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SEPTEMBER 1967

September 1: The need for design modifications had required shipment of a manned orbital workshop to the McDonnell Douglas Space Systems Center, Huntington Beach, Calif., said Marshall Space Flight Center. The workshop, built by McDonnell Douglas, was the model for the Saturn S-IVB stage and, when design changes were completed, would represent the Saturn stage as it was to be used in the Apollo Applications program --a manned space laboratory. The workshop was some 50 ft long and 21.5 ft in diameter, and was used at MSFC as an engineering tool in designing structures, equipment, and experiments for the initial mission of 28 days. MSFC's recent design review had included relocation of a floor which would separate the two sections of the stage's liquid hydrogen tank, addition of a ceiling and other fixtures, and moving some experimental locations. (MSFC Release 67-181)

. FAA proposed a maximum speed of 250 knots (288 mph) for all aircraft operating below 10,000 ft mean sea level (MSL) in a move designed to give pilots more time to "see and avoid" other air traffic in the Nation's most heavily traveled airspace. There had been no speed limitations imposed on en route air traffic, for aircraft arriving at an airport. They had been limited to an indicated airspeed of 250 knots when below 10,000 ft MSL and within 30 mi of their destination. Within the immediate terminal area, the permissible speed dropped to 200 knots for turbine-powered aircraft and 156 knots for piston-engine aircraft. FAA cited the growing numbers of high-performance aircraft using the airspace below 10,000 ft MSL where virtually all VFR (visual flight rules) flying is done, as well as about half of all IFR (instrument flight rules) flying. FAA said the proposed rule would promote safer and more efficient utilization of the airspace, since the pilots of many high-speed aircraft probably would choose to operate above 10,000 ft MSL for optimum performance and economy. (FAA Release 67-66)

. Sen. William Proxmire (D-Wis.) urged the acceptance of a study that, he said, indicated the SST could be financed with private capital. The study had been made by Mr. Robert H. Charles (in 1965) before he became Assistant Secretary of the Air Force. According to Senator Proxmire's statement: "The Charles plan, if followed, could eliminate the need for the $142,375,000 which the Federal Aviation Administration is requesting for the SST this year." He stated that "Congress has been scared into voting a huge Federal giveaway to field a competitor to the European SST simply because it has been bludgeoned into believing private industry was incapable of supplying its own financing for a project of this magnitude." (NYT, 9/2/67, 40)

September 2: Two NASA Nike-Tomahawk sounding rockets, launched from Andoeya, Norway, carried GSFC payloads containing four barium clouds. The peak altitude attained by the rockets would be determined by triangulation and by magnetometer measurements because no radar track was made. Missions were (1) to correlate electric field measurements made by double probe technique and barium release technique, and (2) to make an analysis of electric fields from the observed motions of neutral and ionized barium clouds during an aurora condition. Good data were obtained and excellent results were expected. (NASA Rpt SRL)

. Soviet Union announced a new series of rocket tests believed designed to perfect a sea-landing system for Russian astronauts in preparation for a resumption of manned Soviet space flights. The Soviet news agency, Tass, said the test of "carrier rockets" would begin Sept. 3. It warned all ships and planes to stay clear of two 80-mile-wide "bulls eyes" in the Pacific Ocean, centered respectively about 900 miles northeast and 300 miles northeast of Midway Island, from noon until midnight every day through Oct. 30. (Reuters, W Post, 9/3/67, A16)

September 3: Lunar Orbiter V's cameras had revealed flow patterns characteristic of hardened fluid material on the floor of the moon's Tycho Crater, NASA announced [see August 5-27, p. 278]. Preliminary study of new photographs returned by the spacecraft tended to confirm prevailing theory held by scientists that the big crater had been formed by a great meteoroid crashing into the visible side of the moon. Some scientists believed much of the fluid material ejected when the three-mile-crater was formed might have resulted from the intense heat generated by the meteoroid's impact. They also suggested that the appearance of the dark halo resulted from the manner in which pulverized ejected material had been deposited. In the dark halo area, this material might have traveled outward from the impact point in a "base surge" close to the moon's surface, giving a windswept appearance to the terrain. The most detailed photo released by NASA afforded scientists the first close-up view of the crater floor, providing new clues about its origin. Orbiter's high resolution telephoto picture showed fractures, flow markings, and protruding dome-like hills with exposed layers. The Tycho region was one of the 36 areas of high scientific interest on the moon photographed by Lunar Orbiter V. (NASA Release 67-231)

. Photographs of the side of the moon perpetually hidden from the earth showed bullseye-shaped formations, according to data presented at the general assembly of the International Astronomical Union in their sessions which ended August 31, Walter Sullivan reported in New York Times. Data indicated that formations seemed older than the lunar

September 3 (continued)
oceans and might have been formed when comet heads hit the moon and exploded on its surface. The existence of the giant bullseyes came to light through recent Soviet and American efforts to photograph and map the far side of the moon. The Russians displayed a map at the Prague assembly; the map was based on photographs of the moon taken by the Soviet spacecraft Zond III. The map showed three bulls-eye-shaped formations, one of them more than 300 miles wide. American astronomers presented a newly completed map based largely on photographs taken by Orbiter spacecraft. One of the sensations of the assembly held at Prague was the mosaic of Orbiter photographs laid out on the floor of the gym at the law faculty of Charles University. The pictures covered a large part of the floor and showed virtually the entire side of the moon facing the earth. (Sullivan, NYT, 9/3/67, 12E)

. Marshall Space Flight Center announced that Orion, a large ocean-going barge, had been recently modified to carry the largest space boosters --the barge being one of seven vessels used to transport large rocket stages and components. These items would be too large for movement by conventional road, rail, or air transport. Orion would also supplement the USNS Point Barrow, an ocean-going ship used to transport second stages from the West Coast manufacturing site to the Mississippi Test Facility. MSFC would use Orion to transport stages from the manufacturing site at the Michoud Assembly Facility to a nearby acceptance test site and later to the launch site at Kennedy Space Center, Fla. (MSFC Release 67-182)

. Leonid I. Sedov, a leading Soviet space scientist, hinted at cooperation between the Soviet Union and the United States in manned exploration of space. The vice president of the International Aeronautical Federation dropped the hint in an interview with Tass, the official Soviet press agency. "Flight to Mars and the creation of large orbital scientific bases...will certainly demand joint efforts of all nations," Tass quoted him as saying. The Soviet Union previously had declined all suggestions of joining its space efforts with those of the United States, although it had a limited agreement with France. (Reuters, NYT, 9/5/67)

September 4: NASA-sponsored research on equipment used for surviving hard landing on the moon and planets had been conducted by Cal Tech-JPL engineers in simulated operations. Split-second JPL impact tests, which used powerful compressed air guns and a giant slingshot, hurtled equipment against solid backstops at speeds up to 500 feet per second (340 mph). JPL's engineer, Stan Taylor, explained: "During the brief instant that the test specimen is experiencing the 10,000 g shock, every part of it behaves as though it weighed 10,000 times its

September 4 (continued)
normal weight. The bolts supporting a one pound test item have to be good for about five tons." The experiments had proved that intricate, delicate components required in sophisticated unmanned spacecraft of today and tomorrow could be protected to withstand shocks of 10,000 g's. (JPL Release)

. Evidence of 22 varieties of amino acid was found in a rock formation known to be at least 3.1 billion years old, reported John N. Wilford in New York Times. Ames Research Center scientists made the discovery of this important relic of life--chemical building blocks for the protein essential to all living organisms. The discovery by ARC marked the earliest occurrence of amino acids ever found. The earth is dated at about 4.5 to 4.8 billion years old. The oldest preserved rocks date back 3.5 to 3.8 billion years. Man evolved only 2 million years ago. Discovery of this chemical from more than 3 billion years ago indicated that the basic chemicals of life then were similar to those of today. (Wilford, NYT, 9/5/67)

. NASA's work on advanced air-breathing engines was aimed at development of significantly improved propulsion systems, primarily for second-generation supersonic transports, Aviation Week and Space Technology reported. Based mainly at LeRC, advanced engine component research program was designed to improve overall performance by improving efficiencies of individual components such as the compressor, combustor, turbine, and nozzle. Although program was directed primarily to supersonic powerplants, most anticipated improvements were expected to be applicable to future subsonic jet engines. (Av Wk, 9/4/67, 64-71)

. The House Committee on Government Operations in House Report No. 613 urged DOD to proceed with plans for an advanced communications satellite system that would eventually replace the present Initial Defense Communications Satellite Program (IDCSP). The Committee said it "would be a mistake" to lean too heavily on the IDCSP because its limited channel capacity was already strained. Several possible system configurations were under study by DOD. (Av Wk, 9/4/67, 18)

. Facing increased income taxes, escalated war in Vietnam, and riots in the cities, most Americans were beginning to wonder if putting men on the moon was worth almost $5 billion a year, reported Sanders Lamont, Star Gazette Bureau, A Press. With a record budget deficit looming, Congress was particularly anxious to find money to solve domestic and international problems. NASA was a target for increased scrutiny. In spite of the critics, however, there was growing evidence that the space program was changing American life for the better. Dr. Edward C. Welsh, Executive Secretary of the National Aeronautics and Space Council, believed strongly that space paid: "Because of it," he said recently, "our

September 4 (continued)

chances of improving medical research and finding a cure for cancer or for heart disease are greater--not less. Why? Because of it, our chances of improving our educational system and solving a vast range of social problems are greater--not less. The truth is...the space program contributes importantly to advances in practically all other lines of endeavor, and it stimulates the national economy at the same time. We are richer, not poorer, because of the space effort."

