell, Martin, USBI, all got together and they give it a try. You oughta see that sucker fly. Thar she goes, now wave bye bye.

These solid rocket booster's hanging off the side, look out boys you're in for a ride. She's gonna switch into overdrive. Just lay back and let her slide.

Don't hit any fence posts on the way up there boys. Flip in the switch...Awlright.

Crippen and John are in the driver's seat...Home Sweet Home never sounded so sweet. After this ride, they're gonna be beat.

Shook their socks off. Rest of the time when G-2...Hold on boys. Awlright. (TODAY, 4-14-81)

<> More than 200,000 people, undaunted by warnings of rattlesnakes and snarled traffic, were expected to welcome home the Space Shuttle Columbia today when it glides to a landing on a sunbaked lake bed in the Mojave Desert.

"This is the only time we're ever going to see anything like this," said Francis Bonar, one of hundreds of early arrivals at Rogers Dry Lake on this remote desert air base.

Chamber of Commerce officials in nearby Lancaster Monday estimated the crowd would top 200,000 by the time the world's first roundtrip spaceship is scheduled to touch down at 1:28 a.m. EST after orbiting the globe for 2 1/2 days.

Lancaster Mayor Fred Hann predicted the biggest crowd in the city's history.

Tents and trailers began packing a public viewing area 3 1/2 miles from the landing site Sunday night. Awnings were being erected across the lake bed where VIP's, including Air Force Secretary Verne Orr, were to watch the landing.

A mini-midway complete with hot dog, peanut and beer stands sprang up in the public viewing area. Early arrivals snapped up Space Shuttle T-shirts and hats. Some planted American flags in the hard desert ground at their campsites. (TODAY, 4-14-81)

<> Moscow, commenting on the flight of the Space Shuttle Columbia yesterday, continued its criticism of the spacecraft as an instrument of the arms race. "Work on the shuttle began 10 years ago. The American military connected it with far reaching plans to extend the arms race to space. An important element of the very first mission is the testing of a sighting device for laser weapons." (DEFENSE DAILY, 4-14-81, p. 257, Vol. 115, No. 32)

<> Asked yesterday if the Reagan Administration is going to be responsive to the calls for added space efforts by the United States, in the wake of the success of Space Shuttle Columbia, such as joint missions with the Europeans, White House spokesman Larry Speakes said, "Once we get our NASA people appointed, we will discuss it with them." (DEFENSE DAILY, 4-14-81, p. 257, Vol. 115, No. 32)

<> Sen. William Proxmire (D-Wis.) says the Space Shuttle, originally estimated to cost $5 billion, will actually cost about $20 billion, or "about $400 for every American family." Proxmire, who has been a persistent critic of the Space Shuttle program, told ABC"s "Issues and Answers" Sunday that the program is being "grossly oversold." He said the United States is "putting a truck up in the sky and we're being told it's a second coming." Sen. Harrison Schmitt (R-N.M.), chairman of the Senate Space Subcommittee, also on the program, said, "We really have no alternative. The new ocean of space is there. We opened it up far more than the Soviets did. But the competition between oppression and freedom has now expanded into that arena." Schmitt added that the U.S. "must be there as dominant, if not more so, than any other nation." (DEFENSE DAILY, 4-14-81, p. 257, Vol. 115, No. 32)

April 15: Sen. John Glenn (D-Ohio), who has not had much to say about the space program since coming to the Senate, said Sunday that the money being spent on the Space Shuttle is justified.

"I think it would be worth every nickel spent on it just for the military uses the Shuttle and the space program can be put to," he said. "But we're not doing that. We're doing a lot of civilian research and new material development in addition to military uses of surveillance and communications and perhaps defensive weapons," possibly including "lasers in space" that could shoot down Soviet ICBM's aimed at the U.S.

As for U.S./Soviet cooperation in space, Glenn noted that in 1962, when he orbited the Earth in the first U.S. manned orbital flight, "I proposed...that we get together, the astronauts and the cosmonauts," but nothing came of it but one Apollo-Soyuz mission. "I think it probably would be pretty late in the game to do that now," he said. "We seem to be pretty much going our own ways." (DEFENSE DAILY, 4-15-81, p. 270, Vol. 115, No. 33)

<> President Reagan yesterday praised Space Shuttle astronauts Young and Crippen, saying their "brave adventure has opened a new era in space travel. You put new worlds within closer reach and more knowledge within our grasp." (DEFENSE DAILY, 4-15-81, p. 265, Vol. 115, No. 33)

<> The Soviet trawler Ekwator tried to move into the Space Shuttle solid rocket booster recovery area during the launch on Sunday and had to be ordered out by a U.S. helicopter and cutter. The Coast Guard helicopter first spotted the Ekwator at the edge of the recovery area 170 miles east of Flagler Beach, Florida, and asked it to move out of the area. After initially complying, the Ekwator made several efforts to move in closer, but was prevented by the cutter Steadfast. Finally, the Ekwator went dead in the water outside of the impact area. Yesterday, the trawler monitored the recovery of the United Technologies booster castings as they were towed back to the Navy's Trident submarine base at Port Canaveral. One of the casings was to be towed up the Banana River to the Kennedy Space Center yesterday. (DEFENSE DAILY, 4-15-81, p. 270, Vol. 115, No. 33)

<> The 54-hour maiden flight of America's Space Shuttle Columbia concluded in triumph at 1:21 PM EST (10:21 AM PST) yesterday when pilots John Young and Robert Crippen set the 214,000-pound reusable spacecraft down in a perfect wheels-down landing on the dry lakebed at Edwards AFB, California. Firing of the OMS engines to begin reentry began at about 12:22 PM. Six minutes later, Young reported the burn was "on time and nominal."

Early indications were that the flight was near perfect and that the Columbia is in excellent condition. There were no reports that any of the critical "black tiles" on the underside of the spaceship debonded.

Young, who emerged first from Columbia at 2:25, bounded down the steps that were brought out to the Orbiter after it was shut down and checked by technicians for toxic gas leaks, shaking hands with the technicians and walking under the Columbia to look at the tiles. Crippen emerged several minutes later, also all smiles, and the two immediately got in the van to take them back to the air base. The astronauts were to be flown to Houston tonight for five to eight days of debriefing.

