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O C T O B E R 1 9 6 8

October 1: NASA 10th Anniversary: National Space Club presented special award to President Johnson at White House citing his legislative and executive leadership of national space program and gave commemorative dinner in Washington, D.C. At dinner Sen. Clinton P. Anderson (D-N.Mex.) and Rep. George P. Miller (D-Calif.) presented retiring NASA Administrator James E. Webb award for his outstanding contributions to national space effort. In telegram tribute to Webb, President Johnson said, "The Nation is in his debt. He will be deeply missed but gratefully remembered as his dreams continue to become reality in the years ahead."

Telegram from Vice President Hubert Humphrey said, "The span of achievement which measures a decade of space progress is one which should be a source of pride to all of us. Now a new decade beckons, with new challenges, and new opportunities. And, such is the nature of the space age that we dare not become complacent about our rate of progress or the scope of our past accomplishments. It is unthinkable that we would allow ourselves to be surpassed in technology by any other nation. I have never questioned that space endeavors have contributed significantly to the strengthening and enrichment of our whole society, through a teamwork approach by private industry, our universities, and the Federal Government. By means of this program we have vitalized our economy, developed improved methods of management, stimulated our educational system, produced new goods and services, added to our store of scientific knowledge, and buttressed our national security." Telegram from Republican Presidential candidate Richard M. Nixon said, "The space program must continue to be one of our national imperatives, and it must be supported at a level assuring efficient and steady progress."

Anniversary ceremonies included open house and annual awards presentation at Marshall Space Flight Center Sept. 28-29. (NSC Newsletter; Texts; Marshall Star, 9/25/68, 4)

During its first 10 yr NASA had completed 234 major U.S. and international launches plus thousands of sounding rocket launches. Of these 234, 189 were launch vehicle successes and 174, spacecraft or mission successes, with two missions still under evaluation. For these launches NASA had developed rockets ranging from 88,000-lb thrust to Saturn V with 7.5-million-lb thrust capable of sending nearly 100,000-lb payload to moon. First phase of manned flight program, Project Mercury, had begun seven days after NASA was established. Six manned Mercury flights had proved man could go into space and function as pilot-engineer-experimenter for up to 34 hr weightless flight before returning to earth. Gemini program announced in 1961 had demonstrated work could be performed in orbit outside spacecraft in more than 12 hr extravehicular activity.

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Gemini included 52 experiments, among them 17 scientific--in astronomy, biology, geology, meteorology, and physics. Seven rendezvous techniques and nine dockings had been accomplished during Gemini. More than 2,000 hr manned spaceflight experience gained through Mercury and Gemini had contributed heavily to Apollo, including 16 flights of unmanned Saturn launch vehicle which had confirmed Apollo engineering concepts and qualified all systems for manned missions. Although Apollo fire on Jan. 27, 1967, had delayed manned missions, it had resulted in safer spacecraft and improved suits for astronauts.

Ahead were two manned missions for 1968; possibly five for 1969, culminating in landing of U.S. astronauts on moon. Facilities at NASA installations in U.S. were worth more than $2.5 billion and peak 35,000 staff included some of Nation's top scientists. Industrial work force had peaked at 400,000 and was dropping to 200,000. NASA had established global tracking network capable of communicating with vehicles as far away as far side of sun. Its aeronautics program conducted R&D on noise abatement, flight safety, supersonic and hypersonic aircraft, lifting-body vehicles, and V/STOL aircraft. NASA's technological advances included development of new electronic parts, alloys, adhesives, lubricants, valves, and pumps, as well as progress in minaturization. More than 2,500 technical innovations applicable in industry, medicine, and other nonaerospace activities had resulted from 10 yr of NASA progress. In Christian Science Monitor, Neal Stanford said, "It is...science satellites and the new technology developed that are counted on to return to the tax-paying public the dividends that some say will make space the best investment man ever made." (Marshall Star, 9/25/68, 5; Wilford, NYT, 10/1/68; CSM, 10/5/68)

In Washington Sunday Star special report, "A Decade in Space," John Lannan commented on NASA's 10th anniversary: "...the space agency's real promise for improving the general welfare of mankind as set forth in the Space Act which brought it into being has apparently been too slow in being fulfilled. The fact that the space investment is only now starting to pay off, and at an increasingly rapid pace, is going unnoticed in the glare of present problems, past mishaps and the imminence of the Apollo venture. Where NASA's real goals lie are in the future--the near future and the near earth. Spin-off, the serendipity of technology, has long been used as a justification for the vast sums poured into space, but little beyond Teflon-coated frying pans have impinged on the tax-payer's mind." (W Star, 9/29/68, A1)

October 1 (continued)

In Space Digest article, Gen. James Ferguson, Commander of Air Force Systems Command, described "A Decade of Cooperation--The Military-NASA Interface." AFSC's FY 1969 "NASA support expenditures amounted to millions of dollars and thousands of man-years in effort. The sums of money, and, more important, the human technological resources we are currently expending on the nation's space programs are of great consequence since they are the foundations of our future benefits. ...we are acutely aware that the fate of future generations lies in space...It is a sad commentary to state that technology has provided us with the means to conduct wars. But it is heartening to realize that one day technology will provide us with the means to prevent wars. (Space Digest, 10/68, 71-3)

NASA Assistant Administrator for DOD and Interagency Affairs Jacob E. Smart wrote in Space Digest, "The tenth anniversary...marks the end of a decade of concerted effort across a broad front to advance the nation's capabilities in aeronautics and space. It has been a decade of accomplishment that has few peers in this country's history. ...the good working relationships...between NASA and DOD have been of immeasurable benefit to them both, and the nation's space effort is the stronger for it. ...with the prospect of tighter budgets likely, the maintenance of such relationships--and their improvement--assumes an increasing importance. The need to stretch the appropriations dollars to the maximum may be partly met by fresh efforts to find common ground where cooperation will produce economies as well as mutual benefits." (Space Digest, 10/68, 68-70)

. Dr. Finn J. Larsen, Deputy Director of Defense Research and Engineering, DOD, testified before House Committee on Science and Astronautics' Subcommittee on Advanced Research and Technology: "If our civil aviation is to continue its dramatic progress, the greatest single requirement is to accomplish...complete system engineering. The...planning must consider not only the aircraft in flight as a system, but also the entire problem of moving people from destination to destination"--calling for "planning and resources on a considerably larger scale than are now available."

NASA's responsibility for U.S. aeronautical research "should continue." DOD had used NASA research, augmenting it for defense as necessary, with "excellent coordination for many years." Military R&D was specialized, but much was transferable to civil aviation. Long-term goals of smokeless combustors and silent aircraft would be of mutual benefit. SAGE air defense computer system had contributed to FAA radar beacon system and new national standards. Much improved

October 1 (continued)

altimetry reporting came from DOD development for high-performance jet aircraft. Common digitizer was joint DOD-FAA project, as was TPX-42 airport traffic control facility. Some 30 projects for all-weather landing and 20 navigational programs had been sponsored in recent years. Eleven aircraft carriers had pilot "hands-off" capability for blind landing. Microwave scanning-beam landing systems were in testing. Collison avoidance, V/STOL, and cargo-handling R&D had civil application. (Text)

. Dr. Frank D. Drake, Director of Cornell Univ.'s Arecibo Ionospheric Observatory in Puerto Rico, said he had detected first distinct pattern to radio signals from two pulsars. He told radioastronomy seminar at National Radio Astronomy Observatory, Green Bank, W. Va., that pulse rate could be explained only if source were star of extraordinary density spinning at incredible speed--such as neutron star. If correct, findings would be first scientific proof that hypothetical neutron stars actually existed. (Wilford, NYT, 10/2/68; Lannan, W Star, 10/2/68, A20)

. MIT physicist and radioastronomer Dr. Bernard Burke and teams of scientists using 140-ft "Big Dish" antenna at National Radio Astronomy Observatory began first radioastronomy test of Einstein's general theory of relativity in attempt to discover gravity's effect on universe. Among three basic tests proposed by Einstein to test his theory to account for action of all bodies under gravitational force was one to measure bending of light from distant source as it passed an energetic body like the sun. Dr. Burke's experiment, one of three recent tests, measured signals from newly discovered quasars to determine amount of bending they underwent in passing the sun. If light, in form of quasar radiowaves, was bent, Einstein theory would receive added support; if it was not bent as much as he predicted, or if astronomers were unable to detect significant bending, theory would remain intact until further proof was provided. (NRAO Proj Off; Lannan, W Star, 10/1/68, A9)

. MSFC announced it had selected RCA for negotiation of $5.1-million cost-plus-fixed-fee contract for logistics and engineering support for Saturn ground computer systems and associated equipment. Contract would cover Oct. 1, 1968, through June 30, 1970. (MSFC Release 68-231)

. President Johnson announced resignation of Leonard H. Marks as Director of U.S. Information Agency in time to head U.S. delegation to negotiate permanent arrangements for INTELSAT at February 1969 conference in Washington, D.C. (PD, 10/7/68, 1433; Halloran, W Post, 10/2/68, A8; AP, NYT, 10/2/68, 23)

October 1: Arnold W. Frutkin, working since Feb. 1 as Special Assistant to NASA Associate Administrator, completed his temporary assignment and resumed his duties as Assistant Administrator for International Affairs. (NASA PAO; NASA Ann, 10/2/68)

. Lucius D. Battle, former Assistant Secretary of State for Near Eastern and South Asian Affairs, became ComSatCorp Vice President for Corporate Relations. (ComSatCorp Release 68-51; AP, W Post, 10/1/68, A2)

October 2: U.S.S.R. launched Cosmos CCXLIV into orbit with 158-km (98.2-mi) apogee, 140-km (87-mi) perigee, 87.4-min period, and 49.6° inclination. Satellite reentered same day. (GSFC SSR, 10/15/68)

. Sen. Stuart Symington (D-Mo.) said on Senate floor, "In the past ten years, money expended by the Defense Department for R&D has almost doubled, from $4 billion to about $8 billion. Yet since 1955, the United States has not produced a single modern fighter; in fact, it has produced no combat plane except the TFX series. The Navy version of that plane has already been abandoned; and the Air Force has once again found it necessary to ground their version because of technical difficulties." Despite "all those billions we have developed no air superiority fighter capable of competing against a first-class air force such as the Soviets possess today." He said U.S. was losing its lead on seas as well because "our various Government branches produce arguments, whereas the Soviets produce the submarines." (Text; NY News, 10/3/68, 18)

. Sen. Clinton P. Anderson (D-N.Mex.), Chairman of House Committee on Aeronautical and Space Sciences, told Senate, "Ten years from now NASA will be celebrating its 20th anniversary. I hope that the chairman of the Committee...at that time will be able to stand here and congratulate the agency and its people for 20 years of accomplishment and say that the United States is still first in space and in aeronautics. But unless we are vigilant and supply the agency with the needed authorizations and appropriations, that statement will not be made." (CR, 10/2/68, S11844)