A Chicago paint manufacturer who sold a paint originally developed for satellites agreed. So did a handicapped child in Southern California who used a walking chair originally built for use on the moon. So did officials of a utility company in the Midwest who saved $1 million by adapting space-age techniques, and drivers who used safer highways in wet weather, and residents of the Eastern United States who benefited from more advanced hurricane warning in 1966. "These [benefits] are but fragmentary first returns of a scientific and technological revolution that is changing our whole way of life," Dr. George E. Mueller, NASA Associate Administrator for Manned Space Flight, said.

Down-to-earth accomplishments had included: creation of an industry comprising 400,000 people and 20,000 companies; a revolution in worldwide communications, linking continents and cutting costs; a worldwide weather satellite system which made better forecasts available to all nations at relatively small cost; development of man-in-space capability; and development of new products, ideas, and methods for the market place, as well as better uses for old ideas. (Lamont, A Press, 9/4/67)

. Current attacks on the SST project appeared to stem from ignorance of the plan and a failure to appreciate what it would contribute to the economy and security of this country, reported Lt. Gen. Ira C. Eaker (USAF, Ret.) to Detroit News. He had presented estimates of the sales volume and financial aspect of the SST programs--ones which had been developed, checked, and rechecked by civil advisory groups, the airlines, and individual experts in transportation, industry, and finance. He said no Federal program since World War II had had the thorough analysis, careful examination, and close scrutiny accorded the present SST plan. He emphasized that the SST was not competitive in any way with social reform programs. On the other hand, it would stimulate continued growth of the economy, create employment, and provide a higher standard of living for thousands. (Eaker, Detroit News, 9/4/67)

. Michael E. Gluhareff, Russian-born engineer and associate of helicopter pioneer Igor I. Sikorsky, died in Bridgeport, Conn., at 74, AP reported. Mr. Gluhareff was engineering manager of Sikorsky Aircraft, a division of United Aircraft. His many patents had included: a dart-shaped plane; sailplane (glider); tail-less airplane with rear-mounted propeller; and device to use exhaust gases of engines to increase the speed and load

September 4 (continued)
of the plane (co-inventor). A native of St. Petersburg, Mr. Gluhareff had graduated from Polytechnic Institute of Emperor Peter the Great. (AP, W Post, 9/6/67, B8)

September 5: An experiment designed to report river height and rainfall measurements automatically via satellite was the object of a cooperative program by the Weather Bureau's Office of Hydrology and NASA, it was announced by U.S. Department of Commerce. The synchronous satellite, ATS I, would be the communications link between automatic measurement devices at three locations in the U.S. and the Office of Hydrology in Washington, D.C. Purpose was the development of a fast, reliable, operational system by which potential flood conditions would be relayed instantly so public warnings could be issued. The ATS Hydrolic Communications Experiment system had been designed by the Weather Bureau as part of a program to acquire information first from normally inaccessible areas of the U.S. and ultimately from rivers throughout the country. The three sites chosen for the research program were at Benton, Ark., which started transmitting data to the satellite on Aug. 1; Salem, Ore., which began operating Aug. 4; and Sacramento, Calif. (ESSA Release 67-68)

. Trained monkeys completed a two-month simulated space flight which indicated that astronauts could return their spacecraft to earth even after a near-fatal dose of solar radiation, Chicago Tribune reported. Sixteen rhesus monkeys, trained to operate an instrument panel, were used in a test at Los Alamos scientific laboratory. Some of the animals were exposed over a 10-day period to gamma radiation, anywhere from 500 to 1,000 roentgens. Three of the monkeys in the high dose group died but all the others survived. This evidence of monkey vitality was of great importance to man because the U.S. target date for moon landings would come at a peak of the sun's 11-year-cycle for emitting deadly radiation. (C Trib, 9/5/67)

September 6: The Early Bird communications satellite passed its test as a device for expediting clearance of passengers and cargo through airports when jet aircraft would be put in service in 1970, according to New York Times. Moments after an airline flight took off from Frankfurt, Germany, for Dulles International Airport, data on passengers and cargo was sent via satellite to Government officials at Dulles so they could process the data in advance of the plane's arrival. Officials in Frankfurt relayed facsimiles of the cargo manifest, health certificates, and Customs declaration forms of the 120 passengers. Customs, Public Health Service, Immigration, and Agriculture Department employees and cargo handlers had a chance to process some of the paperwork before the plane's arrival. (NYT, 9/7/67)

September 6: Army contract awards to the Western Electric Company, totaling $231.4 million, for Nike-X work had been announced. Specific totals and contract purposes: $215.2 million for continued R&D; $13.2 million for deployment planning activities; and $3.0 million for support facilities. (DOD Release 837-67)

September 6-7: Spin-off benefits from the research conducted by NASA received attention from Sanders Lamont in A Press. He listed diverse benefits: fliers made safer, wet-weather landings; hospital patients got better, safer, and more efficient diagnosis and treatment; do-it-yourself addicts got better tools and paints; and smokers got cooler-smoking, ready-to-enjoy pipes. He listed other benefits: Apollo-developed materials, resistant to fire in an oxygen environment, would benefit hospital patients confined to oxygen tents; computer systems, locking together operations at tracking stations and aboard spacecraft, could be used by shipping and banking firms. Further, the "systems approach" to management, exploited within the Apollo program wherein some 20,000 firms were involved, could be further exploited by businesses and various levels of government--a management approach designed to eliminate waste while improving the quality of management. (Lamont, A Press, Binghampton, N.Y., 9/6/67; 9/7/67)

September 7: Reorganization of the Bureau of Budget had created the Economic, Science and Technology Division, headed by John D. Young, reported Jerry Kluttz, in Washington Post. Young, at one time NASA's Assistant Administrator for Administration, had headed the task force that recommended the shakeup. Reporting to his new division would be the Departments of Commerce and Transportation, the Atomic Energy Commission, the National Aeronautics and Space Administration, the National Science Foundation, the Small Business Administration, and the regulatory agencies. Both NASA and AEC were transferred from the Military Division. The reorganization laid heavy emphasis on improved management and organization of Federal agencies. (Kluttz, W Post, 9/7/67)

. Navy contract award had been made to Radio Corporation of America in letter contract for $2.0 million, for six navigation satellites. The Special Projects Office, USN would be contracting activity. (DOD Release 846-67)

September 7-9: NASA's Biosatellite II, (Biosatellite B) was successfully launched from ETR by a two-stage Thrust-Augmented Improved Delta launch vehicle into orbit with 202-mi (326-km) apogee; 187-mi (302-km) perigee; 90.8-min period; and 33.5° inclination. The 940-lb research spacecraft consisted of three main sections: an adapter section which would remain

September 7-9 (continued)

in orbit; the reentry vehicle which carried the retrorocket and heat shield for reentry into the earth's atmosphere; and the experiment capsule which contained the scientific experiments, life support equipment, parachutes, and radio beacon to aid in recovery. Biosatellite II was designed to provide answers about a large number of basic biological processes. Thirteen experiments selected to determine the effects of the space environment on various life processes were orbited in the research spacecraft. The biological specimens selected for space flight had been intensively studied in ground laboratories, not only as they appear in nature but under such phenomena of the space environment as could be simulated on earth. The most important factor that could not be simulated on earth had been weightlessness. Biosatellite II provided weightlessness of 1/100,000th of earth's gravity or less. A secondary mission was to determine whether the effects of a known quantity or dose of radiation in weightlessness are the same, greater, or less than they are known to be on the same organisms on earth.