Young, a veteran of four previous space missions, told mission control that the Shuttle "is an all right flying machine. It doesn't fly like anything I ever flew before. It is really super."

"It was one fantastic mission," added Crippen.

Shortly after the successful landing, NASA-Johnson director Chris Kraft commented: "We just became infinitely smarter."

Meanwhile, early indications from the Cape were that damage to the Shuttle's Solid Rocket Boosters that were recovered in the Atlantic was less than earlier expected.

"I have no doubt that these SRB's will be reusable," Roy Runkle, a NASA design engineer for the SRB, told reporters. (DEFENSE DAILY, 4-15-81, pp. 264-265, Vol. 115, No. 33)

<> The twin rocket boosters that helped propel Columbia into orbit will be refurbished at a cost of $14.2 million and put to use on the sixth shuttle mission, planned for December 1982.

National Aeronautics and Space Administration (NASA) officials said yesterday that the boosters were "in very good condition" despite the battering they took with their plunge into the Atlantic Ocean on Sunday.

Reconditioning the boosters will cost $36 million less than building a new pair from scratch. (THE PHILADELPHIA INQUIRER, 4-15-81)

<> From the moment John W. Young and Robert L. Crippen entered the space shuttle Columbia to the moment they emerged safely after their flight, both carried $800,000 worth of accident insurance.

The coverage was arranged through the National Space Club Scientific and Educational Foundation, which promotes research and education relating to rocketry and astronautics, and by Corroon & Black-INSPACE, a Washington-based firm that specializes in insuring space risks.

James W. Barrett, chairman of Corroon & Black, said his firm arranged for each of eight insurance firms to provide $100,000 worth of coverage on each astronaut. The nonprofit foundation paid the premiums, and, in turn, each insurance company made a donation to the foundation. (ASSOCIATED PRESS, 4-15-81)

<> Boeing Aerospace Co., one of the Phase-A study contractors for preliminary definition of NASA's conceptual Space Operations Center (SOC), reports completion of the first phase of its study, accompanied by the release of an artist's concept of the Shuttle-serviced, modular SOC.

As depicted, the Boeing SOC concept is comprised of: 1) Two "large mobile home" -sized Habitat Modules that would serve as living quarters; 2) Two attached Cylindrical Service Modules which contain propellant, batteries, power processing, units, oxygen and nitrogen; 3) A Logistics Module which serves as a storeroom for consumables such as food, water and hydrazine; 4) A large hexagonal hanger for servicing and storing spacecraft; 5) A tubelike docking module for docking spacecraft and building structures in space; 6) Two solar arrays attached at either end of a long boom to provide power for the center; 7) A flat panel radiator; and, 8) A track or truss structure and moveable "cherry picker" crane used for handling spacecraft.

Boeing notes that the SOC concept differs from previous Space Station concepts in that it would begin primarily with operational functions rather than as an R & D operation.

These functions would include construction of space structures; tending of free-flying satellites; and servicing, launching and recovering space-based vehicles, in addition to scientific research.

The center, orbiting some 200-250 miles above the Earth, would be permanently manned, with crew members staying about 90 days before returning to Earth.

Boeing says an initial station with a crew of four could be constructed in the late 1980's. (DEFENSE DAILY, 4-15-81, p. 271, Vol. 115, No. 33)

April 16: The Soviet evening television news program devoted about 30 seconds today to film clips showing the Columbia landing and its two astronauts being greeted after getting off the plane that took them to Houston.

The Soviet commentator, reading from a New York dispatch by Tass, the official Soviet press agency, said the new feature of the American spaceship was that it could be re-used and should be able to put payloads into orbit at a lower cost than rockets.

"These characteristics of the re-usable ships," the Tass dispatch said, "can serve both in the exploration of space for peaceful purposes and in the solution of tasks of a purely military nature."

"A big role is reserved for the shuttle program in the testing of various types of the newest weapons, which the United States intends to station in space," the press agency added. (THE NEW YORK TIMES, 4-16-81)

<> The second cargo carrier in America's space transportation fleet is taking shape here and is due to become operational in just over a year.

Rockwell International's assembly plant in this wind-swept Mojave Desert town 20 miles south of the landing strip where the Space Shuttle Columbia landed Tuesday is one of a kind.

Its 400 workers assemble a single product - Shuttles, at $500 million per copy delivered to NASA. Rockwell, the prime contractor for the Space Shuttle, labored nine years to get Columbia in shape for Sunday's launch at Kennedy Space Center, and the reusable spacecraft's first five flights will all be tests of increasing complexity.

But the Columbia's sister carrier, Challenger, "will right into operational flight" in June 1982 when it is transported from the tall, 110,000-square-foot building where it is being assembled, according to Rockwell spokesman Bill Green. (TODAY, 4-16-81)

<> While a full inspection of the insulation tiles on the Space Shuttle Orbiter Columbia remains to be completed, NASA is starting preparations for the second flight of Columbia in September.

The backup astronauts for the first Shuttle flight, space rookies Joe H. Engle and Richard H. Truly, have been named to pilot the second flight, which is slated to last four days, compared to the two-day (54 hours, 20 minutes, 52 seconds) Orbital Flight Test-1 mission. Both astronauts participated in the landing tests of the Shuttle Orbiter Enterprise.

The third test flight of the Shuttle is planned for next spring; the fourth and final test flight in the fall of 1982, and the first operational flight, carrying the first Tracking and Data Relay Satellite, is planned for the end of 1982.

Columbia is slated to begin its return flight to Cape Canaveral from Edwards riding atop a 747 airliner in about a week.

Scientists estimate that the nose and leading edges of Columbia's wings were subjected to temperatures of about 2750 degrees F during reentry, which started at an altitude of 400,000 feet over the Pacific. The spacecraft, traveling at more than 17,000 mph when it began reentry landed at a speed of 215 mph.

Deke Slayton, manager of the Orbital Flight Test program, said Tuesday that shuttle officials are "all supremely happy with the way the vehicle performed. I guess we consider it a 100 percent successful mission."