. NASA awarded Chrysler Corp.'s Space Div. $10,545,753 cost-plus-award-fee extension to $77,877,486 contract for KSC support services. Extension, for July 1 through Dec. 31, covered necessary manpower and material to provide design and sustaining engineering, modification, testing, refurbishing, and launch support of KSC-designed equipment and Saturn IB launch operations. (KSC Release KSC-418-68)

October 2: MSFC announced it had awarded American Science and Engineering, Inc., $5,413,000 addition to contract for final design, fabrication, assembly, integration, test qualification, and acceptance of prototype and flight unit x-ray spectrographic telescope, part of Apollo Telescope Mount. Award brought total value of contract to $11,617,471. (NASA Release 68-170; MSFC Release 68-234)

October 3: Aurorae (ESRO I) satellite, designed, developed, and constructed by European Space Research Organization under July 8, 1964, NASA-ESRO agreement, was successfully launched by NASA from WTR by four-stage Scout booster. Orbital parameters: apogee, 949.4 mi (1,528 km); perigee, 160.9 mi (259 km); period, 102.8 min; and inclination, 93.7°. Primary NASA mission objectives were to place Aurorae into planned orbit and provide tracking and telemetry support. The 185-lb cylindrical satellite carried eight experiments to study aurora borealis (Northern Lights) and other related phenomena of polar ionosphere, representing six different organizations from U.K., Denmark, Sweden, and Norway. All experiments were operating as planned, and their scientific objectives were being achieved.

Aurorae was second successful ESRO satellite launched by NASA. IRIS I, launched May 16 to replace ESRO II-A which had failed to achieve orbit May 29, 1967, had entered planned orbit and conducted solar-astronomy and cosmic-ray studies. ESRO was responsible for experiment instrumentation, delivery of spacecraft to launch site, equipment and personnel necessary to mate spacecraft to launch vehicle, and spacecraft testing. NASA provided Scout launch vehicle, conducted launch operations, and supplied data and tracking acquisition support. (NASA Proj Off; NASA Release 68-158; AP, W Star, 10/4/68; GSFC SSR, 10/15/68)

. Cosmos CCXLV was launched by U.S.S.R. into orbit with 481-km (298.9-mi) apogee, 272-km (169-mi) perigee, 92-min period, and 70.9° inclination. (GSFC SSR, 10/15/68)

. NASA Deputy Administrator, Dr. Thomas O. Paine, presented NASA FY 1969 interim operating plan to Senate Committee on Aeronautical and Space Sciences. Although President Johnson had not yet signed appropriations bill, Bureau of the Budget had indicated NASA's share of $6 billion expenditure reduction might amount to $350 million. This meant limitation of use of FY 1969 appropriations to $3.85 billion, Dr. Paine said. "Our actions also have had to be constrained by our current instructions within the Executive Branch to hold expenditures to a minimum in 1970 as well as in 1969, and to be prepared for the eventuality of budgetary limitations in FY 1970 even more restrictive than those in FY 1969. I am personally convinced that the nation's space program requires an increase in funding in FY 1970 and I am hopeful...we will succeed in

October 3 (continued)

establishing the need for a significant increase. Until this decision is made...we have no alternative but to proceed with an interim operating plan...which, where possible, holds open options we can exercise in FY 1970 if the budget is higher but which does not overcommit us if the FY 1970 budget is lower."

Plan retained $2.025 billion authorized for Apollo program--$14 million below budget request. It reduced authorized $253.2 million for Apollo Applications, to $150 million, amount "required to work toward the important but sharply limited and deferred Apollo Applications program we now propose." This would include cessation of Saturn IB launch vehicle production after completion of 14th (Saturn 214) and discontinuation of Saturn V at completion of first 15 vehicles. Single Saturn I workshop and single Apollo Telescope Mount (ATM) would be launched in early 1970s. Authorized $5 million for advanced missions would be cut 50% to $2.5 million, for continued studies related to manned earth-orbital and lunar missions. Authorized $136.9 million would be reduced to $132.1 million for physics and astronomy with level of effort in supporting research and technology and data analysis approximately 10% lower than in FY 1968.

The $92.3 million authorized for lunar and planetary exploration would be cut to $75.8 million, with $6.8 million for lunar and $69 million for planetary--to support Mariner-Mars 1969 mission, reacquisition of telemetry from Mariner V, and Mariner-Mars 1971 mission. Plan also supported in FY 1969, at reduced funding level, capability to conduct Mars mission during 1973 opportunity in keeping with NAS recommendation [see Sept. 19]. Overall scope of mission would be reduced and schedule compressed. Operating plan provided for construction of two 210-ft antennas for Mars and other missions during 1970s. Launch vehicle procurement authorization of $115.7 million would be cut to $100.2 million and bioscience from $33 million to $32.7 million, which was $15 million below budget request and required slip of 6-12 mo in 21-day Biosatellite missions.

Space applications authorization of $98.7 million would be retained; program change necessitated by May 18 destruction of Nimbus B would result in launch of replacement, Nimbus B2, in spring 1969. Aeronautics R&D budget would remain at authorized $74.9 million, while FY 1969 effort in nuclear rockets would be limited and NERVA development deferred until 1970, when $7.5 million withheld in FY 1969 could be added to allow total of $39.5 million. Of $180.5 million total authorization for basic research, space vehicle systems, electronics system, human factor systems, space power and electric propulsion systems, and chemical propulsion, interim plan would provide $178.4 million, reduction

October 3 (continued)

of $21.5 million from NASA's budget request. Work in long-endurance life-support-equipment technologies would proceed as planned but in other areas, research and technical development would be reduced, especially efforts in support of advanced space missions. Tracking and data acquisition budget would be reduced from $289.8 million authorized to $280 million, providing full Apollo schedule support but limiting support for spacecraft aloft and on future missions.

Construction of facilities funds had been reduced from $39.6 million authorized to $21.8 million appropriated. Operating plan would increase figure to $35.7 million by transferring funds from R&D appropriation. Facility planning and design funds were reduced from $3 million requested to $1 million. Interim operating plan anticipated transfer of $20.1 million from R&D to administrative operations, bringing total to $623.3 million instead of $603.2 million in authorization and appropriations acts and $648.2 million requested by NASA in budget. Dr. Paine emphasized that administrative operations appropriation did not cover only "administrative" expenses; it covered direct costs of operating NASA laboratories, research centers, development centers, and launch centers.

NASA Administrator James E. Webb told Committee, "...when you use words such as 'Congress consistently has supported the Apollo program,' you must add 'at a minimum level.' We have clearly indicated in every budget that the basis on which we were going forward with this support by Congress was one that did not take into account unusual risks and happenings and was, in effect, based on success in all these efforts." Webb said NASA Apollo funding was related to success on various operations and did not include "a return to test flight on the Saturn IB should we not be able to make the shift to the big rocket after this next flight." From 1961 to 1969, Webb said, "we have not had the funds to proceed except in a manner that would permit us, within the total budget, to do this lunar landing within this decade and on an all-up systems test basis. So the excrutiatingly painful period of all-up testing on the Saturn V is yet ahead of us." (Testimony; Transcript)

. NASA's HL-10 lifting-body vehicle, flown by NASA test pilot John A. Manke, successfully completed eleventh flight from Edwards AFB. Vehicle with full load of fuel was carried to altitude, where successful jettison test was performed before launch from B-52 aircraft. Purpose of flight was pilot proficiency. (NASA Proj Off)

October 3: Boeing Co. said it would build one-fifth size thermal models of manned space stations under $156,500 NASA contract to determine their feasibility for predicting temperatures in full-size earth-orbiting station. (Boeing Release S-9840)

. NASA said spacecraft and parts of Agena 2nd stage of Nimbus B weather satellite launched unsuccessfully May 18, including two SNAP-19 nuclear power generators, had been found Sept. 30 by crew of research submarine four miles south of San Miguel Island off California coast. Pictures taken by submarine indicated three- by six-inch graphic cores of generators were intact; surrounding magnesium-thorium alloy casings were almost completely decayed since they dissolved in sea water almost immediately. Each core contained three pounds of plutonium. AEC had spent $200,000 searching for missing nuclear sources. Nimbus B had been destroyed shortly after launch when it veered off course. (NASA Release 68-171; Lannan, W Star, 10/4/68, A16; AP, NYT, 10/11/68, 10)

. Senate, after secret session, defeated by vote of 45 to 25 amendment by Sen. John S. Cooper (R-Ky.) to eliminate from $71.8-billion defense appropriations bill $387.4 million requested by Administration to start deployment of Sentinel antiballistic missile system. Final action on largest defense appropriations bill in U.S. history was deferred until Oct. 4. (CR, 10/2/68, S11872-85; AP, W Star, 10/2/68, A4; Finney, NYT, 10/3/68, 1; Lardner, W Post, 10/5/68, 1)

October 4: NASA-USAF review board report said failure of Nimbus B mission May 18 had been caused by improper installation of yaw-rate gyro 90° from design position in the Thorad-Agena launch vehicle. Board recommended revision of test procedures which failed to discern error and redesign of gyro mounting brackets to make improper installation impossible. Repeat mission, Nimbus B2, would be launched in spring 1969 because of flight's importance to meteorological research. (NASA Release 68-171; UPI, H Chron, 10/5/68)

. ComSatCorp, on behalf of INTELSAT, awarded Hughes Aircraft Co. $72-million contract for INTELSAT IV advanced comsats. Hughes would deliver within 22 mo four flight spacecraft, one prototype, associated spacecraft test equipment, and necessary ground equipment. (ComSatCorp Release 68-52; WSJ, 10/7/68, 3)

October 5: U.S.S.R. successfully launched Molniya I-10 to relay telephone and telegraph communications and TV programs to far northern and far eastern U.S.S.R. and to central Asia. Orbital

October 5 (continued)
parameters: apogee, 39,639 km (2,463.1 mi); perigee, 429 km (266.6 mi); period, 711.9 min; and inclination, 64.8°. (UPI, W Star, 10/7/68, A9; AP, NYT, 10/8/68, 2; GSFC SSR, 10/15/68)