Performance of the spacecraft was satisfactory with the exception of completely reliable response to command transmission from the ground stations. The spacecraft's temperature, attitude control, and atmospheric pressure readings were all normal. Mid-air recovery of NASA's Biosatellite II experiment capsule, by aircraft at 3:15 pm EDT Sept. 9, within 15 mi of predicted impact location of 7° 15'N and 162°1'W, marked a new first. Biosatellite I, which had remained in orbit for two months after retrorocket failed, landed in Australia following reentry Feb. 15, but was not recovered.

The most important single question for Biosatellite II had involved learning whether the changes produced in organisms by radiation are slowed or hastened under weightless conditions. Biosatellite scientists had noted that early recovery had resulted in less risk to the experiments than if recovery had been delayed beyond the planned three days. Despite the delayed launch and early recovery, scientists reported only a small decrease in the expected data return from the experiments. Indications were that all programmed events in orbit, such as fixation of frog eggs, fixation and feeding of amoeba, fixation of wheat seeds, and camera shutter opening, had worked as planned. Successful recovery of plant and animal life carried on a 45-hr journey through space by Biosatellite II might be expected to provide important clues about how life forms would develop in a weightless environment or how radiation might affect future generations.

Biosatellite II was under management of ARC and under direction of OSSA. The Delta launch vehicle was managed by GSFC. Communications and tracking were handled by NASA's Satellite Tracking and Data Acquisition Network, operated by GSFC. Biosatellite II was built by the General Electric Reentry Systems Dept. The Delta launch vehicle was built by Douglas Aircraft Co. (NASA Proj Off; NASA Release 67-239; Av Wk, 9/18/67; AP, W Post, 9/11/67; Myler, UPI, W Post, 9/15/67; 9/18/67; B Sun, 9/8/67; Yuenger, C Trib, 9/15/67)

September 8: Explorer XXXIV had been adjudged a success, based upon the results of the mission and the approved prelaunch objectives. Satellite performance data, after more than three months of operation, indicated that all spacecraft systems and ten of the eleven experiments were operational and performing satisfactorily. No scientific data had been received from the TRW spherical electrostatic analyzer experiment since launch because the experiment had experienced a malfunction in its electrical system. (NASA Proj Off)

. Col. Joseph F. Cotton (USAF), pilot, and Lt. Col. Emil Sturmthal (USAF), copilot, flew XB-70 No. 1 experimental bomber to 59,700-ft altitude and 1,510 mph (mach 2.3) in flight at Edwards AFB. Purposes of test: longitudinal stability and control and handling qualities checkout; throat unstart checkout; variable nose ramp functional test; radar airspeed calibration; and handling qualities approach sidestep maneuvers. Flight was successful except for lost radar contact. (XB-70 Proj Off)

September 8-10: Engineers and scientists on three continents went far beyond the normal day's work during a three-day period to (1) secure aerial recovery of Biosatellite II approximately 15 mi from the recomputed impact point over the mid-Pacific; and (2) softland Surveyor V on the moon at a speed just over eight miles an hour and within 18 mi of its original target site. The work had involved hundreds of men in tracking stations (certain of which could track simultaneously up to three separate objects: deep space, manned capsule, or near-earth satellite) and control centers in the U.S., South America, and Australia. Surveyor V and Biosatellite II projects were carried out by two different NASA teams. Participants had included scientists and engineers from a broad spectrum of the community which responded to NASA's mission for these two projects, including JPL and Hughes Aircraft Co. (for Surveyor V), and ARC and GSFC (for Biosatellite II)--both projects ably supported by tracking-station and control-center personnel from around the world. (NASA Release 67-241; NASA Proj Off)

September 8-30: NASA's Surveyor V (Surveyor E) unmanned spacecraft was successfully launched by Atlas-Centaur launch vehicle from ETR on direct-ascent mission to softland in the Apollo area of interest on the moon and to take television pictures of the lunar surface around its landing area. Surveyor V was the first of the Surveyor series to carry an instrument to study the chemical characteristics of the lunar soil and the first to attempt a landing in the eastern portion of the Apollo zone. The coast period between burns was 6 min, 47 sec. Spacecraft insertion into a lunar trajectory occurred at 04:15:25 EDT Sept. 8. The trajectory appeared to be satisfactory. After separation from the launch vehicle, Surveyor V automatically acquired the sun and

September 8-30 (continued)

responded to commands to turn its transmitter to low power. Spacecraft telemetry indicated that all systems were operational. The Surveyor V midcourse correction was accomplished at 21:45 EDT Sept. 8. Immediately after completion of the midcourse correction, it was determined that the pressure in the helium supply tank was decreasing, indicating that the regulating valve did not make a positive closure. Correction of leak was accomplished by reduction in pressurization of the helium tank but an optimum terminal descent strategy had to be developed to overcome degradation of the vernier engine retrograde capability; a final midcourse correction of 5.4 sec burning duration was needed because of flight history of six vernier engine firings conducted in efforts to reseat the helium regulating valve.

Surveyor V softlanded on the moon at 20:46:38 EDT on Sept. 10. The landing site was in the Sea of Tranquility at approximate coordinate, 23.23°, a site some 30 km from the target point. The spacecraft took 200- and 600-line pictures of the lunar surface and conducted background counts with the alpha backscattering instrument. As of the time of lunar sunset, 6:40 am EDT, Sept. 24, a total of 18,006 high-quality lunar photographs had been obtained (more than the combined totals from Surveyors I and III). The alpha backscattering instrument had operated for 83 hours on the lunar surface, having provided excellent-quality data on the relative abundance of the chemical elements in the lunar material. To optimize the conditions for lunar-night survival the spacecraft was operated for short periods at 2½-hr intervals using compartment heaters until the battery charge was down to 30 ampere hours. This condition would be reached about 4-6 days after lunar sunset, at which time the spacecraft would be placed in hibernation for the remainder of the lunar night.

The vernier engine erosion experiment was conducted at 01:38 EDT on Sept. 13. The experiment was to obtain information on effects of impingement of a high velocity jet gas stream on the lunar surface. TV pictures were taken of the area under study before and after vernier engine firing. No significant erosion was noted, but follow-on operations with low sun angle photographs and shadow progression studies revealed a crater-like depression under vernier engine number 3 which had not been previously visible at the higher sun elevations. Surveyor V accomplished all mission objectives. Prior to touchdown, radar reflectivity data was obtained; touchdown dynamics data were determined at landing time (bearing strength of lunar surface as the ultimate objective). Thermal data continuously were obtained (accumulation of data throughout the mission as the ultimate objective).

The Surveyor program received project management from JPL under OSSA direction. Hughes Aircraft Co., under contract to JPL, designed and built the Surveyor spacecraft. Tracking and communications were the responsibility of JPL-operated Deep Space Network. (NASA Proj Off; NASA Release 67-227; B Sun, 9/11/67; AP W Star, 9/25/67; Hines W Star, 9/29/67; W Post, 9/14/67; O'Toole, W Post, 9/30/67; Clark, NYT, 9/30/67)

September 9: Two astronauts, Maj. Edwin E. (Buzz) Aldrin, Jr. (USAF) and Capt. James A. Lovell, Jr. (USN), had won the 1967 Harmon International Aviation Trophy, the Clifford B. Harmon Trust announced in New York. Trophies also would go to Miss Sheila Scott of Britain, who had established speed records during a 28,633-mi solo flight around the world in a single-engine plane, and to Alvin S. White. Mr. White, now manager of supersonic flight research and development for Trans World Airlines, was named the outstanding airplane pilot for test flights of the XB-70 at mach 3 as chief test pilot for North American Aviation Company. The awards are made annually for exceptional feats of individual piloting skill. Mr. Harmon, a pioneer flier and balloonist, who died in 1945, had founded the awards in 1926. (NYT, 9/10/67)

. Stanford Linear Accelerator Center was dedicated. Contained within a two-mile long building would be the world's longest research instrument --one of the most complex and precise machines ever built by man. Director of the Stanford Linear Accelerator Center would be Professor Wolfgang K. H. Panofsky. The energy of this linear accelerator would exceed by a factor of three that of any other electron accelerator in the world--producing more than 20 billion electron volts. Through experiments conducted at the center, physicists would be able to probe deeper into the nature of the nucleus of the atom. Dr. Seaborg, Chairman of AEC, in his speech of dedication, hoped that "these forces of science, these common quests that men can undertake and work together on,...will in large part be responsible for the fullfillment of one of man's most basic needs--that of being able to live together in peace and understanding." Dr. Seaborg emphasized that the center "is open not only to scientists at Stanford University, but to qualified scientists from all parts of the United States and the world." (AEC Release S-35-67)