Slayton said he got a preliminary report from the ground crew saying the tiles looked to be in good shape. (Sixteen tiles came loose from Columbia's OMS pods during takeoff.) A close inspection was delayed because a small amount of explosive freon and hydrazine gases were detected near Columbia shortly after landing.

The one negative report on the mission is that the Shuttle's launch pad at the Cape suffered significant damage, which is going to require "a lot of time and manpower to fix." Pad director John Styles said the pad will have to undergo "some redesign." (DEFENSE DAILY, 4-16-81, p. 273, Vol. 115, No. 34)

<> U.S. Rep. Bill Nelson is calling for the Reagan administration to establish a firm national policy on space - including goals for an orbiting space station by 1990.

The Melbourne Democrat said Wednesday his proposal has the full support of the House Science and Technology Committee and its space subcommittee.

Nelson said he gained his colleagues' backing at this week's successful Space Shuttle launch from Kennedy Space Center and landing at Edwards Air Force Base in California.

"I will urge the new administration to make a strong declaration of space policy in the near future -- what we should do and when," Nelson said.

The nation hasn't had a space policy in eight years, Nelson said at an Orlando news conference. (TODAY, 4-16-81)

<> These are the firsts connected with the space shuttle Columbia:

It is the world's first reusable spaceship.

It is the first spaceship to carry a human crew on its maiden flight.

It is the first spacecraft to ride piggyback on its main fuel tank into space.

It is the first spacecraft to have booster rockets that were designed to be reused. By the way, the boosters themselves

were the first to use solid fuel for a manned flight. And they are the biggest solid fuel rockets ever used in the space program with a total thrust of 5.3 million pounds.

It is the first winged spaceship. The wing span is 78 feet. The tail is 46.3 feet tall.

It is the first spaceship to have a cargo capacity. Such capacity is about 1 1/2 times as great as an Air Force C-130 cargo plane and the shuttle's hold can accommodate a Greyhound bus.

It is the first spaceship capable of ferrying as many as 10 people in an emergency. (HOUSTON CHRONICLE, 4-16-81)

April 17: Federal officials moved yesterday to suspend the license of a pilot who may have risked a collision with the space shuttle Columbia by flying his private plane into restricted air space seconds before blastoff.

The pilot, not identified pending receipt of the suspension notice, was chased away from the launch pad 90 seconds before the Columbia lifted off Sunday.

He later said he was trying to photograph the launch, spokesmen for the Federal Aviation Administration said.

Kennedy Space Center security helicopters twice had to chase the single-engine Cessna-150 away from the launch pad and an FAA chase pilot later forced the plane to land at a local airport. (THE SUN, 4-17-81)

<> NASA Space Shuttle officials continue to be optimistic that the Shuttle Orbiters will be able to make the 100 flights for which they were designed, following preliminary examinations which show the Columbia to be in excellent condition.

Orbital Test Flight director Deke Slayton said, "Overall, we're happy about the performance of the whole system." "I see no reason why we can't have 100 missions with this machine, probably more than that."

Slayton said that besides the 16 insulation tiles that were pulled of the OMS pods during launch, no additional insulation tiles on Columbia were lost. Some of the tiles on the underside of the Columbia, however, were discolored by the heat of the reentry and some were chipped or pitted by sand kicked up by the landing on the dry lakebed at Edwards.

However, said Slayton: "All the damage looks like it's repairable." (DEFENSE DAILY, 4-17-81, p. 281, Vol. 115, No. 35)

<> Somalia has become the 106th member country of Intelsat, the International Telecommunications Satellite Organization. (DEFENSE DAILY, 4-17-81, p. 281, Vol. 115, No. 35)

April 20: Shuttleliner Columbia's departure from Launch Complex 39A here last week was well within the strictest airline on-time standards. There was a small ball of flame visible from the viewing site when the orbiter's three main engines ignited at the pad within a minute of the launch schedule revised after the recycled first attempt April 10. A small squirt of steam ejected to the right and a larger one an instant later to the left. The shuttle stack hung for six seconds on the pad for thrust monitoring and umbilical retraction before the pair of solid rocket motors fired. Then it popped off the pad, executed a quick 100-degree roll to the right just above the lightning mast on the support tower leaving all but the tips of its delta wing hidden behind the belly-mounted, bulging external tank, in turn flanked by the slimmer solid boosters. With that, it barreled straight up leaving a fat, pristine white cumulus-puffed finger of smoke in its wake.

Unlike the majestic, deliberate acceleration of the Apollo spacecraft Saturn 5 liquid rocket powered booster and its deep bass low-frequency vibration, the shuttle lit up and was gone. It was the typically solid-rocket-motor fast getaway of the Titan 3 launch vehicle.

Cheers, yells of elation, shouts of encouragement swelled from the crowd as the shuttle's smoke trail arched over to trace orbital insertion trajectory. Despite all the emotion of a 10-year development program with a two-year slip and letdown of the earlier aborted launch, uproar seemed slightly out of place, for the shuttle was all business.

The resumed final countdown at the T-5 hour point -- and incredibly the complex final 9 minutes on automatic sequencer -- went just like the documents. No glitches, no unplanned holds, no second agonizing recycle of the launch date. For a first flight of a space vehicle, let alone one more complex than Apollo, it was a remarkable performance.

Improvements are still needed. The first mission missed the tracking and data relay satellite system now in development whose delays will slip operational service to 1983 or 1984. Without it on STS-1, the crew could communicate with mission control only 30-40% of each orbit because of loss of NASA worldwide tracking stations for budgetary or political reasons.

What happened to cause launch recycle -- random out-of-phase timing mismatch between the shuttle's four primary and one backup flight computer system -- also makes an important point about the shuttle. The shuttle is an electric airplane, with complex avionics and software, one that is still in a test program. It represents a different generation of operating and procedural technology, and there will be new kinds of problems to solve as it moves through its remaining three orbital test flights and into operation over the next two years. (AVIATION WEEK & SPACE TECHNOLOGY, 4-20-81, p. 13, Vol. 114, No. 16)

<> Shuttleliner Columbia's arrival here two days and six hours after launch was as precise and businesslike as its departure, except for a bit of showmanship to herald its approach -- a double sonic boom that sounded like the climatic cannon shots in the 1812 Overture.