. Republican Presidential candidate Richard M. Nixon issued policy statement, "The Research Gap: Crisis in American Science and Technology." U.S. was "shortchanging" its scientific community and risking research gap between U.S. effort and that of U.S.S.R. "Faced with dynamic possibilities for science, the current Administration is hobbled by the static philosophy that technological potentialities are limited.... This attitude is particularly perilous in the realm of defense.... In few areas of development is activity so intense and productive as in Soviet military research and development." While U.S.S.R. graduated twice as many scientists annually as U.S., American scientific community was "demoralized" by wavering attitudes toward R&D. "Scientific activity cannot be turned on and off like a faucet. The withdrawal of support disperses highly trained research teams, closes vital facilities, loses spinoff benefits, and disrupts development momentum.... The United States must end this depreciation of research and development in its order of national priorities.... It would be an urgent goal of my administration to devise effective means by which it could cooperate with industry and the academic community in an effort to make maximum use of scientific advances to help solve major national problems.... Our goal is to make the United States first again in the crucial area of research and development." (Text; Walsh, Science, 10/18/68, 335-7)

October 6: In Washington Sunday Star William Hines commented on James E. Webb's resignation as NASA Administrator: "Yes...there was a James Webb. He had his faults, God knows, and a peculiar style. Most people would have done the job differently. But, on balance, it is difficult to see how anyone could have done it much better." (W Star, 10/6/68, C4)

October 7: U.S.S.R. launched Cosmos CCXLVI into orbit with 317-km (197-mi) apogee, 145-km (90.1-mi) perigee, 89.1-min period, and 65.3° inclination. Satellite reentered Oct. 12. (InteraviaAir-Letter, 10/8/68, 11; GSFC SSR, 10/15/68)

. Resignation of James E. Webb as NASA Administrator, announced Sept. 16, became effective. (NASA Off of Administrator)

October 7: Sen. Stuart Symington (D-Mo.) said in statement put into Congressional Record, "I am now confident...serious consideration should be given to canceling the entire Air Force F-111 series.... If the plane is fundamentally unsound--and that would now appear to be the case--its termination would prevent the loss of additional billions of dollars--and what is more important, save the lives of many pilots." He said October report of Preparedness Investigating Subcommittee of Senate Committee on Armed Services "points up the grave security deficiencies that have resulted from the Department of Defense forcing the Air Force and Navy to put all the eggs of their aircraft development into one unfortunate basket." (Text; CR, 10/7/68, S12148-51; Witkin, NYT, 10/8/68, 18; W Post, 10/8/68, A11)

. In National Observer, Peter T. Chew criticized Americans as "uncertain, timid farers in space." During "19-month interregnum in manned space flight" occasioned by Jan. 27, 1967, Apollo fire, "Americans have become obsessed with the race question at home and the Vietnam War abroad.... If some doomsayers are to be believed, the vast U.S. space science and technology establishment put together during the last decade will be systematically dismantled once the manned Apollo landing has been accomplished because NASA has 'no clear mandate' to go on; cornfields will reclaim the great rocket and spacecraft-testing sites...; the solar system will become the exclusive playground of Soviet cosmonauts." Yet NASA's mandate to explore space "for the benefit of all mankind" had been set down in legislation establishing the agency and did not end with the moon. If anything, "the moon is the first stepping stone." Dr. Wernher von Braun "stands almost alone among the country's leaders in his ability to express in understandable terms just why we are going to the moon--and beyond.... To critics of the space program he replies, '...Man was born with an insatiable nosiness about his natural environment. ...it seems to pay off handsomely, but often in the most unexpected way, to keep satisfying his curiosity about the world around him." (Natl Obs, 10/7/68)

. Newsweek said NERVA project had "become one more casualty of cutbacks in the space program." Workers at Nevada test site "say only a skeleton staff will be left on the project by spring." (Newsweek, 10/7/68)

. NASA announced it had awarded Technical Information Services Co. $4.3-million cost-plus-award-fee contract for continued operation of NASA's Scientific and Technical Information Facility at College Park, Md. Contract would extend through November, 1969, with two one-year options. Current contractor was Leasco Systems and Research Corp. (NASA Release 68-173)

October 7: NASA Administrator James E. Webb issued order dissolving Apollo 204 Review Board established Jan. 27, 1967, to investigate Apollo fire of that date. (Text)

October 8: Antennas on NASA's Explorer XXXVIII (launched July 4) were each successfully extended to 750-ft maximum length and damper boom to maximum 630 ft by ground command. Satellite's antennas had been initially deployed to 455 ft each July 22 and extended to 600-ft each Sept. 24. Maximum extension completed planned antenna deployment sequence. (NASA Release 68-174; NASA Proj Off)

. Senate unanimously approved space rescue treaty, providing for rescue and return of astronauts downed on foreign soil. It had been signed by 75 nations. (CR, 10/8/68, S12215-6; AP, B Sun, 10/9/68, A10)

. NASA Associate Administrator for Manned Space Flight, Dr. George E. Mueller, addressed Ninth National Conference of United Press International Editors and Publishers in Washington, D.C.: "For the conception and construction of the equipment necessary to the safe transport of men into space and for their accomplishment of productive tasks in that new atmosphere, a new mix of professional and scientific disciplines has been created which has forced cooperation between engineers and medical doctors. Many of the technologies which are essential to our sending three men to the moon and back did not exist a few years ago. They had to be invented, adapted or developed.... We now have the giant boosters which have released man from his atmosphere, and...life support systems that can maintain him in space. As a result of the cleanliness requirements of the space program we have the largest 'clean rooms' in the world--rooms which hospitals are now emulating.... Over 600 computers now comprise the largest and most advanced communications system in the world. The fuel cell, which had lain dormant for many years, was activated to power spacecraft in orbit. Thirty public utility companies now have a $27,000,000 program for the adaptation of the fuel cell for home power units. We had to know on a real-time basis how fast the hearts of the astronauts were beating while they were in space...how much oxygen they were using, and how their muscles were responding...so we invented another new system, biosensor to computer to data gathering equipment, and through communications network to the Manned Spacecraft Center at Houston--from 100...or 800...or from $\frac{1}{4}$ of a million miles out in space. And a half a dozen newly formed companies are now manufacturing these adapted space-created instruments for the use of doctors and hospitals here on earth." (Text)

October 8: Commenting on James E. Webb's retirement, Sen. John Stennis (D-Miss.) said on Senate floor, "I have been a member of the Committee on Aeronautical and Space Sciences since about the time Mr. Webb was appointed to head NASA. I am not given unduly to praise a man. I am not impressed by a title. I am impressed by a record. But I am certainly impressed with the fact that Mr. Webb carried out his responsibilities for NASA with an expenditure of $34 billion, in what might be called a crash program; and I have not seen any evidence of any activity of his except that clothed in the highest degree with integrity, honesty, frankness and openness in his dealings with the committee, with Congress, as well as with the public." (CR, 10/8/68, S12227-8)

. Dept. of State said it would issue visas to 35 Soviet space scientists to attend 19th Congress of International Astronautical Federation (IAF) in New York Oct. 13-19. However, it might recommend cancellation of sightseeing tour of KSC arranged with NASA by American Institute of Aeronautics and Astronautics (AIAA) for scientists from 34 countries attending both IAF Congress and AIAA annual meeting in Philadelphia Oct. 21-25. No Soviet scientist had yet visited KSC, "apparently out of concern that the United States would ask for reciprocal rights in Russia for American scientists," said New York Times. Rep. Paul G. Rogers (D-Fla.), in letter to Secretary of State Dean Rusk, had said visit was inappropriate in light of U.S.S.R.'s invasion of Czechoslovakia, imprisonment of Pueblo crew by North Korea, Soviet aid to North Vietnam, and existence of Communist regime in Cuba. (NYT, 10/9/68)

October 9: Univ. of California at Los Angeles astronomer Dr. Kurt Riegel and graduate student Mark Jennings reported discovery of cloud of intensely cold interstellar hydrogen gas near region of galaxy where star formation was known to be taking place, about 3,000 light years from earth in direction of Milky Way. Dr. Reigel said, "The implication is that the process of star formation may in some way depend on the cooling of the gas floating around between the stars." (Getze, LA Times, 10/9/68)

. NASA was completing tests for USAF Cambridge Research Laboratories in which individual plastic hailstone models were dropped from 20,000- to 25,000-ft altitudes near NASA Wallops Station to study speed at which hailstones fell to earth and its effect on their size and growth rate in atmosphere. Wind-tunnel tests had confirmed theory that size and weight to which naturally formed hailstones would grow was related to speed they fell and thus to length of time spent in storm clouds. Shape and surface roughness affected fall speed by

October 9 (continued)
changing drag characteristics. Wallops test data would check tunnel results and would be applied in predicting growth of real hailstones. (NASA Release 68-172)

October 10: Aerobee 150 MI sounding rocket launched by NASA from WSMR carried Naval Research Laboratory experiment to 109.2-mi (174.7-km) altitude to obtain stellar spectra in Scorpius in 1,000-1,600Å far ultraviolet range and photometric data on stellar fluxes. Rocket performed satisfactorily. Scientific objectives were not achieved because attitude control system (ACS) malfunctioned and vehicle failed to capture and point at desired targets. Experiment performed as expected, but because of ACS malfunction no film was advanced by spectograph or aspect camera. Some photometric data were obtained by Geiger tube photometers. (NASA Rpt SRL)

. Australian House of Representatives, by 60-30 vote, defeated opposition Labor Party motion to condemn government for ordering 24 F-111C fighter-bombers from U.S. Crashes, delays, and cost increases had led to major criticism of government. Deliveries of aircraft were 18 mo behind schedule. Latest U.S. estimate of cost, including spares and ground equipment, was $294.63 million, about one-fourth Australian defense budget for 1968-69. There was no ceiling price on aircraft and no way Australia could cancel contract without $200-million penalty. (AP, W Post, 10/11/68, A11; NYT, 10/9/68, 12)

. NASA announced it had requested proposals by Nov. 18 in its program to build two experimental turbofan jet engines and to conduct intensive test program [see Aug. 18]. Objective was to reduce two major sources of noise--interaction of jet exhaust with outside air and noise created by fan--to produce turbofan demonstrator engine operational at noise level at least 15-20 db below those powering DC-8 and 707 aircraft. Specifications were developed at LeRC with assistance on contract from Allison Div. of General Motors Corp. and Pratt & Whitney Div. of United Aircraft Corp. while McDonnell Douglas Corp. studied feasibility of integrating quiet engine with DC-8. (NASA Release 68-175)

. Sen. John J. Sparkman (D-Ala.) on Senate floor said: "President Johnson is properly called the principal architect of America's space program. As Senator and Vice President he worked unceasingly to assure this country a role of leadership in the exploration of space.... Under President Johnson's leadership in the Senate the Space Act was passed in 1958, creating the National Aeronautics and Space Administration... setting up a charter to win for this country a preeminence in the

October 10 (continued)
peaceful exploration of space. NASA pulled together widely scattei efforts in space and built an organization unique in this country's history. It has contributed to the technological competence so vita to modern industrial society." (NASA LAR VII/108)