September 10: The Soviet Union had been giving top priority to efforts to develop multiple warheads for its big missiles, William Beecher reported in New York Times. If the report was correct and if the Soviet effort succeeded, it meant that Moscow could increase several-fold its ability to hit a number of targets in the U.S. simultaneously. In Britain, Air Commodore Neil Cameron described the new weapon in Royal Air Force Quarterly. "It is widely believed," he wrote, "that the Russians have developed the multiple individually guided reentry vehicle known as MIRV, which could revolutionize nuclear strategy.... It would mean that each Soviet missile dispatched could carry ten or more individually guided warheads in the megaton class.... This could neutralize the Americans' numerical lead in this field." (Beecher, NYT, 9/10/67; AP, B Sun, 9/15/67)

September 11: An all-metal payload shroud which separated in three sections would be used when an Air Force Titan III launch vehicle placed a communications satellite into space in the fall of 1968. Developed and produced by Douglas Aircraft Co., Inc., under a $2.6-million contract, the shroud would be made up of fairings which protect the sensitive instrumentation of scientific payloads during passage through the earth's atmosphere. Once free of the atmosphere, the protective fairings would be jettisoned. The three-section separation system would enable the shroud to clear the spacecraft more rapidly and reduce the possibility of damaging the payload during separation. (AFSC Release 171.67)

. Cosmos CLXXV was launched into orbit with 386-km (240-mi) apogee; 210-km (130-mi) perigee; 92.0-min period; and 72.9° inclination. This satellite is one of the unmanned series of Cosmos earth satellites, announced as part of a program of space research. (GSFC SSR 9/15/67; W Post, 9/12/67)

September 12: NASA Nike-Tomahawk sounding rocket, launched from Andoeya, Norway, carried GSFC payload containing four barium clouds. The peak altitude attained by the rocket would be determined by triangulation measurements because no radar track was made. Objective was to make an analysis of electric fields from the observed motions of neutral and ionized barium clouds during an aurora condition. Four barium clouds were released and photographic coverage was obtained from all sites. Additional analysis of photographs would be required for total experimental results. (NASA Rpt SRL)

. The world's largest aircraft would begin to take shape in October when three sections of the Air Force's C-5A Galaxy would be joined together to form a nearly 230-foot-long structure, AFSC announced. The aircraft would be scheduled for completion early in 1968. The airplane had been under construction by Lockheed-Georgia Co., at Air Force Plant Six, Marietta, Ga, under AFSC contract. With engines and operating equipment installed--minus fuel and payload--the C-5A would weigh 323,900 pounds. This airplane would be capable of airlifting all types of combat and support forces anywhere in the world--complete with tanks, equipment, and supplies--within 24 hours. Its total length would be 246 feet with a wingspan of 223 feet and a tail tip more than 65 feet off the ground. (AFSC Release 149.67)

. An Army Pershing ballistic missile fired from Utah by U.S. troops overshot the White Sands Missile Range and smashed into the Mexican countryside. The Mexican government gave permission for a U.S. helicopter to cross the Rio Grande to look for it. No injuries nor property damage were reported. The test firings had been part of an annual training for West German Air Force personnel and U.S. troops based in Europe.

September 12 (continued)
The Utah-to-New Mexico range had been used because there was no range large enough in Europe. (W Post, 9/13/67)

. Cosmos CLXXVI was launched into orbit with 1,581-km (982-mi) apogee; 206-km (128-mi) perigee; 102.5-min period; and 81.9° inclination. The Soviet Union had successfully launched its second unmanned satellite in three days, according to Tass. This latest Soviet earth satellite was part of a continuing five-year-old space research program. (GSFC SSR, 9/15/67; NYT, 9/14/67)

September 12-15: The Soviet supersonic transport, the Tu-144, designed to fly at 1,559 mph, should be ready for flight tests in the first quarter of 1968, according to AP. It was understood that the Soviets had hoped to get the plane in the air before the celebration of the 50th anniversary of the Bolshevik Revolution on Nov. 7. A visiting British aviation delegation saw the incomplete Tu-144 prototype on Sept. 12 and was told by its builders that it would fly in the first quarter of next year at the earliest. Soviet Deputy Minister of Civil Aviation, Leonid Zheludev, said "we need to test it very well, and we cannot say when it will be put into operation on civilian passenger flights." The British-French supersonic Concorde, similar in delta-wing shape and in projected performance to the Tu-144, was scheduled to make its first flight by February 28, 1968, and go into passenger service in 1971. (AP, W Star, 9/13/67; AP, W Post, 9/16/67)

September 13: Communications Satellite Corporation had announced the selection of B. F. Parrott & Company, Roanoke, Va., as contractor for general construction work ($1.1 million) on the new comsat earth station in Preston County, about 35 miles southeast of Morgantown, W. Va. The high-capacity earth station would serve the Atlantic area and would be capable of sending and receiving all forms of international communications via commercial satellites--television, telephone, telegraph, and data. The station would be complete and in operation by the fall of 1968. Earth stations also had been started near Cayey, Puerto Rico, and near Jamesburg in the central coastal area of California. Three existing stations are located at Andover, Maine; Brewster Flat, Washington; and Paumalu, Oahu, Hawaii. ComSatCorp filed the proposed award as manager of the joint undertaking under the Earth Station Ownership Agreement. Signatories to that agreement for joint ownership of the station, in addition to ComSatCorp, were American Telephone and Telegraph Company, ITT World Communications, Inc., RCA Communications, Inc., and Western Union International, Inc. (ComSatCorp Release 67-43)

September 13: Safety of combat air crews in Southeast Asia would be greatly improved by application of a new material (polyurethane foam) first used on the Indianapolis speedway. AFSC's engineers had successfully adapted the foam which would be installed in the fuel tanks of combat aircraft in Vietnam. Under an Air Force contract, the Monsanto Research Corp., Dayton, Ohio, confirmed compatibility of the foam with military aircraft fuels. The foam would virtually prevent explosion in case of a direct hit on the fuel tank by machine gun tracer bullets or other incendiaries. It would also suppress slosh in the fuel tanks during flight. "It should help reduce aircraft combat losses and save lives...[and] the new technique has far-reaching safety implications in commercial aviation," said Gen. James Ferguson, Commander of AFSC. (AFSC Release 158.67)

September 14: Mariner IV survived a micrometeoroid bombardment 29 million miles out in space and continued to radio information back to earth. The spacecraft was pelted with at least 17 pieces of meteroid matter during a seven-minute period while traveling between the orbits of earth and Mars, a spokesman for JPL said. The bombardment had caused a temporary change in the spacecraft's attitude but there was no loss of power, scientists said. Scientists had concluded from a one-degree temperature drop inside the craft that only the thermal shield was damaged--and that was slight, reported Thomas O'Toole in Washington Post. At the time of the accident, Mariner IV was 29.6 million miles from earth and had traveled almost 1.4 billion miles in its 1,020 days of flight. It had been launched in November 1964, and since photographing Mars in July 1965 had been used for engineering experiments. (UPI, Detroit News, 9/16/67; O'Toole, W Post, 9/16/67, A7)

. Richard J. Keegan, Chief of the Procurement Division, GSFC, was appointed to new position of NASA Assistant Director of Procurement (Policy and Review). (NASA Ann)

. The Institute for Strategic Studies of London, England, had said that the U.S. was way ahead of the Soviet Union in missiles, but that the Russians were closing the gap, reported New York Times. The Institute issued a report, called "The Military Balance," as it had every year, providing a rundown of the military strength of all nations. The report said the deployment of a limited ballistic defense system around Moscow had increased protection of Soviet land-based ICBMs. The new Soviet defense system now being installed along the eastern Baltic coast--the so-called Tallin Line--might be primarily an extension of radar coverage. The report also noted a "probable reduction in the combat effectiveness" of the Chinese armed forces because of the domestic upheaval. (NYT, 9/15/67)

September 14: France delayed the signing of an agreement with Britain and West Germany for development of a European "airbus" to carry 250-300 passengers in the 1970s, reported Reuters. Officials insisted that only "minor differences" were involved and that the agreement, which had been reached last July, would be approved. Britain's Rolls-Royce Company would supply the engine, the RB-207, to be constructed in cooperation with the French firm of SNECMA and MAN of West Germany. France would build the aircraft. (Reuters, W Post, 9/15/67)