At something like 80,000 feet, when the twin boom hit, the shuttle was invisible to the naked eye. Its position overhead could be approximated, though, by the two contrails of a pair of Northrop T-38 chase aircraft flying a 5-minute racetrack pattern outboard of the orbiter's planned course to landing. There was a blip amid the contrails -- possibly a last puff of the orbiter reaction control thrusters, and then the contrails diappeared as the T-38s cut inside the orbiter's gentle 1.3-g left-hand turn toward Runway 23 on Rogers Lake for a delicately timed rendezvous with the spacecraft decelerating from supersonic speed.

When the orbiter finally appeared to the watchers on the ramp at NASA's Dryden Flight Research Center, it was flaring on final just over the low hills to the north. In the slight haze and shimmering heat waves of the Mojave Desert, the orbiter could easily have been mistaken, with only a casual glance, for an arriving medium-size commercial jet transport. It was a relatively long flare as the aircraft commander, astronaut John Young, let the energy gradually bleed off and the orbiter settle softly to the dry lake bed. There it kicked up a streamer of tan silt like the spray of the speedboat, silhouetting one of the chase planes, an inspection, speed calibration and photo aircraft flown by astronaut Jon McBride, as the T-38 pulled up to start its own approach. The orbiter rolled to a halt in the black-line criss-cross markers of Runways 23, 18 and 30, within a couple of hundred feet of a prelaunch planned stopping point, 8 minutes ahead of scheduled arrival.

The shuttle is designed to change spaceflight from exploratory, one-of-a-kind, disposable hardware leaps into the unknown of Mercury, Gemini and Apollo to a routine airline-analogous turnaround. What the by-the-manual launch, two days in orbit, reentry and landing demonstrated is that the shuttle's design goal is now achievable.

Despite the skepticism that has grown with the Shuttle's slips, the frustrated wisecracks about "that turkey on the pad" after the scrub of the first launch, the worry about the missing tiles on the orbital engine pods discovered in orbital inspection with the vehicle's TV camera, the message from the shuttle's sparkling Palm Sunday liftoff and precision landing in the beige California desert is that the shuttle will work. (AVIATION WEEK & SPACE TECHNOLOGY, 4-20-81, p. 13, Vol. 114, No. 16)

<> Launch processing system for National Aeronautics and Space Administration's space shuttle here provides checkout, control and monitoring functions an order of magnitude better than those available for Apollo, but requiring about one-tenth the firing room staff, according to NASA officials. Designed principally to implement the short turnaround time requirement for operational shuttle flights, the launch processing system uses minicomputers in "what is probably one of the largest distributed processing systems ever built," according to Walter Murphy, chief of guidance digital electronics and software here.

Although there is some central processing, the consoles in a shuttle firing room are driven principally by about 45 miniprocessors, all Modcomp 240 central processors in basic architecture, but with varying interfaces. The units are made by Modular Computer Systems, Ft. Lauderdale, Florida.

The miniprocessors drive the firing room's 15 consoles, each comprised of three bays and support equipment, Murphy said.

"With 15 consoles and three people per console, we have about 45 people with real control capability," he said. Apollo launch facilities required about 450 people.

"One of the biggest gains is in repeatability," according to Murphy. More than 50 test counts have been conducted with the actual vehicle and with the Shuttle Avionics Integration Laboratory (SAIL) at Johnson Space Center in Houston, Murphy said. Several hundred firings have been run against simulators.

The firing room here interfaces with the shuttle vehicle through the pulse code modulation (PCM) telemetry downlink. Control through launch is effected via the launch data bus. "We stay on hard wire line until the umbilical is pulled," he said. (AVIATION WEEK & SPACE TECHNOLOGY, 4-20-81, p. 32, Vol. 114, No. 16)

<> Shortly after the software/hardware synchronization problem developed in space shuttle orbiter STS-1's onboard computers during the initial launch attempt April 10, two teams were formed here at Johnson Space Center to troubleshoot the situation on a high-priority basis.

Computer program tapes were quickly sent from Cape Kennedy here and masses of computer printouts were made in an attempt to provide data on signal input-outputs with time correlations.

One team, comprising approximately 8-10 personnel at Johnson and several at Kennedy Space Center, worked on data analysis.

The operation entailed obtaining reams of computer printouts and dividing these among data analysis team members for close scrutiny.

The team believed at 3:00 p.m. April 10 that they had finally determined the problem, with John R. Garman, assistant division chief, spacecraft software division, Johnson Space Center, and Lynn Killingbeck, an IBM Systems software specialist, credited with identifying the problem.

At a 5:00 p.m. meeting that day, the teams arrived at final problem identification and a solution for overcoming it. Unfortunately, this was too late to prevent the launch from being cancelled that day. (AVIATION WEEK & SPACE TECHNOLOGY, 4-20-81, p. 22, Vol. 114, No. 16)

<> Damage to the Kennedy Space Center Launch Complex 39A from liftoff of the space shuttle was minimal and will be no factor in the schedule toward second launch, according to NASA officials.

Damage was characterized as no more extensive than that created by Saturn 5 launch vehicles and involved damage to light fixtures and instrumentation cabling. Damage to the cabling and light fixtures was expected.

Some handrails on the fixed service structure were blown away and one was driven through an elevator about 100 feet away. The handrails will be redesigned for pre-flight removal. Small shower-head sized water spray nozzles in the solid rocket booster flame trenches were melted, also as expected. (AVIATION WEEK & SPACE TECHNOLOGY, 4-20-81, p. 29, Vol. 114, No. 16)

April 22: The external tank for the second flight of the Space Shuttle Columbia was loaded on a barge at the Michoud Assembly Facility in New Orleans last week on a five-day trip to Cape Canaveral. The tank, which carries the liquid oxygen/hydrogen propellant for the Shuttle's three main engines, is 154 feet high, 27.5 feet wide and weighs 76,000 pounds unfueled. Martin Marietta Aerospace builds the ET at Michoud. The second Shuttle flight is planned for late September. (DEFENSE DAILY, 4-22-81, p. 306, Vol. 115, No. 38)

<> 2-C. Mr. Page gave the status of the STS-1 hardware and said that the Orbiter might not begin its flight returning to KSC until Saturday, April 25. There was a general discussion of possible ceremonies upon its arrival at KSC with the likelihood that KSC employees and their families would be invited to attend.