. Federal Aviation Administration published report, SRDS Program Goals, Achievements and Trends, on 50 Systems Research and Development Service projects undertaken in FY 1968. Beacon tracking level of terminal automation would provide aircraft identity, altitude, and computed ground speed on air traffic control radarscopes. Over three years, automated radar tracking system ARTS III would be installed at 62 busiest airports. Computer-aided approach spacing (CAAS) system would give more consistent spacing of landing aircraft. R&D eventually would lead to Category III all-weather landing systems (AWLS) at major airports, permitting aircraft to land with zero ceiling and runway visual range. (FAA Release T-68-39)

October 11: Cosmos CCXLVII was launched by U.S.S.R. into orbit with 343-km (213.1-mi) apogee, 215-km (133.6-mi) perigee, 89.9-min period, and 65.4° inclination. Satellite reentered Oct. 19. (GSFC SSR, 10/15/68; 10/31/68)

. U.S.S.R.'s Zond V could be precursor to next step in flying complex unmanned missions to Venus or Mars as well as to carrying men to moon, RAND Corp. scientist Merton E. Davies and Cal Tech scientist Bruce M. Murray wrote in Science. Soviet descriptions of Zond V suggested U.S.S.R. might plan to send pair of spacecraft to Mars in late February or early March. One might land on Mars and cast off satellite to orbit it and relay signals to earth; other might fly by Mars and return to earth with film of Mars surface. Speculations were based on Pravda and Krasnaya Zvezda (Red Star) articles by Soviet Prof. A. Dmitriyev, which said "information from space" must be delivered "directly to the scientists' laboratory" free of "encumbrances and distortions of radioed signals." He said Zond V had successfully completed assignment of developing means and methods for returning space devices. Also, U.S.S.R. had previously sent pair of spacecraft on planetary mission and might repeat mission to take advantage of favorable Mars or Venus positions for flyby or landing attempts. (Science, 10/11/68, 245-6; Cohn, W Post, 10/11/68, A9)

October 11: President Johnson sent NASA Semiannual Reports covering period July 1, 1966, to Dec. 31, 1967, to Congress with message of transmittal, saying, "I commend these reports to your attention. They contain, I believe, concrete evidence that NASA is moving forward, and that America is contributing mightily in the worldwide effort to conquer space for the benefit of all mankind." (NASA LAR VII/111)

. In TV program to viewers in Texas, New Mexico, Arkansas, and Oklahoma, Republican Presidential candidate Richard M. Nixon said a Republican administration would strive to make U.S. "first in space." He said, "I don't want the Soviet Union or any other nation to be ahead of the United States.... Let's emphasize the moon shot and others where we can make a direct break-through." (W Star, 10/12/68, A1)

. President Johnson vainly urged Senate ratification of nuclear non-proliferation treaty: "If the treaty does not go into effect soon, an increasing number of countries will see it in their national interest to go nuclear...[and] the advent of new nuclear powers could force upon us this dilemma: either withdrawing our influence and commitment from areas of the world which are vital to our interests; or having other nations trigger a nuclear conflict which could involve us." He said if Senate found it impossible to remain in session to act on ratification, he might call special session after election. However, after consulting with President Johnson, Senate Majority Leader Mike Mansfield, (D-Mont.) announced he was laying treaty aside for this session of Congress because to call it up during closing days would result in "a devisive political dispute" that could convert it into partisan issue and imperil its eventual approval. (PD, 10/14/68, 1481; CR, 10/11/68, S12685-90; Finney, NYT, 10/11/68, 12; Kilpatrick, W Post, 10/12/68, A14)

. NASA task force appointed by Assistant Administrator for University Affairs Francis B. Smith announced publication of A Study of NASA University Programs, containing assessment of programs and their benefit to NASA and academic community. NASA university programs had "made major contributions to aeronautics and space program. Research sponsored...has generated new concepts, has developed new technology, and has created unique facilities for further education and research. Over 50 percent of all experiments flown on NASA satellites have been generated by university programs. Universities have awarded at least 500 graduate degrees and provided continuing education opportunities to thousands...[and] university consultants have given policy, scientific, and engineering advice to NASA at all levels." (Text; NASA Release 68-177)

October 11: NASA had asked its contractors to cut KSC personnel 10% in effort to save $40 million by July 1. Boeing Co. had already announced plans to reduce 4,400-man force to 4,000. Chrysler Corp. would keep 1,000 of its 1,200. Cutbacks were due to NASA budget cuts and affected only 2% of work force. (NASA PAO; W Star, 10/11/68, A3)

. Comparison of infrared images of lunar eclipses of Dec. 19, 1964, and April 13, 1968, showed thermal anomalies of lunar maria unchanged after 3½ yr, Air Force Cambridge Research Laboratories researchers reported in Science. Graham R. Hunt, John W. Salisbury, and Robert K. Vincent wrote that hundreds of hot spots that cooled more slowly than surroundings were strikingly similar in images from both eclipses. One new, linear thermal anomaly had been discovered, whose close relation to lunar crustal fracture line suggested it might be of internal origin. Origin could give clue to formation of craters. (Science, 10/11/68, 252-4)

. Dr. William H. Avery, head of Aeronautics Div., Johns Hopkins Applied Physics Laboratory, explained to Johns Hopkins audience idea for aerial car transportation (ACT) system based on ski-lift principle, designed for local trips of under 10 mi within urban areas, and linked with high-speed transit system for longer distances. Series of small cars would move along elevated rail, operated by electrically powered cable 12 to 14 ft above pavement. (Christmas, W Star, 10/14/-68, B3)

October 11-22: NASA's Apollo 7 (AS-205), first manned mission in Apollo lunar landing program, was successfully launched from KSC Launch Complex 34 at 11:02 am EDT by Saturn IB booster. Primary objectives were to demonstrate command and service module (CSM) and crew performance; demonstrate crew, space vehicle, and mission support facilities; and demonstrate CSM rendezvous capability. All launch events occurred as planned and spacecraft, carrying Astronauts Walter M. Schirra, Jr. (commander), Donn F. Eisele (CM pilot), and R. Walter Cunningham (LM pilot), entered initial orbit with 190.1-mi (306-km) apogee, 142.3-mi (229-km) perigee, 89.9-min period, and 31.6° inclination. Saturn IB 2nd stage (S-IVB) manned control test was completed with excellent results, and S-IVB separated from CSM on schedule. Crew successfully transposed CSM and simulated docking by maneuvering CSM to within four or five feet of S-IVB.

On second day Schirra told ground controllers that crew was too busy to set up portable camera for live TV coverage because of minor but time-consuming difficulties. Astronauts had to pump waste water

October 11-22 (continued)

manually from spacecraft, Schirra and Eisele had trouble with their biomedical harnesses, Schirra had head cold symptoms, spacecraft evaporator system required maintenance, and hatch windows blurred and were bordered by mysterious "small hairs like fuzz." Crew fired SPS engine for 10 sec and 8 sec to set up rendezvous and maneuvered CSM to within 70 ft of tumbling spent 2nd stage, simulating techniques to be used on future flights if LM were to become disabled in lunar orbit. Crew took close-up photos of LM adapter attached to 2nd stage. S-IVB reentered earth's atmosphere Oct. 18 and splashed into Indian Ocean.

On third day crew, which had already accomplished half its objectives, photographed clouds and earth and continued checking out spacecraft systems. Power failure in spacecraft's AC electrical system was quickly restored, but overloading prompted officials to reschedule third SPS burn 20 hr sooner than planned. Burn positioned and sized ellipse for CM reaction control system deorbit in case of emergency and set up auxiliary gaging system test. Astronauts, all with head colds, appeared on national TV for 7 min for first time live from space. Crew displayed hand-printed signs bearing greetings from "the lovely Apollo room high atop everything."

Second live telecast for 11 min Oct. 15 showed closeups of spacecraft interior and astronauts so clear that observers could read astronauts' lips. Third TV appearance Oct. 16, which included nine-minute tour of spacecraft, won astronauts honorary membership in American Federation of Television and Radio Artists. Later, crew successfully fired SPS engine for fourth burn, demonstrating 20,500-lb-thrust engine's minimum impulse capability. As spacecraft passed over Hurricane Gladys in Gulf of Mexico, astronauts photographed storm and relayed data to Weather Bureau hurricane center. They also took pictures of a "long plume" of air pollution. Crew continued spacecraft checkout, guidance and navigation procedures, and TV operations on seventh day, but fourth telecast was smudgy. Successful 67-sec fifth SPS burn--longest to date--was performed out of plane to test auxiliary gaging system and readjust ellipse for lifetime and CM reaction control system deorbit.

On ninth day astronauts showed viewers exceptionally sharp pictures of main control panels in fifth TV broadcast and performed close-order drill to demonstrate movement in weightless environment. Sixth SPS burn, essentially a duplicate of fourth minimum impulse test burn, was successfully conducted. Seventh burn, on following day, adjusted time phasing for backup SM reaction-control-system deorbit burns. At 259:39 GET astronauts fired SPS engine for eighth time, to deorbit CSM for reentry. CM/SM separation, parachute deployment, and other reentry events were nominal, and spacecraft

October 11-22 (continued)
splashed down in Atlantic 8 mi north of recovery ship U.S.S. Essex at 7:11 am EDT Oct. 22. Crew was picked up by helicopter and flown to recovery ship within one hour after splashdown.

All primary Apollo 7 mission objectives were achieved, as well as every detailed test objective and three not orginally planned. Crew comfort and safety were enhanced by a change in cabin atmosphere to 100% oxygen in flight, hot meals, and relatively complete freedom of motion in spacecraft. Engineering accomplishments included live TV from space and drinking water produced as by-product of fuel cells. NASA's ATS III applications technology satellite relayed TV pictures to Europe. Service module SPS main engine, largest thrust engine to be manually thrust-vector controlled, proved itself by accomplishing longest and shortest manned SPS burns and largest number of inflight restarts. Manual tracking, navigation, and control achievements included full optical rendezvous, daylight platform realignment, optical platform alignments, pilot control of launch vehicle attitude, and orbital determination by sextant tracking of another vehicle. Mission also accomplished first digital-autopilot-controlled engine burn and first manned S-band communications.

All launch vehicle systems performed satisfactorily; spacecraft systems functioned with some minor anomalies, countered by backup subsystem, change in procedures, isolation, or careful monitoring so that no loss of systems support resulted.

Apollo 7 spacecraft had been redesigned for safety. Original two-piece side hatch had been replaced by a quick-opening, one-piece hatch. Flammability within CM had been reduced by extensive materials substitution, and systems redundancy had been expanded to reduce single failure points. Saturn IB launch vehicle carried less telemetry and instrumentation equipment, to lower weight and increase payload capability. New propellant lines to augmented spark igniter had been installed in J-2 engine to prevent failure which had occurred on Apollo 6.