September 15: A scientific satellite, ATS I, was used experimentally to relay weather photographs of current storms to the U.S. Weather Bureau's National Hurricane Center in Miami and other hurricane watchers in the Caribbean. The satellite was launched into its synchronous orbit on Dec. 7, 1966, and was positioned over Christmas Island in the Pacific at an altitude of 22,000 miles. The satellite had been used as a testbed for advanced meteorological, communications, and satellite control systems, and also had made scientific measurements of its orbital environment. Photographs first were recorded and radioed to earth by the ESSA V weather satellite while passing over the storm area. The collected photographic data were then compiled as a mosaic and gridded by computers at ESSA before delivery to the Goddard Space Flight Center ground station at Mojave, Calif., for radio transmission to the ATS I. The satellite then retransmitted the gridded data to earth by means of its weather facsimile (WEAFAX) experiment. Any ground station equipped with the relatively inexpensive Automatic Picture Transmission receivers could receive the pictures. Mosaics would be transmitted daily on an experimental basis in this manner between 9 and 10 pm, EDT. WEAFAX had been a joint NASA-ESSA experiment. (NASA Release 67-243)

. NASA Associate Administrator Dr. Homer E. Newell, in a letter in Science, called attention of the scientific community to the opportunity of proposing experiments for the initial flight of the Voyager series of missions to Mars planned for 1973. Primary objectives of the 1973 Voyager Mars mission were to obtain information relevant to the existence and nature of extraterrestrial life; the atmospheric, surface, and body characteristics of the planet; and the planetary environment. Evaluation of scientific proposals would begin on Nov. 1, 1967; selection of scientists for participation in the planning and development steps would be made by February 1968. (Science, 9/15/67, 1261)

. Findings of 14-mo study by Denver Research Institute (DRI) under NASA contract of methods governing acquisition of new technology in 62 firms in four industries--electric batteries, printing and reproduction,

September 15 (continued)

industrial controls, and medical electronics--were summarized in Science. In report entitled "The Channels of Technology Acquisition in Commercial Firms and the NASA Dissemination Program," it was concluded that (1) few organizations were vigorously seeking to acquire new technological know-how resulting from space research; (2) little had been done to increase the technical awareness of the manufacturer outside the space and military fields; and (3) the technologist faced with an immediate problem was inclined to use information in standard manuals that averaged two to five years behind the state-of-the-art. The report noted that "most individuals felt it too difficult to retrieve relevant material from the mass of government publications and indicated that they expected to learn of important government-developed technology through trade and professional channels. In several firms, those interviewed felt it wasn't really practical to keep up with and use government technology unless one's firm had government R&D contracts." (Greenberg, Science, 9/15/67, 1016-18)

. A Thor-Agena launch vehicle at Vandenberg AFB, Calif., launched an unidentified satellite. (UPI, C Trib, 9/16/67)

. William Markowitz, physics professor at Marquette Univ., summarized his study of the reported flight dynamics of UFOs (unidentified flying objects) in Science. Study was made because of letter in Oct. 21, 1966, Science by Dr. J. Allen Hynek, consultant to USAF's Project Blue Book, urging investigation of residue of puzzling UFO cases by physical and social scientists. Markowitz's findings: (1) the control of reported UFOs by extraterrestrial beings is contrary to the known laws of physics; and (2) the data published do not justify the holding of investigations. He added that he would not believe that earth had ever been visited by any extraterrestrial until he was shown such a visitor. (Markowitz, Science, 9/15/67, 1274-79)

. A Soviet astronomer, V. Makarov, had said UFOs were not all hoaxes, according to the magazine Technica Molodezhi. The astronomer added that he did not believe they were full of little men from far out in space either. Previously, UFOs had been written off by Soviet commentators as inventions of the foreign press or the hallucinations of disturbed persons. Mr. Makarov wrote that "the files of some private persons and organizations dealing with these phenomena either as their official job or out of curiosity are filled with considerable information. Whatever they may be, we cannot say that some phenomena which are still hard to explain exist in reality." Mr. Makarov said data had come from radar stations, pilots, and scientists "about whose common sense and honesty we have no right to be doubtful." (NYT, 9/14/67)

September 16: The likelihood of plane collisions and ship collisions would be reduced considerably by an advanced navigation satellite, NASA's Eugene Ehrlich explained. The chief of NASA's Navigation and Traffic Control program explained that by providing accurate position fixes, a system of such satellites also could reduce the separation distances between aircraft; automatically steer ships across oceans; warn high-flying supersonic jets of radiation dangers; guide craft around bad weather; monitor airplane systems for possible trouble; and pinpoint ditched planes or ships in distress. "The navigation satellite of 1970-1980 will be an entirely different spacecraft from the presently operational navigation satellites of the United States Navy," said Mr. Ehrlich. The Navy orbited its first Transit navigation satellite in 1960. Attention had focused on the Navy system recently when the U.S. announced that the previously classified network would be made available to America's civilian ships. The Navy satellites orbit at 700 miles. NASA envisioned a network of evenly spaced synchronous satellites 22,300 miles above the earth. A ground craft could be in touch with as many as six of them simultaneously for extremely accurate positioning. Mr. Ehrlich said advanced satellites "will contain a position determination capability, communications service, weather relay service and scientific sensors." He said the Maritime Administration and advanced thinkers in the shipping field had been looking to the day of the automated ship. "The satellite-derived position information would be fed directly into the ship's computer to keep the ship on a preset path." Mr. Ehrlich also had said that the reduction of the present widely spaced separation standards for aircraft was estimated to be capable of saving some $46.5 million annually for the North Atlantic region alone. (B Sun, 9/18/67)

. The 20,000 concerns that work for NASA under contract have laid off employees at the rate of 4,000 a month, largely because of cutbacks in funds, James E. Webb, NASA Administrator, told an audience at the dedication of the Olin E. Teague Research Center, Texas A&M Univ., College Station, Texas. He said about 100,000 persons had been laid off and the figure might reach 200,000. Rep. Olin E. Teague (D-Tex.), in a short conference following the dedication, said lack of money would be the biggest detriment to U.S. space programs. (UPI, NYT, 9/18/67; Bryan Daily Eagle, 9/17/67)

. Cosmos CLXXVII was launched into orbit with 267-km (166-mi) apogee; 201-km (125-mi) perigee; 89.1-min period; and 51.7° inclination. Satellite, announced as part of a program of space research, reentered September 24. (GSFC SSR, 9/30/67; Krasnaya Zvezda, 9/19/67, 1)

September 17: Frank Kopecky, Jr., 46, a contract negotiator for NASA Hq., died at his home. Born in Omaha, Neb., he was an officer

September 17 (continued)
in the Navy during World War II. In 1950, he received a law degree at the University of Denver, came to Washington as a contract negotiator for the Navy Department, then transferred to NASA. (W Post, 9/19/67, B4)

September 18: The Saturn V/Apollo shot, now scheduled for mid-October, would have a variety of missions to perform on its one-day flight test, according to J. V. Reistrup, Washington Post: flight-test 1st and 2nd stages of Saturn V; restart the hydrogen-fueled J-2 rocket engine of 3rd stage--this stage already flight-tested during test of smaller Saturn IB; test heat shield of Apollo in high-speed reentry from a point 11,400 miles above earth; and color-photograph the earth using high resolution techniques. This kind of all-up testing "proves to be a very feasible and excellent way of testing the flight hardware," Milojko (Mike) Vucelic told reporters at a briefing. Vucelic was manager for Apollo spacecraft requirements at North American Aviation. The test would lack two important elements of an actual moon mission. The crew and the lunar excursion module would be replaced by black boxes (for the crew) and a water tank for ballast (for LEM). But even these exceptions showed how much was being crammed into a few missions of the Saturn V/Apollo systems. The Apollo spacecraft was to be rated safe for man after one successful flight; the Saturn V was to take only two. And after only one separate flight test [Sept. 25, LEM & Saturn IB], the lunar landing vehicle would be added to the list of hardware in flight-tested status. (Reistrup, W Post, 9/19/67, A3)

. NASA Nike-Tomahawk sounding rocket launched from NASA Wallops Station carried GSFC payload containing pitot-static probe to measure atmospheric density, pressure, and temperature in observing diurnal variation in the fine structure of the region from 15 to 110 km. Probe was launched in conjunction with thermosphere probe experiments. The 2nd stage of the sounding rocket did not ignite because of low current application. (NASA Rpt SRL)