2-G. Dr. Buchanan discussed residue samples which had been removed from Pad A and the service structure. Aluminum oxide, silicon oxide, and iron oxide as well as hydrochloric acid have been identified necessitating a washdown of the structure to protect employees health and to prevent corrosion. (EXECUTIVE STAFF NOTES #12-81 for meeting of April 20, 1981, 4-22-81)

<> Except for the loss of two $100,000 parachutes, the Space Shuttle's assist rockets are in good shape. In fact, parts of them may be back in the air as early as the sixth Shuttle flight -- scheduled for 1982.

"We're pretty well elated by the whole system," said John M. Gerding, the chief of NASA's solid rocket booster retrieval branch. "Recovery was a piece of cake."

The trio of parachutes on each booster opened perfectly, he said. But two of the parachutes sank to the bottom of the ocean because their floats were torn away when the parachutes were deployed. (TODAY, 4-22-81)

<> The 900 members of the International Association of Machinists and Aerospace Workers employed on the Space Shuttle program at Kennedy Space Center by Boeing Services International who went on strike February 20, voted Saturday to accept the latest contract offer from BSI. The workers struck to protest elimination of cost-of-living allowance from their three-year contract. (DEFENSE DAILY, 4-22-81, p. 310, Vol. 115, No. 38)

April 23: Former CIA director William Colby says the Space Shuttle offers the possibility of reopening the arms limitation talks with the Soviet Union. "We have agreed to limit weaponry in space. It is possible to destroy such a system, but the immediate result if the Soviets should

destroy our system, is that we would destroy theirs. The Shuttle offers the possibility of negotiating new arms controls and systems," Colby said in Charlottesville, Virginia. (DEFENSE DAILY, 4-23-81, p. 314, Vol. 115, No. 39)

<> President Reagan today announced the nomination of business executive James Montgomery Beggs to become Administrator of the National Aeronautics and Space Administration and Dr. Hans Mark as Deputy Administrator.

Beggs has been Executive Vice President, Aerospace, and a director of General Dynamics Corp., St. Louis, Mo. Mark is former Secretary of the Air Force and former Director of NASA's Ames Research Center, Mountain View, California.

Beggs, if confirmed, will succeed Dr. Robert A. Frosch who resigned on January 20, 1981, to take over as the first president of the American Association of Engineering Societies in New York. Frosch had been Administrator since June 21, 1977.

Born in Pittsburgh, Pa., Jan. 9, 1926, Beggs and his wife, the former Mary Harrison, have five children.

Mark served as Secretary of the Air Force from July 1979 to 1981. He had served as Under Secretary since 1977.

Born June 17, 1929, in Mannheim, Germany, Mark came to the United States in 1940 and became a citizen in 1945. He received his bachelor's degree in physics from the University of California at Berkeley in 1951 and a doctorate in physics from Massachusetts Institute of Technology in 1954.

He and his wife, the former Marion G. Thorpe, have two children. (NASA NEWS RELEASE NO: 81-51, 4-23-81)

April 24: Nobody was more pleased about the results of the first Space Shuttle flight than KSC officials. Here are some of their comments:

"I've been on a lot of first launches. I've been in this business over 20 years. But I've never felt anything like this," said George Page, Director of Shuttle Operations. "I'm so proud of that launch team. I thought the landing was an absolutely fantastic conclusion to a perfect mission."

"It was fantastic," said Dr. Bob Gray, manager of the Shuttle Projects Office. "It went all the way but I was afraid to think it would be this good in advance. It sure shows me that all things promised for Shuttle can and surely will come about. It's an outstanding tribute to America's space talents and capabilities."

"It was super," remarked Tom Utsman, Director of Technical Support. "It's going to be hard to beat. It's hard to believe it was a first mission."

"Much praise and thanks goes to our design and operations organizations. It was indeed a great effort by the KSC, JSC and MSFC Shuttle team," said R.L. Clark, Associate Director for STS Development.

"We're delighted with the performance of the equipment we supplied," said Deputy Director of Design Engineering H.C. Paul. The Launch Processing System provided much better visibility into equipment operations than we had ever had before, and offers the potential for further automation of Space Shuttle processing at KSC.

"The many systems at the pad functioned properly with only minor exceptions and sustained the rigors of the launch with flying colors." (SPACEPORT NEWS, 4-24-81, p. 3, Vol. 20, No. 8)

<> I extend my personal congratulations to each and every member of the KSC team for the successful first launch of the Space Shuttle. We have come down a long and sometimes bumpy road, but the results of our patience and effort can be seen today in every face in the NASA/industry team. The resounding success of the first flight is a legitimate source of pride for all of us.

But let us not be so blinded by our pride that we lose sight of the road ahead. The mission of the Space Shuttle is to fly safely again and again. We must be prepared to make the same efforts, to exercise the same diligence each and every time. Our path to those future launches has already begun.

We have set a fine example for ourselves in this first step, and I look forward to sharing the remainder of the journey with you.

Richard G. Smith, KSC Director (SPACEPORT NEWS, 4-24-81, p. 3, Vol. 20, No. 8)

<> An estimated crowd of 41,000 witnessed the historic liftoff of Columbia from viewing sites on Kennedy Space Center.

Workers and their families, visitors and invited guests fought mammoth traffic jams to get onto KSC and to their front row seats for the occasion.

For many, it was the second time in as many days but when they got to their sites, they found a little more elbow room than had been available on the first launch attempt April 10 - which was scrubbed when a computer problem developed in the final minutes of countdown.

Nearly twice as many folks - a capacity crowd - turned out for the scheduled launch on April 10. Many of the local residents who had car passes apparently stayed home on Sunday, watching the launch on TV instead of battling the crowd again.

But for those who endured, the sight of Columbia rising above Pad 39A was an unqualified thrill.

Among the watchers were 2,700 professional observers edia representatives from around the country and as far away as Japan, reporting on the launch of Columbia for their news organizations.