Earlier unmanned Apollo flights had yielded all spacecraft information possible without crew on board. Apollo 4 (launched Nov. 9, 1967) and Apollo 5 (launched Jan. 22, 1968) had both been highly successful, completing inflight tests of all major pieces of Apollo hardware. Apollo 6 (launched April 4), despite launch vehicle problems, had attained four of five primary objectives and had been recovered in excellent condition. Apollo program was directed by NASA Office of Manned Space Flight; MSC was responsible for Apollo spacecraft development, and KSC for launch operations. Tracking and data acquisition was managed by GSFC under overall direction of NASA Office of Tracking and Data Acquisition. (NASA Proj Off; NASA Releases 68-168K, 68-179; Cohn, W Post, 10/12/68, A1; 10/13/68,

October 11-22 (continued)
A1; AP, B Sun, 10/12/68, A10; O'Toole, W Post, 10/12/68, A1; 10/15/68, A1; 10/16/68, A1; 10/17/68, A3; 10/18/68, A3; 10/21/68, A1; 10/23/68, A1; Lannan, W Star, 10/13/68, A1; 10/19/68, A1; W Star, 10/17/68, A2; Sehlstedt, B Sun, 10/23/68, A1; 10/24/68, A3; W Post, 10/23/68, A20)

October 12: Washington Post editorial noted Apollo spacecraft costs and that total cost of space program to date was upwards of $20 billion. "The expenditure of sums of money like these cannot be justified in terms of the military or civilian spin-off, although both have been substantial, or of the knowledge we have gained about the atmosphere surrounding our planet. But they can be justified in terms of the national prestige that is to be won or lost in space and of the inevitable fate of man to pursue knowledge towards its ultimate end in hope of some day achieving a better understanding of what the earth and universe are all about. It is in this latter hope that we cheer the astronauts on, wish them well in their planned 163 orbits of the earth, pray for their safe return, and urge those who make the crucial decisions about the future space program to proceed with all deliberate speed to reach the goal President Kennedy put before us." (W Post, 10/12/68, A12)

. South African Defense Minister Pieter W. Botha had announced plans, at annual conference of newspaper publishers, to establish nation's first experimental missile test and launching base on Zululand coast. (Reuters, NYT, 10/13/68, 74)

. Page Communications Engineers, Inc., subsidiary of Northrop Corp. had received $5.25-million contract to build first Middle East comsat earth station in Iran. (W Star, 10/12/68, C5)

October 13: New observations from Britain's Jodrell Bank Experimental Station indicated distance estimates to pulsars had been 30 times too short. Observations from Australia's Molonglo Radio Observatory had identified pulsar PSR 1749-28, believed to be three times more distant than 10 others observed to date. Despite great distance its pulses were more powerful than those of all but one other. From these observations, Jodrell's Dr. Graham Smith believed pulsars lay in distant halo, not in Milky Way. (Sullivan, NYT, 10/13/68, 74)

. U.S. State Dept. said there was no intention of blocking tour of KSC by scientists attending International Astronautical Federation Congress Oct. 13-19 and American Institute of Aeronautics and Astronautics

October 13 (continued)
annual meeting Oct. 19-20. Group included 40 delegates from U.S.S.R. AIAA also had arranged lecture tour of U.S. for Soviet space scientist Prof. Leonid I. Sedov of Moscow Univ. (Wilson, W Post, 10/14/68, A3)

October 13-19: At 19th Congress of International Astronautical Federation (IAF) in New York, NASC Executive Secretary, Dr. Edward C. Welsh, in opening address read message from NASC Chairman, Vice President Hubert H. Humphrey: "We take considerable pride in the United States with the generally open nature of our space program and in the manner in which we have attempted to cooperate with other nations in space participation as well as in the dissemination of facts and theories gleaned from our space experience. ...man has now begun to make the space far beyond the Earth's surface a part of his library of education and his scope of achievement. Now more than ever before the way of the future must be the way of nations working together to harness the forces of nature so that the peaceful pursuits of mankind may flourish." Dr. Welsh said, "I would place high on the list of benefits those which flow from increased international cooperation in the field of space. ...stimulated by the universal desire for knowledge [it] has brought somewhat closer together the peoples of the world. ...as the practical applications of space become more evident in the form of weather predictions, communications, and increased knowledge of the world's limited natural resources, additional strength is added to the foundation for peace." (Text)

Daniel and Florence Guggenheim International Astronautics Award of $1,000, made annually by International Academy of Astronautics in recognition of outstanding contribution to progress of space research and exploration over five-year period, was presented Oct. 18 at Congress banquet to Dr. Zdenek Svestaka of Astronomical Institute of Czechoslovak Academy of Sciences. He was Chairman of Commission on Solar Activity of the International Astronomical Union. (IAF IAA Release 34; AIAA Release 10/13/68)

Soviet scientist Prof. Leonid I. Sedov in news conference said U.S.S.R. was not in race to the moon with U.S. "The question of sending astronauts to the moon at this time is not an item on our agenda. The exploration of the moon is possible, but it is not a priority." Prof. Sedov said Soviet timetable for manned expenditions would depend on next series of flight tests using Zond rocket. Zond V was successful, he said, "because the capsule returned safely, which was the purpose of the flight." Regarding U.S.-U.S.S.R.

October 13-19 (continued)
scientific cooperation, "it's successful implementation is very much dependent on international relations." At present, he said, close relations did not exist. (NYT, 10/15/68, 48)

Informal meeting of international space scientists, organized by Northwestern Univ. UFO expert Dr. J. Allen Hynek, in conjunction with IAF Congress, discussed advisability of world cooperation on UFOs. While several speakers urged international cooperation such as uniform UFO report forms, it was agreed that no action should be taken until after appearance of Univ. of Colorado report expected later in year. (Sullivan, NYT, 10/16/68, 12)

Dr. Harold Masursky, U.S. Geological Survey astrogeologist reported analysis of data from spacecraft that had orbited and crashed into or landed intact on moon had shown area was largely a basin similar to that of Pacific Ocean. It seemed more like earth than had been previously believed. Lunar interior had been molten. Deep cracks in its crust were lined with craters where molten material had erupted from below. He said study of remains of giant crater in western Texas had shown features analagous to lunar craters with mountain in center. (Sullivan, NYT, 10/19/68, 19)

October 14: NASA successfully launched two Nike-Cajun sounding rockets two hours apart from Point Barrow, Alaska, to 80-mi (128.8-km) altitudes. Purpose of launch was to obtain data on variation of temperature, pressure, and wind profile by detonating 19 grenades per rocket at prescribed times and recording the sound arrivals on ground. Data would be compared with data from two launches to be conducted from Churchill Research Range Oct. 15. Rockets and instruments performed satisfactorily; sound arrivals were recorded for all grenade ejections. Good data were anticipated. (NASA Rpts SRL)

. Special committee of National Academy of Sciences had nominated Duke Univ. biochemist Dr. Philip Handler, Chairman of National Science Foundation's National Science Board, to succeed Dr. Frederick Seitz as NAS president. Election by mail ballot would be held in December. (NYT, 10/14/68, 33)

. Barron's editorial criticized concentration of space funding on manned lunar program rather than on military: "Congress in its wisdom already has curtailed funds for manned flights after the lunar landing--the so-called Apollo Applications Program--and it could usefully wield

October 14 (continued)

an even sharper axe. The money might far better go toward the military exploitation of space, which, for the past seven years, has suffered from dangerous neglect. Thus, out of the vast sums spent on space, at most one dollar in six has had a military bearing. In turn, with the possible exception of the Manned Orbital Laboratory...nearly every cent of the so-called military budget has gone for hardware with a passive or defensive aim, notably satellites for reconnaissance, communications, navigation and weather forecasting. In striking contrast, the Soviet Union has developed and tested...a weapon aptly known as Scrag, which can hurl a guided missile carrying a nuclear payload of 15 megatons or more into a partial orbit (hence, fractional) round the earth. To anyone in his right mind, FOBS constitutes a gross violation of the outer space treaty, which prohibits the placing of nuclear warheads in orbit. However, according to the confused legal eagles in the State Department and Pentagon (if not to some future hapless populace which finds itself on ground zero), anything less than a full orbit goes.... In the interest of survival, here is one balance the U.S. must move swiftly to redress.... The first duty of government is to protect its people. Neither the Kennedy nor the Johnson Administration has honored that trust." (Barron's, 10/14/68, 15)

. American Independent Party platform in regard to science and technology: "...Emphasis on the further exploration and utilization of space must be renewed. This, again, is a highly competitive area between nations, but not for this reason alone, but for the welfare and security of this nation, we must not be lacking in our efforts in this field...." [Party had been organized by Alabama Gov. George C. Wallace who was its Presidential candidate.] (W Post, 10/14/68, A10)

October 15: NASA launched two Nike-Cajun sounding rockets from Churchill Research Range to obtain data on variation of temperature, pressure, and wind profile by detonating 19 grenades per rocket at prescribed times and recording sound arrivals on ground. Rockets reached 78.8-mi (126.8-km) and 77.8-mi (123.5-km) altitudes and performed nominally. Sound arrivals were recorded from all grenades. Data would be compared with data from Oct. 14 Point Barrow, Alaska, launches. (NASA Rpts SRL)

. NASA Nike-Tomahawk sounding rocket launched from NASA Wallops Station carried Univ. of Michigan payload to 211-mi (340-km) altitude to investigate role of quenching, dissociative recombination, ionospheric decay, and nonthermal electrons on airglow during decay period immediately following sunset. Rocket and instruments performed satisfactorily; peak

October 15 (continued)
altitude was as predicted, and 570 sec of telemetry was received. All measuring systems functioned properly and scientific objectives were met. (NASA Rpt SRL)

. Kennedy Space Center Director, Dr. Kurt Debus, said Saturn IB Launch Complexes 34 and 37 would be put on standby basis until beginning of Apollo Applications program in late 1970, with resultant reduction of 1,315 personnel. Shutdown, forced by space budget cuts would save NASA $20 million. Some 10% of 2,400 contract work force would be affected, with 1,000 engineers and technicians continuing to work in other areas. Complexes were to have been maintained in event Saturn V launch vehicle encountered serious development problems, but Dr. Debus said this insurance was no longer needed. (KSC Release 463-68; AP, B Sun, 10/16/68, A7)

. U.K. Minister of State in Ministry of Technology, J. P. W. Mallalieu, told House of Commons U.K. would have to pay U.S. equivalent of $60 million in cancellation fees and other expenses connected with termination of its order for 50 F-111 aircraft Jan. 16, 1968. Order was valued at $650 million but this would have risen to $1 billion with computation of spares and 10-yr interest. (WSJ, 10/15/68, 17)