. NASA Nike-Tomahawk sounding rocket launched from NASA Wallops Station carried Univ. of Michigan payload to 178-mi (286-km) altitude on flight to measure simultaneously density and temperature of neutral N2 and of electron temperature and density; to compare day and night measurement of these parameters; to compare a new design for the Omegation Gauge System with the flight proven system; and to compare the 120-km region of the pitot-static probe and thermosphere probe density measurement. All experimental data appeared good. Excellent results were expected. (NASA Rpt SRL)

September 18: Secretary of Defense Robert S. McNamara announced his approval for production and deployment of a "thin" Nike-X antiballistic missile (ABM) system at a meeting of UPI editors and publishers in San Francisco. Mr. McNamara's reasoning in opposing a "full" system was explained: "And this is the whole crux of the nuclear action-reaction phenomenon," he said. "Were we to deploy a heavy ABM system throughout the United States, the Soviets would clearly be strongly motivated to so increase their offensive capability as to cancel out our defensive advantage." He opposed a more advanced, heavy, anti-Soviet system and approved the "thin" ABM system because "The system would be relatively inexpensive--preliminary estimates place the cost at about $5 billion--and we would have a much higher degree of reliability against a Chinese attack than the much more massive and complicated system that some have recommended against a possible Soviet attack." Mr. McNamara stated: "An ABM deployment designed against a possible Chinese attack...would provide an additional indication to Asians that we intend to deter China from nuclear blackmail, and thus would contribute toward our goal of discouraging nuclear weapon proliferation among the present non-nuclear countries."

The Secretary of Defense said the defensive move was being made with China in mind, not the Soviet Union, reported William Beecher in New York Times. Mr. McNamara warned the Soviet Union, however, that if it decided to expand its limited antimissile system, this country would respond by increasing its offensive forces in order to maintain its overwhelming retaliatory capacity.

The announcement of Mr. McNamara's decision to build a "thin" missile defense was generally applauded by Congressional leaders but the decision unleased an offensive--expected to be focused in the Joint Committee on Atomic Energy--to build a "heavy" defense system against Soviet missiles, reported John W. Finney in New York Times.

The proposed "thin" ABM system would provide each region of the U.S. with at least one battery of warhead interceptors, reported AP. The exact locations of the batteries, each with several missiles, remained a secret. (DOD Release 868-67; Av Wk, 9/25/67, 11; Beecher, NYT, 9/19/67, 1; Finney, NYT, 9/19/67, 1; AP, SF Exam, 9/19/67, 5)

. Interchange of ideas, technology, hardware, and personnel had helped to make progress in space possible, said B/G Edmund F. O'Connor (USAF), MSFC's Industrial Operations director, in a talk before the Tennessee Valley Chapter of the Air Force Association, Huntsville, Ala. "Today's space program is a joint effort of both military and civilian agencies, and there exists a cooperative give-and-take relationship in the finest sense," he stated. (MSFC Release 67-191)

. Britain's leading radio astronomer, Sir Bernard Lovell, was convinced the Soviet Union would attempt one or more space spectaculars during 1967, possibly during October, reported Richard Lewis of Chicago

September 18 (continued)
Sun-Times. October would mark the 10th anniversary of the launching of the first satellite, Sputnik 1, and the 50th anniversary of the Bolshevik Revolution. The possibilities included a flight around the moon or a lunar landing with animals as passengers, a manned space station in earth orbit, and the first photographs of the planet Venus, the astronomer said. Sir Bernard Lovell said: "I have always believed that 1967 was the year they would try the circumlunar (around the moon) flight, but I should think they would do it unmanned because of the difficulties of the return at lunar flight velocity." (Lewis C S/T, 9/18/67, 16)

September 19: Fabrication of five S-II's (Saturn V's 2nd stage) would be accomplished under a contract modification awarded by NASA to North American Aviation, Inc. Purchase of these five stages would complete the S-II requirement for the 15 Saturn V launch vehicles currently approved for development as a part of the Apollo program. The first of the stages would be delivered to NASA in Feb. 1969. The Marshall Space Flight Center, Huntsville, Ala., managed the Saturn program. (NASA Release 67-244)

. The three Pegasus spacecraft launched by NASA in 1965 had far exceeded the most optimistic expectations and were still operating as the end of a one-year lifetime extension drew near. The spacecraft were launched aboard the last three Saturn I launch vehicles on Feb. 16, May 25, and July 30, 1965. They had completed their assigned tasks --to measure the meteoroid environment of near-earth space--and had telemetered back to earth much information on other subjects of interest to space scientists. Scientific results of Project Pegasus had been covered in an interim report prepared by MSFC's Space Sciences Laboratory. Throughout the history of the space program, the question of how the space environment would affect electronic components had been explored. The three Pegasus satellites had offered an excellent opportunity to study such effects since the combined number of systems made a statistically meaningful sample. (MSFC Release 67-192)

. Examples of air, sea, and space technology, "working together as partners for the better understanding of our total environment" were cited by Dr. Robert C. Seamans, Jr., NASA Deputy Administrator, in a speech to the 2nd International Buoy Technology Symposium, Marine Technology Society, Washington, D.C. The Interrogation, Recording and Location System (IRLS), developed by Goddard Space Flight Center, would demonstrate the use of a satellite to locate and determine the position of sensors, receive data from the sensor, record that data onboard the spacecraft, and later relay the data to ground stations. Possible

September 19 (continued)

terrestrial sensors are meteorological stations or buoys, oceanographic buoys, gauges for measuring the strains in the earth's crust, drifting balloons, ice islands, or any of a wide variety of data platforms located on the surface of the earth or in its atmosphere. Seamans said: "It is quite easy to conceive how such a system could begin to solve many of the problems hindering world-wide fixed or free buoy systems for the study of currents and ocean-depth profile data." He also noted that "photographs and images returned by such satellites as Nimbus, Tiros, and Gemini are being analyzed to assess their oceanographic value." (Text)

. Three Lewis Research Center engineers received "I-R 100" awards at National Industrial Research Week ceremonies in New York City. The "I-R 100" awards had been sponsored by Industrial Research Magazine and presented in observance of National Industrial Research Week. Lewis Research Center recipients: William D. Klopp, Peter L. Raffo, and Walter R. Witzke. The three engineers had been cited for the development of Tungsten RHC, the highest strength metal known to man at temperatures above 3,500°F. This alloy would have eight times the tensile strength of pure tungsten at the same temperature with no sacrifice in ductility at low temperatures. At temperatures below 250°F pure tungsten would be very brittle and alloying it to increase strength usually would make it more brittle. (LeRC Release 67-60)

. Addressing the House on means for providing a terminal-phase missile interception system, Rep. William R. Anderson (D-Tenn.) called for a sea-based antiballistic missile intercept system (SABMIS). Pointing to the popular estimate that Red China would have a ballistic missile delivery capability in the early 1970's, the Congressman stated: "...deployment of a SABMIS unit would place in the seas close to an adversary's homeland and across his 'launch trajectory window,' a mobile, partly submerged screen of antimissile forces. (CR, 9/19/67, H12137)

. Mayor Henry Maier of Milwaukee, addressing a conference of United Press International editors and publishers in San Francisco, said: "The central city cannot be saved without a reallocation of our national resources to spend as much to build decent cities for man on earth as we spend on sending a man to the moon." (CTWS, C Trib, 9/19/67)

. U.S.S.R. launched Cosmos CLXXVIII into orbit with 310-km (193-mi) apogee; 137-km (85-mi) perigee; 88.6-min period; and 50° inclination. Satellite, announced as part of a program of space research, reentered on same day it was launched. (GSFC SSR, 9/30/67)

September 20: In informal remarks at Kennedy Space Center, NASA Administrator James E. Webb predicted that congressional cuts in the space budget would slow up the launch rate and lead to the phasing out of Apollo equipment after man landed on the moon. Mr. Webb said that only nine of the 15 Saturn V launch vehicles could be launched before 1970, compared to 13 planned launchings. "I don't think there's any doubt that to absorb this cut for $500 million, after already having absorbed a $600 million cut back in 1964, means that we will have to slow up the launch rate," he stated. The cuts had also knocked out any new planetary missions before 1975, reported Arthur Hill, Houston Chronicle. Space budget cuts would likely mean the elimination of the Saturn IB from the middle-term space program, Mr. Webb had explained in his brief press conference. NASA was committed to the purchase of 16 Saturn IB launch vehicles. Three vehicles had been flown; the next one would propel the first manned Apollo into earth orbit in mid-1968. NASA planned to switch manned flights to the three-stage Saturn V as soon as possible. The first Saturn V flight, an unmanned test, was scheduled for Oct. 19. The Saturn IB was to have continued to be used on flights not requiring the huge power of the Saturn V, but Mr. Webb said emphasis instead would switch to the Air Force's Titan IIIM launch vehicle. This vehicle was being developed for the military Manned Orbiting Laboratory. Mr. Webb listed several future checkpoints: (1) fewer orders for new Apollo spacecraft equipment after the moon landing, in such programs as Apollo Applications; (2) definition of the next system after Apollo, which might be something on the order of a 100,000-lb space station, or something bigger, launched with Saturn V, or a new launch vehicle; (3) development of new and better concepts in view of the fact that planetary missions have been knocked out until 1975; and (4) massive reorganizational changes a possibility for NASA. (UPI, W Star, 9/21/67; Hill, H Chron, 9/22/67)