"Seeing all those people coming here to view the launch and knowing that hundreds of thousands more viewed liftoff from the shorelines told me that the public's interest in the space program is a lot greater than some believe," said Arnold Richman, chief of the Visitors Services Branch.

Bus after bus - 119 in all - ferried special guests and VIPs from their hotels to space center viewing sites. As dawn broke, the bleachers across the street from the VAB were beginning to fill up with invited guests - including former astronauts, corporate executives, government officials, educators and foreign visitors.

"It was a beautiful sight and I was glad to be here," said former Apollo Astronaut Neil Armstrong - the first man to walk on the Moon.

"Just fantastic!" exclaimed former Apollo launch director Rocco Petrone. "I see a lot of use of the Shuttle."

"Apollo was sensational but this exceeded that," remarked Florida Congressman Don Fuqua, chairman of the House Science and Technology Committee. He said the time appears right for a fresh look at our future efforts in space. "I think this launch will renew confidence in our program," he added.

"This is the greatest launch team in the world," said U.S. Rep. Bill Nelson, also a member of the Science and Technology Committee. "Every American is grateful for their high degree of excellence, this is a great day for America, an important day for America."

Celebrities Pat Boone, John Denver and Nichelle Nichols - otherwise known as Star Trek's Lt. Uhuru - were here April 10 for the scheduled liftoff but were unable because of prior commitments to make a return to launch site on April 12.

Present both days, however, were film producers George Lucas - "Star Wars" - and Steven Spielberg - "Close Encounters of the Third Kind."

Among the thousands of viewers who watched the launch from the NASA Causeway East were visitors from all corners of the country.

"This is my third space shot that I have seen," said Ted Miller of Berlin, Pa. "But this was the most fabulous and I'm so happy to be a part of history being made."

As did many of the viewers, Joel Siegler of Milwaukee, Wis., had a personal interest in the Shuttle. His company - Siegler Machine and Tool Co. - has supplied machine tools to other firms building parts for the Columbia.

"It was terrific," said Siegler.

Florence and Jack Whaley traveled here from Los Gatos, Calif., to see Columbia off on its maiden voyage.

"I thought the launch was terrific," said Jack Whaley. "I've worked for NASA for 20 years at Ames Research Center in California. I'm in the Research and Development Section of it. And we have tested this configuration that I just saw go up in the air and it's quite a thrill." (SPACEPORT NEWS, 4-24-81, p. 6, Vol. 20, No. 8)

<> We're back in the manned spaceflight business again.

It was smooth sailing all the way for Columbia, from the moment of its dazzling early morning liftoff to the flawless touchdown on a California desert runway 54 hours and 21 minutes later.

The Space Shuttle thundered away from KSC's Pad 39A on its maiden flight a few seconds after the scheduled 7 a.m. launch on April 12, the dawn of a new era in space.

"We'll try to do a little better next time," quipped Shuttle launch director George Page in a post-launch press briefing that was punctuated with applause and cheers.

But there was no doubt about the accomplishment achieved with the successful flight of Columbia - the world's first reusable spaceship.

The historic mission flown by Astronauts John Young and Bob Crippen demonstrated in a remarkable performance, the hardware of a new Space Transportation System that has been under development for nearly 10 years.

America has opened the third decade of manned spaceflight with a versatile new tool that will play a major role in expanding mankind's presence on the space frontier.

Even as Columbia flew 170 miles above the Earth, work had already begun on its second flight into orbit. And the winged spaceship will soon be back in its nest at KSC, undergoing preparations for a return to space.

For the moment, however, NASA and its contractors are in what has been described as an "exhilaration mode," basking in the success of a mission that has scored big points for America's space efforts.

Liftoff had been planned for 6:50 a.m. on Friday, April 10. Anyone who tried to travel the roads on and adjacent to Kennedy Space Center could easily see that a lot of folks fully expected it to go.

But a computer problem in the final minutes of countdown forced a postponement of the launch until Sunday morning.

There were no hitches on the second attempt. When the ignition command went out, Columbia got up and went with a roar that cracked across miles of marshland, and a release of power that made the ground tremble under those who watched from sites a safe distance away.

About 50 minutes later, as the Columbia flew over the Indian Ocean, a second firing of the Shuttle's orbital maneuvering system engines circularized the craft's orbit at an altitude of about 150 miles. Another burn later in the flight boosted them a little higher.

Young and Crippen spent the next two days performing checks of Columbia's systems during on-orbit operations. The long payload bay doors opened and closed without trouble.

Both crewmen praised the vehicle for "performing like a champ."

Crippen, on his first flight into space, was quick to give a hearty endorsement to space travel. "I highly recommend it," he said.

And when it was time for Columbia to return to the ground, it responded flawlessly to computer commands and John Young's control stick.

"What a way to come to California," remarked Crippen.

Columbia's dramatic unpowered descent began over the Pacific. As the craft glided toward California, it was flown at hypersonic speeds through a series of S-turns that gradually decreased its speed as it banked north and south of a straight line to Edwards Air Force Base. As sure as the mission was a milestone in the history of space travel, the re-entry was a milestone in the history of aeronautics.

And when it came time to set Columbia down on the dry lake runway at Edwards, Young made it look easy.

Touchdown came at 1:20 p.m. EST - two days, six hours, 20 minutes and 52 seconds after liftoff.

A KSC ground crew greeted the Columbia in SCAPE suits, "sniffing" the air around the craft for toxic gases and beginning the process of safing the vehicle.

"You can't believe what a flying machine this is," Young told controllers in Houston as he and Crippen waited to exit the craft. "It's really something special."

About an hour after the landing, the Columbia's hatch opened and a grinning commander Young bounded down to inspect the Columbia from nose to tail. Soon after, Crippen emerged from the portable white room which had been positioned snug against Columbia's hull.

After the astronauts had departed, the rest of KSC's 300 recovery and safing crew members went to work on the orbiter to prepare it for it's triumphant return home.

Their first looks confirmed that the orbiter had come through its test flight in excellent shape. No additional tiles had been lost during the reentry, according to Deke Slayton, and repair work would be minimal before the ferry flight could be begun.