October 16: Aerobee 150 MI sounding rocket launched by NASA from WSMR carried Lockheed Missiles & Space Co. experiment to 96.6-mi (155-km) altitude to obtain quantitative measurements of spectrum and intensity of solar x-ray flux in 2- to 30-kev range, determine distribution on sun, and observe galactic x-ray sources. Rocket and instruments performed satisfactorily. All detection systems on payload acquired useful data. Communications, maintained with both satellite x-ray monitor and ground-based optical observer, indicated sun was in non-flaring state with increasing activity on west limb. (NASA Rpt SRL)

. Ray Cromley commented in Washington Daily News: "It is one of the tragedies of the moon race that earth satellite programs which could revolutionize certain aspects of agriculture, mineral exploration, TV broadcasting, navigation, weather forecasting and flood control are being squeezed unmercifully by Apollo. It is now clear that these unpublicized, unromantic programs promise unbelievably large payoffs. The U.S. return...has been conservatively estimated at $400 million to $1 billion for every $100 million invested after feasibility research is completed. The investments could be private, public or a mixture of both." (W News, 10/16/68, 31)

October 16: U.S. and Australia signed five-year agreement in Canberra to expand scientific cooperation through exchanges of scientists and information. They agreed to participate in joint research projects and to include scientists and institutions from other countries in some projects. (Reuters, NYT, 10/17/68, 14)

. MSFC issued to NAR's Rocketdyne Div. two contract modifications to extend engine production and delivery. An $8.4-million supplement was awarded for extension of J-2 engine production through April 30, 1970, because of overall stretch-out of launch vehicle production. Under extension, J-2 engine production would be cut from three engines per month to one. Contract for F-1 engine deliveries was extended through June 1970 under $4-million modification which decreased F-1 production rate from two engines per month to one. (MSFC Releases 68-246, 68-247)

. Experimental, miniature, deep-exploration submarine Alvin sank in 4,500 ft of water during launch operation 120 mi south of Cape Cod when cable holding it to mother ship broke. No one was aboard. Woods Hole Oceanographic Institute, which operated vessel, expected to recover it. (W Post, 10/17/68, A30; AP, W Star, 10/17/68, A11)

. 1968 Nobel Prize for medicine and physiology was awarded in Stockholm to Dr. Marshall Warren Nirenberg, National Heart Institute; Dr. Har Gobind Khorana, Univ. of Wisconsin; and Dr. Robert W. Holley, Salk Institute, for genetic research pointing way to combatting hereditary illness. (B Sun, 10/17/68, A3; Lee, NYT, 10/17/68, 1)

October 17: NASA's ATS IV applications technology satellite reentered earth's atmosphere over the South Atlantic southwest of St. Helena island. Spacecraft, launched Aug. 10, had remained in parking orbit, tumbling uncontrollably, when Centaur engines failed to reignite for second burn. (NASA Release 68-188)

. NASA issued summary of combined findings of Accident Board and Review Board appointed to investigate May 6 accident which destroyed Lunar Landing Research Vehicle (LLRV) at Ellington AFB. Pilot, Astronaut Neil A. Armstrong, had to eject few seconds after loss of helium pressure in propellant tanks caused premature shutdown of attitude control rocket system. Helium had been inadvertantly depleted earlier than usual in flight. Armstrong incurred minor injuries. Review Board, appointed by then NASA Deputy Administrator Dr. Thomas O. Paine to study accident's possible impact on Apollo program, discovered no unfavorable effects on lunar landing project,

October 17 (continued)
particularly lunar module. It agreed with Accident Investigation Board in calling for improvements in design and operating practices in LLRV and urged more stringent control over such flying programs and greater attention to all NASA lunar landing simulators. (NASA Release 68-182)

. Atmospheric scientists at JPL and Ohio State Univ. announced successful high-altitude test of balloon-borne spectrometer to measure atmospheric radiation emitted in four-micron region. Data, obtained on flight from National Center for Atmospheric Research Station at Palestine, Tex., indicated sunlight reflected from earth would pose no significant obstacle to continuous effective operation of radiation sensors on spacecraft in earth orbit. Researchers concluded satellite-borne instrument could probe earth's lower atmosphere to provide basis for global weather prediction. Test marked step in NASA program to define experiments for manned earth-orbiting missions in Apollo Applications program. (NASA Release 68-176; Pasadena Star-News, 10/17/68)

October 18: RAM C-2 radio attenuation measurement mission launched Aug. 22 was adjudged successful by NASA. Good quality measurements of electron and ion concentrations in flow field were obtained at discrete locations along the spacecraft during reentry. (NASA Proj Off)

. XB-70A, flown by NASA test pilot Fitzhugh Fulton, successfully reached 52,000-ft altitude and mach 2.18 in flight from Edwards AFB to evaluate ILAF-exiter vane systems, air vehicle performance, and handling qualities. (XB-70 Proj Off)

. USAF announced lifting of three-week ban on F-111 flights but reimposed severe limits on speeds and maneuvers in force before halt. Restrictions would be lifted following reinforcement of high-stress area of wing box to distribute load more evenly. Investigation of Aug. 27 ground fatigue testing failure had shown it was "due to an isolated small crack induced during manufacturing process in the metal surrounding a bolt hole." No other such imperfections had been found. USAF said Sept. 23 F-111 accident at Nellis AFB had occurred when pilot lost control because of excessive rearward shift of aircraft's center of gravity following fuel transfer to which crew had given inadequate attention. (DOD Release 947-68; Witkin, NYT, 10/19/68, 1; B Sun, 10/19/68, 4; AP, W Post, 10/19/68, A11; W Star, 10/22/68, A9)

October 18: ComSatCorp reported net income of $5,054,000 (50 cents per share) for first nine months of 1968. Income included $1,750,000 (17 cents per share) for third quarter. (ComSatCorp Release 68-56)

. NASA announced it had released tracking ship USNS Watertown from priority role of reentry support for Apollo missions, thus effecting reduction in operational costs required by budgetary curtailments. Manned Space Flight Network land stations in Pacific, Apollo tracking ship Huntsville, and Apollo range instrumentation aircraft would serve returning Apollo spacecraft landing in preselected Pacific area. (NASA Release 68-181)

. Sen. Gordon L. Allott (R-Colo.) in letter to Science scored "Understanding Gap" between scientific community and Congress and taxpayers on Federal R&D funding. "We are limited to a great degree by revenue taken in by the Treasury if we are to make the financing of our national debt manageable. Within our admitted lack of expertise, coupled with an appalling lack of national goals or a system of priorities, I think we do a fair job of spreading out the federal dollar. We could do better, though, with some constructive help from the scientific community from an objective and realistic appraisal of the circumstances and of existing realities, and we could benefit from the establishment of some system, either a joint Committee or something similar, which would view research on an overall basis, which would review national goals and aspirations and which might...make a stab at setting up some type of priority list." U.S. "might well benefit if...the scientific community would become 'involved,' would drop the cloak of mystery, and take the time to explain, not just to us in Congress, but to Mr. Taxpayer as well, just what it's all about." (Science, 10/18/68, 214-8)

October 19: U.S.S.R. launched Cosmos CCXLVIII into orbit with 543-km (337.4-mi) apogee, 473-km (293.9-mi) perigee, 94.7-min period, and 62.2° inclination. (InteraviaAirLetter, 10/21/68, 6; UPI, W Post, 10/21/68, A11; GSFC SSR, 10/31/68)

. USAF test pilot Maj. William J. Knight was named 1968 winner of Harmon International Aviator's Trophy as "world's outstanding pilot for exceptional individual piloting performance." He had piloted X-15 No. 2 to 4,520 mph Oct. 3, 1967. Maj. Knight held both command pilot and USAF astronaut's command wings, having piloted research aircraft to 280,000-ft altitude. (NYT, 10/20/68, 84; CSM, 10/21/68)

October 20: Cosmos CCXLIX was launched by U.S.S.R. into orbit with 2,158-km (1,304.9-mi) apogee, 491-km (304.1-mi) perigee, 112.1-min period, and 62.3° inclination. (AP, B Sun, 10/21/68, A4; GSFC SSR, 10/31/68)

October 21: ComSatCorp, on behalf of INTELSAT consortium, signed $72-million contract with Hughes Aircraft Co. for construction of INTELSAT IV series of advanced comsats--four spacecraft and one prototype, with test and ground equipment. (ComSatCorp Release 68-57)

. Richard Witkin in New York Times quoted "reliable sources" as saying Assistant Secretary of Defense for Systems Analysis, Dr. Alain C. Enthoven, had forwarded paper to Undersecretary of Defense Paul H. Nitze proposing further cuts in F-111 production, including cancellation of interim bomber version. Dr. Enthoven, specialist in calculating cost effectiveness of competing weapons systems, claimed many projected F-111 missions could be performed by much cheaper aircraft such as Ling-Temco-Vought A-7. (NYT, 10/21/68, 25; Business Week, 10/26/68)

October 21-25: At Fifth Annual Meeting and Technical Display of American Institute of Aeronautics and Astronautics (AIAA) in Philadelphia, Boeing Co. Vice President John M. Swihart announced abandonment of swing-wing design for SST in favor of fixed-delta-wing aircraft with four independently mounted engines under triangular tail. Final detailed design would be given to FAA by Jan. 15 deadline. New design differed from delta-winged Anglo-French Concorde and Soviet Tu-144 in wider wing span and horizontal tail which, according to Boeing Vice President in charge of SST H. W. Withington, made possible superior control at low speeds which compensated for more drag encountered with sweep-back angle of wing. Aircraft cost would be same as swing-wing, $40 million. It would carry same number of passengers, 280 or more, at same maximum speed, 1,800 mph. (Witkin, NYT, 10/22/68, 77; UPI, W Post, 10/22/68, A11; AP, W Star, 10/22/68, A3)

Dr. William H. Pickering, Director of Jet Propulsion Laboratory, received $5,000 AIAA Louis W. Hill Space Transportation Award "for devising, developing and supervising significant space and satellite programs for military and civilian agencies of the United States Government." NASA Ames Research Center Director H. Julian Allen was named Honorary Fellow of AIAA, highest membership award given by Institute. It was presented annually to two Americans and one foreign

October 21-25 (continued)
national. Other 1968 recipients were James S. McDonnell, Chairman of Board, McDonnell Douglas Corp., and England's Sir Frank Whittle, often called father of jet engine. (AIAA Releases; ARC Release 68-15; ARC Astrogram)

October 22: Dr. Wernher von Braun, Director of Marshall Space Flight Center, told reporters before addressing Sales Executive Club luncheon in New York, Apollo 7 flight had gone so well that less had been learned from it than expected. If there were any major flaws in spacecraft they did not show up on the mission. Circumlunar flight in December would be undertaken only if study of Apollo 7 showed it could be done without unnecessary risk. (NYT, 10/24/68, 33)