. U.S. public and communications users would be deprived of "early attainable benefits" if the Communications Satellite Corporation's proposed pilot program for domestic satellite services were delayed, ComSatCorp stated. "In the end, a pilot-scale demonstration is essential, and nothing is gained by postponing for over a year the planning and building of the demonstration model," James McCormack, ComSatCorp's chairman said. Comments had been made in a formal filing before the FCC in the pending domestic satellite case. They were in reply to the Ford Foundation, which had asked FCC on Sept. 18 to withhold approval of ComSatCorp's pilot program. ComSatCorp argued that valuable experience could be gained by implementation of the pilot program, that this would supplement, not hinder, the work of the Task Force appointed recently by President Johnson to develop national telecommunications policy. Mr. McCormack had said the pilot program would provide vital experience for voice, broadcast, data, and the press in the economical utilization of high-capacity satellite and earth station facilities. (ComSatCorp Release 67-47)

September 20: ComSatCorp announced the selection of Vanguard Construction Corporation, NYC, as contractor for general construction work ($864,990) on the new earth station to be located near the city of Cayey about 30 miles south of San Juan, Puerto Rico. The earth station would serve the Atlantic area, including communications between the U.S. and Puerto Rico, and would be capable of sending and receiving all forms of international communications via commercial satellites--television, telephone, telegraph, and data. The station would be completed and in operation in the fall of 1968. Earth stations also had been started near Green Valley, West Virginia, and near Jamesburg in the central coastal area of California. Three existing stations are located at Andover, Maine; Brewster Flat, Washington; and Paumalu, Oahu, Hawaii. A second antenna was being installed at Paumalu and would be in operation by the fall of 1968. (ComSatCorp Release 67-44)

. New rules designed to improve substantially the passengers' chances for surviving airplane crashes were announced by the FAA. For the first time, airplane manufacturers would have to demonstrate a 90-second emergency evacuation using a full and representative passenger load before they would be issued type certificates. Present FAA rules required the airlines to demonstrate passenger evacuations, allowing two minutes for complete evacuation. The new rules ("Crashworthiness and Passenger Evacuation Standards for Transport Category Airplanes") would require extensive safety improvements in both airline equipment now in service and in designs of new planes not yet type certificated. In general, the new rules would take effect October 24, 1967. Aircraft now in service or already type certificated would have to meet most of the retrofit changes required under the new rules by October 1, 1969. Under the new rules, carriers would have to conduct 90-second evacuation demonstrations when they introduced new or significantly modified equipment into service, or when passenger seating capacity was increased by five percent or more. (FAA Release 67-67)

. Gen. James Ferguson, Commander of AFSC and director of MOL, told his National Space Club luncheon audience in Washington, D.C., that sixteen aerospace research pilots have been named for the MOL program and "we plan to have two of these men in orbit in 1970." (NSC News Letter)

. The Soviet Union had urged the U.N. Committee on the Peaceful Uses of Outer Space to take action on the Soviet draft treaty on rescuing cosmonauts in emergencies, reported Space Business Daily. The Soviets had expressed regret that the Legal Subcommittee had not completed action on the proposal. Soviet representative P.D. Morozov said the Soviets would not object to amendments. He praised the recent U.N. space treaty as "a great achievement of the progressive forces on the road of using outer space in the interests of mankind. It is a serious step forward in the development of cooperation and mutual

September 20 (continued)
understanding between states and peoples." Morozov also had emphasized space cooperation among the socialist countries. He had noted that the April meeting of "experts of the socialist countries outlined new steps for broader cooperation in space meteorology, biology and medicine," as well as communications. (SBD, 9/20/67, 100)

. Japanese defense specialists had expected the first Red Chinese test of an intercontinental missile by the end of this year, reported Albert Axelbank to Washington Evening Star. Before they would test a full-scale missile, the Chinese would test-fire the first stage of the missile. This could come at any time. However, Prof. Tetsushi Okamoto of Tokyo Institute of Technology believed that the Peking regime would first launch a satellite, probably on Oct. 1. Fear of China's progress toward a system that could deliver a nuclear bomb laid behind Secretary of Defense Robert S. McNamara's announcement on Sept. 18 that the U.S. would begin production of a limited antiballistic missile designed to guard against a Chinese attack. China's ICBM was expected to be fired from a site at Shwangchengtse, which was situated north of Chiuchuan in Lanchow, central China. (Axelbank, W Star, 9/20/67)

. The French government last year started to build a space research and operating base near Kourou, a village 40 miles west of Cayenne, French Guiana, reported Francis B. Kent. Kourou would be expected to grow to a modern city of 10,000 by 1972. A number of factors had pointed to locating the space base on French Guiana, among them its location near the equator, ideal for putting satellites into equatorial orbit. The decision to locate in French Guiana had been taken after Algeria had won its independence in 1962, obliging the French to abandon bases in the Sahara. Figures available at government offices in Cayenne estimated the impact on French Guiana's economy with the completion of the space base would triple the area's gross product by 1970. (GDLATNS, St. Louis Globe-Democrat, 9/20/67)

. France and Quebec would launch a joint communications satellite for relaying French television programs to Canada, UPI reported. The satellite would enable programs to be relayed without depending on existing American Early Bird satellites, informed sources said. (UPI, C Trib, 9/21/67)

September 21: Defense of the U.S. supersonic transport program against charges the Administration had bankrolled an industrial monopoly was headed by Secretary of Transportation Alan S. Boyd in a speech before New York's University Club, reported David Hoffman of Washington Post. Critics had alleged that Boeing and General Electric would stand to reap huge profits because of a loosely-worded Federal contract.

September 21 (continued)
Boyd had said "there are very good economic reasons to believe" that at least 500 planes would be sold, and if so, the Federal treasury would get back its $1.25 billion and another $1.1 billion in royalties. He had said the SST program would involve no monopoly for Boeing and General Electric. Far from being a monopoly, he had stated, the SST program would provide economic activity for: two prime contractors, 20,000 subcontractors, 12 U.S. airlines, 14 foreign airlines, and 65 R&D firms working with seven Government agencies. (Hoffman, W Post, 9/22/67)

September 22: Expanded memory units for use in tracking facility computers of the Apollo lunar landing program had been added by NASA as a modification to its fixed price contract with the Sperry-Rand Corp. The work would be performed at Sperry-Rand's Univac Defense Systems Div., St. Paul, Minn., which would expand existing memory bank units for digital data processing systems from a storage capacity of 32,000 to 48,000 words. The systems would be installed in ground stations and aboard ships in the world-wide tracking network for Apollo flights. Work would be performed under the direction of Goddard Space Flight Center. (NASA Release 67-246)

. More than 2,000 major construction and supply firms in the U.S. received invitations to bid on the second phase of NASA's Electronics Research Center at Kendall Square, Cambridge, Mass., announced the New England Division Engineer, Corps of Engineers. The first phase had been the placing of foundation pilings. The construction package or second phase would include three brick-faced buildings; one at least 10 stories high to house laboratories, offices, and cafeteria; another 350-seat auditorium; and another a center support building for service utilities. The Electronics Research Center had been in operation since Sept. 1, 1964, in temporary quarters at Technology Square near the permanent site in Kendall Square. (USA Release, 9/22/67)

. Cosmos CLXXIX was launched into orbit with 157-km (98-mi) apogee; 141-km (88-mi) perigee; 87.3-min period; and 49° inclination. This satellite was announced as part of a program of space research; like CLXXVIII, this satellite reentered on the same day it was orbited. (GSFC SSR, 9/30/67; Pravda, 9/23/67)