By the day after landing, Columbia had been moved to the mate-demate device at Dryden for mating with the 747 carrier aircraft. The craft's windows were covered with protective shields and a number of purge and safing operations had been started.

The trip home will take two days.

Already back at KSC were the two solid rocket boosters which helped begin the Columbia's journey.

The two boosters will be refurbished, returned to the contractor for refueling and used again on a future flight, possibly as soon as STS-6.

Perhaps the best summary of the Columbia's mission can be found in a comment made by Deke Slayton, Orbital Test Flight Manager, in a post-landing press briefing.

"It was as perfect a mission as one could expect," he told reporters. "The Shuttle will do for space what the DC-3 did for aviation." (SPACEPORT NEWS, 4-24-81, pp. 1-2 & 8, Vol 20, No. 8)

April 25: When the space shuttle Columbia thundered off its launching pad at Cape Canaveral, Fla., earlier this month, a small circle of German engineers, eyes fixed on a television screen here, were particularly excited.

The engineers were sitting across a field from the metal buildings that house the assembly line for Spacelab, a reusable orbiting laboratory scheduled to go into space in the shuttle's voluminous cargo bay in late 1983.

"Columbia is America's dream," said Manfred Fuchs, director of project development at Erno Raumfahrttechnik, the West German aerospace company that is Spacelab's prime contractor. "If that dream doesn't work, ours won't either."

Spacelab proved in the last seven years to be not only Europe's biggest, most ambitious space undertaking, costing nearly $1 billion, but also a curiously complex experiment in industrial and management cooperation. The shuttle's success gave the project a much needed lift, after delays in America's orbiter threatened to sap the interest of European governments and industry. (THE NEW YORK TIMES, 4-25-81)

April 27: Poor weather is always a concern just before a rocket is launched into orbit, but until now there has been little worry about rainfall right after a launch -- the space shuttle has changed that.

The shuttle's two huge solid-fuel booster rockets have created the possibility that a sudden thunderstorm or shower immediately following a launch could produce acid rain, scientists point out.

So the National Aeronautics and Space Administration is conducting studies to determine the environmental effects of such rain. (THE WASHINGTON POST, 4-27-81)

<> While hailing the flight of the space shuttle, the archbishop of Canterbury, Robert A. K. Runcie, warned yesterday that man must explore "inner space, which harbors the fears and the desire to dominate, which are the sources of the violence and the divisions which disfigure the world." In a sermon at Washington Cathedral, the archbishop said, "There is a terrifying disparity between our technical achievements and our moral progress." (PHILADELPHIA INQUIRER, 4-27-81)

April 28: The House HUD-IA Appropriations Subcommittee has gone along with the changes proposed in the FY '81 NASA budget by the Reagan Administration, which includes adding $60 million to the Space Shuttle program and taking $7.5 million from Space Flight Operations, $28 million from Applications, $6 million from Aeronautics and Space

Technology and $10 million from R & PM. The changes were previously authorized by the House Science Committee. The net effect of the changes is a reduction of $14.5 million in the FY '81 NASA budget to $5,522,688,000.

The Senate HUD-IA Appropriations Subcommittee is scheduled to mark-up the FY '81 HUD-IA appropriation, including NASA, early next week. The House subcommittee has tentatively scheduled hearings on the FY '82 NASA budget next week; the Senate subcommittee is planning hearings May 12. (DEFENSE DAILY, 4-28-81, p. 339, Vol. 115, No. 42)

<> NASA's Jet Propulsion Laboratory intends to initiate preliminary studies this year for definition of the new technology that will be required for spacecraft to investigate the far outer planets in the 1990's.

The studies will specifically include investigation of concepts for an advanced spacecraft system for the outer planets missions "as a departure from" the traditional three-axis-stabilized Mariner-class spacecraft.

The mission opportunity period for coordinated exploration of Saturn, Uranus, Neptune and Pluto, utilizing gravity assist from the planet Jupiter, will begin in 1991. In addition, NASA is planning the Saturn Orbiter/Dual Probe mission in the late 1980's a direct mission to orbit Saturn and send probes into Saturn's atmosphere and to Saturn's large moon, Titan. (DEFENSE DAILY, 4-28-81, p. 343, Vol. 115, No. 42)

<> With the Space Shuttle Orbiter Columbia bolted to its top, a 747 carrier aircraft took off from Edwards AFB at 10:18 AM PDT yesterday on a two-day return trip to Kennedy Space Center. The aircraft will stop over at Tinker AFB, Okla., and make the final trip to KSC today. The flight was delayed Sunday when a tailcone strut had to be replaced. Late arrival of the replacement strut delayed the flight three hours yesterday. (DEFENSE DAILY, 4-28-81, p. 343, Vol. 115, No. 42)

<> NASA, which is currently in the process of revising its flight manifest for the Space Shuttle program, will reduce the number of flights planned through FY '85 from the

original 44 to between 26 and 36, a reduction of 18-41 percent. The agency says that it believes the 36-flight figure is achievable.

The revisions are being made because of the slip in the maiden Shuttle launch and the curtailment of the NASA space science program, with some missions eliminated and others pushed back until later in the decade.

NASA expects to complete the new manifest in about three or four weeks. The agency continues to retain the 487-flight mission model for the 1981-1982 period.

Meanwhile, the second Orbital Flight Test of the Space Shuttle Columbia (OV-102) is planned for September/October, with NASA believing the later date is more likely and Rockwell saying the earlier date can be met.

OFT-3 is planned for January 1982; OFT-4 for April 1982.

The first operational flight of the Shuttle is planned for September 15, 1982, carrying a NASA science payload and two commercial communications satellites.

The second operational flight is planned for November 1982, carrying the German Shuttle Pallet Satellite (SPAS-01).

The third operational flight is planned for January 1983, carrying the first Tracking & Data Relay Satellite (TDRS-A).