. DOD Systems Analysis Office cost-effectiveness proposal submitted to Secretary of Defense Clark Clifford called for elimination from budget of new nuclear submarines requested by Adm. Hyman Rickover, reduction in funds already approved for purchase of antisubmarine weapons, and retirement of more than 20 diesel-powered submarines, said George C. Wilson in Washington Post. Proposal, according to sources, was to postpone high-speed submarine and cancel development of "quiet" one. Its severity "illustrates the money pinch the Pentagon finds itself in as it tries to cut billions from its fiscal 1969 budget as well as the new budget." (W Post, 10/22/68, A10)

October 23: NASA successfully deployed 40-ft-dia parachute with predicted 10-lb-per-cubic-ft dynamic pressure at mach 3.5. Parachute was ejected from five-foot-long cannister which had been propelled to 33-mi altitude by three-stage rocket launched from WSMR. Test was to determine possible use of parachute for aerodynamic deceleration in planetary entry missions. Another test in Project SHAPE (Supersonic High Altitude Parachute Experiments) was scheduled for November. (NASA Release 68-185; AP, NYT, 10/27/68, 66)

. ATS IV mission (launched Aug. 10 and reentered Oct. 17) was adjudged a failure by NASA. Satellite had remained in elliptical parking orbit instead of entering planned synchronous orbit when Centaur engines failed to reignite for second burn. The resulting highly elliptical orbit precluded meaningful return of gravity gradient data. Day-night camera operated, but attitude dynamics precluded reception other than smeared unintelligible pictures. Electrical operation of ion engines, microwave multiple access, and microwave wide band was verified. Boom camera returned good photos, including some of earth. (NASA Proj Off)

October 23: NASA's HL-10 lifting-body vehicle, piloted by Maj. Jerauld R. Gentry (USAF), failed to climb to desired 45,000-ft altitude after air-launch from B-52 aircraft, apparently because of rocket engine malfunction. Vehicle glided to smooth 225-mph emergency landing on Rosamond Dry Lake. Flight from Edwards AFB was to have been HL-10's first powered flight. (NASA Proj Off; LA Times, 10/24/68)

. Apollo 7 editorial comment:

Washington Post: "...as the men in the space program go over the data on Apollo 7 and consider the alternatives of manned or unmanned flight on Apollo 8, they must not allow anyone's desire to beat the Russians, or to get around the moon by the end of 1968, or to fan public interest in the future of space exploration to enter into their calculations. Only if they are convinced that our knowledge is sufficient, our spacecraft is totally adequate, and our men are ready should they give the go to Astronauts Borman, Lovell and Anders for a Christmas trip into space." (W Post, 10/23/68, A24)

Washington Evening Star: "To those who have made a close study of the space program, [Walter M.] Schirra is the astronaut's astronaut; the man whose ability stands out in that company of the super-able. To those in the know, Schirra is the mischievous perfectionist, the naval officer who lives by the book when he isn't too busy carrying out an elaborate practical joke. But Schirra will surely be remembered by the public as the astronaut who caught cold, who growled when the alarm clock rang, and who blew up when he was pushed too far. And it may be that Schirra's greatest contribution to the space program is that he, the most superlative of the supermen, forcefully demonstrated to the world that his is completely and refreshingly human." (W Star, 10/23/68, A20)

Baltimore Sun: "The toting up and analysis of all the information brought home this time must be left to the teams of experts. So must the decisions as to what comes next, and the planning such decisions call for. The public is content to know that three men in a spaceship have added another brave and brilliant chapter to a history of which all of us are unreservedly proud." (B Sun, 10/23/68, A6)

. MSFC issued McDonnell Douglas Corp. $2,395,955 supplemental contract agreement for qualification test program to verify capability of maintaining S-IVB stage auxiliary propulsion system modules for up to 90 days with propellants loaded. Award brought total value of contract to $965,568,493. (MSFC Release 68-252)

October 24: X-15 No. 1, flown by NASA test pilot William H. Dana, successfully reached 250,000-ft altitude and 3,682 mph (mach 5.04) in flight from Edwards AFB. Purpose of flight was to conduct WTR experiment and check out fixed alpha cone and fluidic probe. (X-15 Proj Off; AP, W Post, 10/25/68; SBD, 10/29/68, 289)

. Second Minuteman III ICBM was successfully launched by USAF from underground silo at AFETR. First test had been conducted Aug. 16. (AFETR PIO; Reuters, P Inq, 10/25/68; SBD, 10/29/68, 289)

. NASA was negotiating with General Electric Co. for data management system costing in excess of $750,000 for 15 mo. It would be used to monitor data from Barbados Oceanographic Meteorological Experiment (BOMEX), in which NASA would assist ESSA during 1969. Data from satellites, five to seven ships, many buoys, and from high in atmosphere to bottom of ocean would be processed by system. (NASA Release 68-251)

. Rep. Alphonzo Bell (R-Calif.) told American Astronautical Society meeting in Los Angeles, "In evaluating space spending as a budget priority, it is vital to consider the relationship of space to defense....Both Russia and the United States have advance surveillance capacity....Both nations have almost unlimited plans for developing their capabilities in this area. Mutual distrust is just one reason for this. The other is concern about the mounting capacity of other nations, particularly China, to produce and deliver nuclear weapons. As long as the threat of nuclear war from any source continues, Russia and the United States will be producing ever more sophisticated orbital 'spies in the skies.' ...That is why the space program of the United States never is going to be abandoned. It will always be high on the list of spending priorities. The reason is not charming, but basic. We need to be in space to protect ourselves....In the somewhat more distant future the harvest of human rewards...now only beginning... will prove that space research and space applications justify a continuing high priority." (Text; Aero Daily, 10/29/68)

October 25: Soyuz 2 was successfully launched by U.S.S.R. into orbit with 229-km (142.3 mi) apogee, 191-km (118.7-mi) perigee, 88.6-min period, and 51.7° inclination. Satellite later was used in rendezvous maneuvers with manned Soyuz 3 [see Oct. 26-30] and reentered Oct. 28. (Lannan, W Star, 10/27/68, A1; SBD, 10/28/68, 279; GSFC SSR, 10/31/68)

October 25: In statement to the press, Secretary of Defense Clark Clifford announced decision to proceed with program for turbine electrical drive [quiet] submarine. He had ordered construction of high-speed nuclear-propelled attack submarine July 1. "The close re-examination...just completed has convinced me that costly as it is [$150 to $200 million compared with $78 million for new Sturgeon class nuclear attack submarine], there is no cheaper and effective way to achieve in equal time desired progress in noise suppression." (DOD Release 971-68)

. NASA announced that H. Julian Allen, who joined NACA in 1936, would retire as Director of Ames Research Center Nov. 15. ARC Associate Director John F. Parsons would serve as Acting Director. Leading authority on supersonic and hypersonic wind-tunnel design, Allen had originated concept of bluntness for reentry shapes--as used in Apollo spacecraft--and had received NACA's Distinguished Service Medal, NASA Medal for Exceptional Scientific Achievement, AIAA Sylvanus A. Reed Award, and Air Force Assn.'s Air Power Trophy. After his retirement Allen would be available to NASA as a consultant. (NASA Release 68-183; SBD, 10/28/68, 272; NASA Ann)

. New York Times editorial commented on failure of swing-wing design for SST: "More than ever now the burden of proof is on those who urge that billions of taxpayers" dollars be spent on an American SST. The falibility of their judgment has been demonstrated in the loss of the swing-wing gamble. Is there reason to suppose that their optimistic forecasts about the profits to be made from such an airplane are any sounder? The aerodynamics of different wing configurations is not the only thing that needs to be assessed in the current re-examination of the SST." (NYT, 10/25/68, 46)

. In Washington Evening Star Carl T. Rowan wrote: "Some disenchanted Americans shake their heads as they note the poverty, the hunger, the sickness, the ignorance that plague the earthlings about them, and they ask what logic provokes our government to ignore critical problems at hand while investing vast sums in space ventures of doubtful value. ...we have become an 'either/or' society...Even though our gross national product is now running at a fantastic level of $871 billion a year, it is absolutely inconveivable to most taxpayers that we can have guns and butter, space spectaculars and dramatic domestic change.... Well, no man of vision, imagination, or hope can possibly believe that we are wrong to search the darkest reaches of outer space....Who can say that contributions to medicine, to weather control, to science in general, to the problems of feeding man, to national defense, and ultimately to peace may flow from the space program? ...The space program

October 25 (continued)
is.., inherently and intrinsically, justification enough for spending $340 for every man, woman, and child in America. But are we not wise to ask: what is man profited if he harness the universe and yet fail to conquer the meanness,...the hatreds, that dog those who inhabit the earth?...Much of the public is not in a mood to finance anything else. So we shall be stuck with the ordeal of setting priorities where there is scant room for making choices." (W Star, 10/25/68, A15)

. MSFC announced Boeing Co. contract modifications totaling $4,652,364 for Saturn V R&D, to: install over 4,000 instrumentation and data acquisition systems in special 2nd stage structural test verification program to confirm design of lighter weight, more powerful 2nd stage for fourth Apollo/Saturn V and subsequent vehicles; perform an abort and alternate mission analysis for Apollo/Saturn vehicles 503 through 510; and perform reliability, quality, and component qualification program, special prelaunch analysis, telemetry systems, and Saturn V Apollo operations system safety program. Total value of Boeing Saturn V systems engineering and integration contract was now $213,443,238. (MSFC Release 68-253)

. USAF's Space and Missile Systems Organization announced award of initial increments to cost-plus-fixed-fee contracts with McDonnell Douglas Corp.: $5-million increment was awarded to $9,829,177 contract for reentry vehicle developmental flight tests; $756,285 increment was awarded to $1,739,105 contract for reentry vehicle environmental components tests. (DOD Release 974-68)

. Edward J. Schmidt, Special Assistant to General Electric Co.'s Vice President for R&D, was sworn in by NASA Acting Administrator, Dr. Thomas O. Paine, as consultant to the Administrator in management operations as affected by scientific and technical information. (NASA Release 68-189)

October 26: Business Week editorial: "...since the tragedy on the launch pad...[Jan. 27, 1967] NASA and its thousands of supporting companies have done a tremendous job in rebuilding the spacecraft and in perfecting the safety and reliability of the entire Apollo system. The clear message of Apollo 7 is that NASA now has a spacecraft that can take men to the moon and back safely. This is a triumph for NASA and for U.S. science, engineering, and management. (Business Week, 10/26/68)

October 26-30: U.S.S.R. successfully launched Soyuz 3, carrying Cosmonaut Georgy T. Beregovoy, from Baikonur Cosmodrome with "a powerful rocket-booster," Tass announced. Spacecraft entered orbit "close to the preset one," with 205-km (127.4-mi) apogee, 183-km (113.7-mi) perigee, 88.3-min period, and 51.7° inclination; all equipment was functioning normally. Launch was first manned Soviet mission since Soyuz I (April 23-24, 1967) in which Cosmonaut Vladimir M. Komarov was killed when spacecraft crashlanded following reentry.