The second Space Shuttle Orbiter, Challenger (OV-99) is scheduled for delivery in June 1982; the third, Discovery (OV-103) in September 1983, and the fourth, Atlantis (OV-104) in December 1984. A fifth Shuttle (OV-105), if initiated in FY '83 could be delivered in 1987. (DEFENSE DAILY, 4-28-81, p. 338, Vol. 115, No. 42)

April 29: Just two weeks ago, I joined millions of my fellow Americans in marveling at the magic historical moment that John Young and Bob Crippen created in their space shuttle Columbia.

The last manned effort was almost six years ago, and I remembered how, over the years, we had all come to expect technological precision of our men and machines. Each amazing achievement became commonplace, until the next new challenge was raised.

With the space shuttle, we tested our ingenuity once again -- moving beyond the accomplishments of the past into the promise and uncertainty of the future. Thus, we not only planned to send up a 122-foot aircraft, 170 miles into space, but also intended to make it maneuverable and return it to earth -- landing 98 tons of exotic metals delicately on a remote dry lake bed.

The space shuttle did more than prove our technological abilities, it raised our expectations once more; it started us dreaming again. "The republic is a dream," wrote Carl Sandburg. "Nothing happens unless first a dream." (President Reagan's April 28 speech before Congress, as printed in THE NEW YORK TIMES, 4-29-81)

<> With little of the fanfare that surrounded its April 12 lift-off, the space shuttle Columbia returned to its home port yesterday to be prepared for a second voyage this fall.

A crowd of about 1,200 space center employees and family members burst into applause as the aircraft rolled onto an apron next to a facility where Columbia will be plucked off the 747.

Richard Smith, director of the Space Center, said the 54-hour, 36-orbit flight that ended in California on April 14 was "more successful than we ever dared hope for." He said he knew of no problems that would prevent a second flight in September or October. (PHILADELPHIA INQUIRER, 4-29-81, p. 6-A)

<> Space shuttle Columbia's thunderous tower of flame would have been far longer and louder without one weight-cutting breakthrough achieved in a Quonset-hut laboratory in Ohio 30 years ago.

Glass-industry researcher Dominick Labino's discovery of a new way to produce microscopic glass fibers led to the ultra-lightweight tiles used to insulate the space shuttle from the searing 2,500 degree F. heat of reentry.

Other heavier materials could withstand the high temperatures but at the steep cost of using more fuel for liftoff or reducing the shuttle's load capacity. As well, the remarkable durability of the tiles results in the shuttle's "RSI" (Reusable Surface Insulation) being scheduled for 100 round trips into space.

Extensive research before the first flight demonstrated the tiles' heat-resistant qualities, their resistance to damage from being plunged from 2,500 degree heat into water or from workers walking on them and their dimensional stability despite great, sudden temperature changes.

Working with Minnesota sand and closely guarded trade secrets, employees in a neat red-brick factory overlooking the Maumee River in Waterville, Ohio, today produce all the silica fiber used in the shuttle's protective tiles. A series of mergers absorbed Mr. Labino's original company, and Johns-Manville Glass Fibers Corporation now churns out the fiber under contract to Lockheed. The glass fiber is so fine that one pound of it could cover a three-acre field. Stretched out as a single fiber, a pound of the invisible thread would be 10 million miles long, Labino explains.

It seems perfectly logical to Labino that one important breakthrough for the space shuttle program came from his tiny laboratory 30 years ago. He expects to continue making new discoveries in his larger but still modest private laboratory which this "retiree" operates without government or industry funding. (THE CHRISTIAN SCIENCE MONITOR, 4-29-81)

<> The Space Shuttle Columbia, riding atop a 747 aircraft, arrived at Kennedy Space Center at 11:23 AM yesterday after a 3 1/2 hour flight from Tinker AFB, Ohio, completing a two-day trip from Edwards AFB, where it landed April 14. Working date for the second flight of Columbia is Sept. 25, but officials say a mid-October launch is more probable. (DEFENSE DAILY, 4-29-81, p. 347, Vol. 115, No. 43)

April 30: The space shuttle Columbia was being towed at a snail's pace Wednesday to the Orbiter Processing Facility, where it will be refurbished for a second test flight next fall.

Columbia, America's reusable rocket ship, arrived at Kennedy Space Center Tuesday amid the cheers of 500 space workers, concluding a two-day 2,248-mile piggyback ride from California atop a modified 747 jet transport.

Workers guided the aircraft into a steel-framed de-mating tower and got ready for the 90-minute tow to the orbiter building two miles away, where it will remain about three months.

Richard Smith, director of Kennedy Space Center, said technicians will troubleshoot the entire orbiter, closely examine the protective tiles that guard its heat-sensitive aluminum skin, and service the in-flight maneuvering systems.

Also on the list is construction of a more comfortable cockpit for astronauts Joe Engle and Richard Truly, who will be inside the shuttle the second time it goes into orbit.

CBS News Tuesday quoted space agency officials as saying the launch would be delayed until next year.

Earlier, however, Smith said the Shuttle would be ready the first part of October, although it will be 18 months before it starts hauling commercial satellites and scientific gear into space on a regular basis.

"It's in excellent shape," Smith said. "I don't see why it can't go 100 times." (THE MIAMI HERALD, 4-30-81, p. 10A)

<> Although they could very well be the first husband and wife in outer space, Dr. Margaret Rhea Seddon and Lieut. Cmdr. Robert Lee Gibson, both astronauts, will settle for a trip to Hawaii by conventional jet following their marriage May 30 in her home town of Murfreesboro, Tenn.

Dr. Seddon, the first woman to gain the full rank of astronaut, was a resident in nutrition and surgery at City of Memphis Hospital in 1978 when she was among the first six women chosen for astronaut training. During the flight of the space shuttle Columbia she was at Cape Canaveral, Fla., aboard one of two standby helicopters. Dr. Seddon and Commander Gibson have dated for two years since meeting at the Johnson Space Flight Center in Houston, where they are now stationed.

The only previous astronaut couple, Drs. Anna and William Fisher, both physicians, were married before joining the space program.

Since Commander Gibson is a pilot and Dr. Seddon would serve as a "mission specialist," the couple "have as good a chance as any" to fly together, Dr. Seddon told THE NASHVILLE TENNESSEAN yesterday. If so, she said, "We'll be so busy up there we won't even have time to say 'hello'." (THE NEW YORK TIMES, 4-30-81)