Tass later announced that during first revolution Soyuz 3 "approached" to within 200 m (656 ft) of unmanned Soyuz 2 (launched Oct. 25), initially by "an automatic system"; subsequent operations were performed manually by Beregovoy. On Oct. 27, Tass said, Beregovoy "independently oriented the ship in space and switched on the motor," to alter spacecraft's orbit; continued conducting scientific, technical, medical, and biological experiments and research; transmitted TV pictures of cabin interior; and approached Soyuz 2 for second time before it reentered Oct. 28. Soyuz 3 remained in orbit until Oct. 30, completing 94 hrs 51 min and 64 revolutions, before it softlanded "with the use of aerodynamics," in a preset area in Soviet territory. Flight was first successful manned docking for U.S.S.R. U.S. had conducted first manned docking March 16, 1966. (Lannan, W Star, 10/27/68, A1; O'Toole, W Post, 10/27/68, A1; Kamm, NYT, 10/27/68; SBD, 10/28/68, 279; 10/31/68, 297; AP, W Post, 10/28/68, A1; GSFC SSR, 10/31/68)

October 27: Lightweight plastic foam invented by ARC scientists Dr. John A. Parker and Salvatore Riccitiello showed great promise for industrial fire protection, particularly fuel fires. Extremely light polyurethane with additives formed tough, protective char layer when exposed to flame, while simultaneously releasing fire-extinguishing gases which helped to quench flame. Used to fill airspaces within structures, foam would prevent oxygen from reaching and feeding a fire. Demonstrations had shown it suitable for fire protection in aircraft, spacecraft, homes, and other structures. Other possible uses included automobiles, boats, trains, oil refineries, paint and chemical processing, and laboratories. Foam was resistant to heat flow, making it an excellent insulator. (NASA Release 68-187)

October 27: In New York Times article John N. Wilford said some NASA Hq. officials were "hesitant to approve a lunar orbit mission out of fear of being criticized for taking undue risks by skipping preliminary test flights. They are worried about the spacecraft's electrical system, which developed some minor 'bugs' during Apollo 7, and the propulsion system, even though the on-board rocket apparently performed well in eight firings during Apollo 7." If lunar mission was decided on, it would probably be launched Dec. 21 when moon's position to earth would require minimum midcourse rocket firing maneuvers for landing and light conditions would give good view of potential lunar landing site. First astronauts on moon were expected to stay less than 24 hr, to demonstrate it could be done. In time astronauts would make many return trips and would roam moon's surface in "moon buggies." Day might come when people would establish lunar colonies. (NYT, 10/27/68, 12E)

. Dr. Lise Meitner, nuclear physicist who was for 30 yr scientific partner of Dr. Otto Hahn, Nobel Prize winning discoverer of nuclear fission, died in Cambridge, England, at age 89. She had been forced to leave her work with Dr. Hahn and flee Nazi Germany's antisemitism in March, 1938, nine months before he announced results of experiments which indicated atom could be split. Dr. Meitner was credited with having laid much of theoretical groundwork for atomic bomb. Though it was she who named the phenomenon "nuclear fission," she took pains to disassociate her work from the bomb itself. (NYT, 10/28/68, 1)

October 28: NASA outlined six steps which would lead to final decision during week of Nov. 11 on next Apollo manned mission. Apollo 8, scheduled for December, was planned as manned earth-orbital mission on Saturn V vehicle. Because of Apollo 7 success, NASA was considering alternative mission possibilities: earth-orbital mission deeper into space, circumlunar flyby, and lunar orbit. Steps--laid out by Associate Administrator for Manned Space Flight, Dr. George E. Mueller, and Apollo Program Director, L/G Samuel C. Phillips--were: detailed analysis and review of Apollo 7 results to determine any necessary spacecraft changes; final certification of solutions to Apollo 6 problems; certification of strengthened Saturn V 2nd and 3rd stage fuel lines and elimination of pogo in 1st stage; completion of ground tests before Apollo 8 command and service module (CSM) certification for lunar flight; completion of flight computer programs for deep space and lunar missions; rehearsal of CSM operations tests with mathematical models, and delivery of Apollo 8 CM computer program; and completion of design certification reviews of launch vehicle and spacecraft subsystems. Dr. Thomas O. Paine, NASA Acting Administrator,

October 28 (continued)
said, "The final decision on whether to send Apollo 8 around the Moon will be made after a thorough assessment of the total risks involved and the total gains to be realized in this next step toward a manned lunar landing. We will fly the most advanced mission for which we are fully prepared that does not unduly risk the safety of the crew." (NASA Release 68-190; UPI, NYT, 10/29/68, 14)

. Washington Evening Star editorial: "The Russians are going to the moon just as fast as their technology will carry them....It is, of course, impossible to judge what lies ahead or guess what problems either nation may encounter before the lunar landings are carried out. But if all goes well it looks as though both nations might be ready to go in about a year. We would have no objection at all if a way could be found to 'fix' the race, and an agreement reached to make the landings literally simultaneous. It would be one way of assuring that neither nation would pursue the goal of national prestige to the point of tragedy." (W Star, 10/25/68, A10)

. Republican Vice-Presidential candidate, Maryland Gov. Spiro T. Agnew, said on visit to Manned Spacecraft Center during Houston campaign trip, "We will not tolerate America becoming second best" in our space exploration. (W Star, 10/29/68, A5; UPI, W News, 10/29/68, 3)

October 29: ESSA said "very minor" solar flare reported at 7:18 am EST was accompanied by large radio burst that could interfere with radio communication. It was too small to affect U.S.S.R. Cosmonaut Georgy Beregovoy in orbit. (UPI, W Post, 10/30/68, A23)

. French Defense Minister Pierre Messmer said plans for 1969 hydrogen bomb testing around Fangataufa Atoll in South Pacific would include miniaturization of H-bomb and perfection of ground-to-ground and sea-to-ground strategic missiles. France's first atomic submarine would start sea tests, and second would be launched. Military budget for 1969 allocated $1.3 billion for nuclear weapons and delivery systems and $476 million for nuclear construction. (AP, B Sun, 10/30/68; W Post, 10/30/68, A20)

. Army Map Service technicians were building 22- by 14-ft hand-carved model of landing site astronauts would see on approaching lunar "target area," to assist NASA in simulating manned landings on moon. Model, part of lunar module simulator (LMS), would be constructed from high-fidelity lunar relief map made from Orbiter IV and V photography. (DOD Release 966-68)

October 29: NASA announced retirement, effective Nov. 1, of Werner R. Kuers, Director of Marshall Space Flight Center's Manufacturing Engineering Laboratory since 1961. (MSFC Release 68-257; Marshall Star, 10/30/68, 1)

. MSFC awarded Boeing Co. $1,404,548 contract modification to predict and evaluate orbital heating effects of liquid hydrogen boil-off, supply thermal criteria, and profiles related to Saturn V 2nd stage, assist with Saturn V preflight reviews, and provide configuration accounting. Award brought total contract to $212,128,585. (MSFC Release 68-256)

October 30: Award of $70,000 Nobel Prizes in physics and chemistry to Univ. of California at Berkeley Prof. Luis W. Alvarez and Yale Univ. Prof. Lars Onsager, respectively, meant U.S. had won all three Nobel science categories for 1968, as it had in 1946. Awards in medicine and physiology [see Oct. 16] went to U.S. geneticists. Dr. Alvarez was cited for "decisive contributions" in early 1960s to physics of subatomic particles and techniques for their detection. Dr. Onsager was honored for findings published in 1931 and sometimes regarded as fourth law of thermodynamics, "the reciprocity relations of Onsager," which could determine interrelation between voltage and temperature as electric current flowed through metal wire. Awards would be presented in Stockholm Dec. 10. (Lannan, W Star, 10/30/68, A1; Lee, NYT, 10/31/68, 1; O'Toole, W Post, 10/31/68, A25)

October 31: U.S.S.R. launched two Cosmos satellites. Cosmos CCL entered orbit with 845-km (525.1-mi) apogee, 753-km (469.7-mi) perigee, 100.6-min period, and 74° inclination. Cosmos CCLI entered orbit with 226-km (140.4-mi) apogee, 170-km (105.6-mi) perigee, 88.3-min period, and 64.7° inclination. Instruments were functioning normally. (GSFC SSR, 10/31/68; SBD, 11/4/68, 12)

. Dr. William H. Pickering, Jet Propulsion Laboratory Director, and Dr. Lee A. DuBridge, California Institute of Technology President, presided at unveiling of historical marker at JPL commemorating test-firing of rocket engine Oct. 31, 1936, by students of Cal Tech's Guggenheim Aeronautical Laboratory under the late Dr. Theodore von Kármán. With firing, Cal Tech had become first university actively to sponsor rocket research. Its work had gained Government sponsorship and later had led to establishment of JPL. (JPL Release 492; Diebold, LA Times, 11/1/68)

October 31: National Academy of Sciences President, Dr. Frederick Seitz, announced William W. Rubey, professor of geology and geophysics at Univ. of California, Los Angeles, had been named Director of Lunar Science Institute, Houston, Tex. NAS had accepted interim responsibility for operation of Institute until consortium of universities could be formed to assume its direction. Formation of Institute had been announced by President Johnson March 1, 1968, to provide base for academic scientists participating in lunar exploration program, working in Lunar Receiving Laboratory, or using other facilities of Manned Spacecraft Center devoted to study of the moon. It was to serve also as center for analysis and study of lunar data obtained from NASA unmanned missions. (NASA Release 68-191; NAS Release)

During October: Soviet Science in the News, Electro-Optical Systems, Inc., publication, said review of Soviet technical press indicated U.S.S.R. would attempt to orbit manned space station within the year and that it possessed "well-devised and thorougly realizable designs." First "rooms" of station would comprise Cosmos or Proton booster joined with Soyuz spacecraft. Additional rooms would combine solid and inflatable elements like polyethylene. Tests of water recovery systems in Pacific indicated broadening of Soviet techniques. Six vessels had been completed for ocean recoveries of spacecraft. Conclusion of Soviet scientists that weightlessness had adverse effect on human skeletal composition seemed to indicate space station would use artificial gravity. "Rotation of space station of from 40 to 60 meters in diameter would generate sufficient artificial gravity to allow large number of scientists to work in space." (SSN, 10/68, 1; Aero Daily, 10/16/68)

. Dr. Robert C. Seamans, Jr., MIT professor and consultant to former NASA Administrator James E. Webb, was nominated as AIAA President for 1969. (A&A, 10/68, 106)

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