September 23: Rep. George P. Miller (D-Cal.), chairman of the House Committee on Science and Astronautics, described correction of "serious procedural deficiences in the flow of timely information" from NASA to the Committee, J. V. Reistrup reported. A letter from

September 23 (continued)
Rep. Miller to Rep. William F. Ryan (D-N.Y.) had explained the corrective measures, worked out with NASA Administrator James E. Webb. NASA would notify the Committee staff immediately of any accident involving death or serious property damage; NASA Oversight Committee would be briefed every three months on Committee-defined "critical problem areas;" NASA would report significant program changes and problems as soon as they occurred; and NASA would furnish budget data in October, updating the data monthly. (Reistrup, W Post, 9/23/67)

September 25: The scientific data required for the Orbiting Geophysical Observatory (OGO IV) primary mission had been obtained and extended data acquisition with three-axis stabilization was continued. With the exception of two experiments which had ceased operating after several weeks in orbit and an oscillatory perturbation introduced by an experimental antenna, all observatory systems were functioning and operating well. During the period of 31 July to 17 Sept., OGO IV had acquired over 19,000 hours of data on latitude-dependent atmospheric phenomena, energetic particle characteristics, VLF noise and magnetic fields, and the incoming solar radiation. Initial reports from experimenters were impressive and underscored the importance of interdisciplinary measurements and global coverage for studies of the near-earth environment. OGO I, II, and III were functioning and had obtained useful data. On Sept. 19, all four OGOs were transmitting data; this represented an accumulation of over 50 experiments providing high-data-rate measurements at widely separate spatial locations within the magnetosphere. The period of coordinated operation of four OGOs would continue for the next several weeks. (NASA Proj Off)

. Plumbing leaks in the first model of LEM had delayed flight testing at Cape Kennedy, Washington Post reported. Recurring problems--primarily involving leaks in plumbing associated with the craft's two main engines--had kept it grounded. Portions of the plumbing system had been sent back to the plant of the main contractor, Grumman Aircraft Engineering Corp., Bethpage, N.Y. The plumbing leaks had virtually eliminated any chance of launching this year the first model of the craft that would land American astronauts on the moon. (AP, W Post, 9/26/67, A9)

. Congressional cuts in the NASA budget had forced an agency-wide hiring freeze, Aerospace Technology reported. No job vacancies might be filled or new positions created unless there were exceptionally mitigating circumstances. JPL expected to lose about 200 engineers during the freeze, but no estimates had been released by NASA field centers. There was no indication of how long the freeze would last. (Aero Tech, 9/25/67, 3)

September 25: Flight test of the X-15 aircraft--scheduled to reach a record-setting speed of 4,500 miles an hour--was canceled because of weather conditions at the Flight Research Center, Edwards, Calif. (NASA Proj Off)

. Airport development sparked the economy of five communities in Texas, South Carolina, California, Maryland, and Minnesota, the FAA had reported in its study: "The Airport--Its Influence on the Community Economy." The study report related economic growth to general aviation (non-airline) airport development at Hereford, Tex.; Sumter, S.C.; Hayward, Calif.; Frederick, Md.; and Fairmont, Minn. Public airports had been developed or improved in each of the communities with Federal assistance under the Federal-Aid Airport Program administered by the Federal Aviation Administration. (FAA Release 67-70)

. USAF Space and Missiles Systems Div. had awarded a contract to Lockheed Missiles and Space Co., Sunnyvale, Calif., for $1.2 million for Agena launch services at Vandenberg AFB during the period of Oct. 1, 1967, through Sept. 30, 1968. (DOD Release 896-67)

September 26: Sen. Clinton P. Anderson (D-N. Mex.) inserted in Congressional Record a copy of a speech given by Dr. W. F. Libby, professor at UCLA, entitled: "The Moon Base." The speech had been delivered on Aug. 14 to the Structural Engineering Group, Douglas Aircraft Division, and the representatives of the Reserve officers of the USAF. Dr. Libby said the space program has been one of the best bargains the American public has ever had; comsat alone, the international communications capability, is worth all the money spent. (CR, 9/26/67, S13678-81)

. The first manned Apollo space flight might be delayed from spring to mid-summer of 1968 due to modification of the Apollo spacecraft by its prime contractor, North American Aviation, according to NASA spokesman Julian Scheer. Mr. Scheer, NASA Assistant Administrator for Public Affairs, told UPI the anticipated delay, among other things, could be because of considerable changes in the capsule after last January's fire. (UPI, W Post, 9/27/67, A6)

. An ordinance outlawing sonic booms was adopted by Santa Barbara's city council, Reuters reported. This was believed to be the first such municipal ordinance in the U.S. The mayor had voted against it. He explained: "I do not believe the law is enforceable." Councilman Klaus Kemp, introducing the ordinance, said booms caused damage to homes and physical injury to individuals. At Hamilton AFB a spokesman said "presumably nothing" would be done about the new law. The presumption was based on court decisions ruling the Federal Government (FAA) had sole jurisdiction over aircraft movements. "We are not attempting

September 26 (continued)
to prohibit supersonic flights...[but] proposing that unnecessary flights over or immediately adjacent to this city at unreasonable and unnecessarily low altitude be prohibited," said Councilman Kemp. (Reuters, NYT, 9/28/67)

. Cosmox CLXXX was launched into orbit with 350-km (218-mi) apogee; 206-km (128-mi) perigee; 90.1-min period; and 72.9° inclination. The satellite was announced as a part of a program of space research. (GSFC SSR, 9/30/67; Krasnaya Zvezda, 9/28/67, 3)

September 27: Development of an advanced direct sensing system for the Nimbus D Meteorological Satellite, scheduled for launching in 1970, had been the subject of a contract awarded by NASA to Radiation Inc., Melbourne, Fla. Called Interrogation Recording and Location System (IRLS), the experiment would involve development of a satellite-borne device and remote platform electronics to obtain measurements of atmospheric and other data from fixed and free floating sensory platforms, including balloons and buoys. The data from the platforms, recorded by Nimbus, would be relayed to its tracking stations for use by scientists. Work would be performed under the direction of Goddard Space Flight Center. (NASA Release 67-247)

. NASA appointed an interim working group composed of Dr. Alfred J. Eggers, Dr. Floyd L. Thompson, and Gen. Jacob E. Smart (USAF, Ret.) to review NASA safety procedures and prepare a plan under which the Administrator could proceed to establish an Aerospace Safety Advisory Panel. Gen. Mark Bradley (USAF, Ret.), Garrett Corp., would serve as a consultant to the chairman, Dr. Eggers. The action would be taken to implement Section 6 of Public Law 90-67 (the NASA Authorization Act for FY 68). Eggers was Special Assistant to the Administrator and Deputy Associate Administrator for Advanced Research and Technology. Thompson, Director of NASA's Langley Research Center, served as chairman of the Apollo 204 Accident Review Board. Gen. Smart was NASA's Assistant Administrator for Policy. (NASA Release 67-249)

. Space Nuclear Propulsion Office, Germantown, Md., had extended its contract with Aerojet-General Corp. for development of nuclear propulsion. Aerojet, which had been the prime contractor since 1961 on the Nerva project, would receive an estimated $14.7 million on the interim contract for work to be performed through Nov. 30. The Space Nuclear Propulsion Office, a joint operation of AEC and NASA, would receive $6.8 million of the funds on the contract extension from NASA, the balance from AEC. (NASA Release 67-250)

September 27: Rep. Theodore R. Kupferman (R-N.Y.), speaking on the House floor, expressed concern about the "noise pollution problem." He quoted from a speech which he had presented on Sept. 12 to a luncheon meeting of the U.S. Chamber of Commerce, held in Washington, D.C.: "It is possible to have noise control and industrial development without penalty to each other.... The idea that noise is a necessary price of industrial and economic progress is as antiquated as is the belief that contaminated waters and a polluted atmosphere must also accompany civilization's material advances.... Noise pollution, however, unlike water and air pollution, is only now beginning to receive a proper share of public attention." (CR, 9/27/67, H12606-13)

. Dr. Edward U. Condon, scientific director of Colorado University's study of Unidentified Flying Objects (UFOs) said that "such studies ought to be discontinued unless someone comes up with a new idea on how to approach the problem," reported R. Roger Harkins of the Boulder Camera. Condon said "it's been extremely difficult to gather information on this subject" and asked anyone with any "hard information to speak now --or forever hold your peace." He stated: "We have approached the problem in an unprejudiced way, seeking to find whatever there is to find by objective scientific means with no scientific results so far. Some of the difficulties associated with belief in visitors from outer space are well set forth in an article by Prof. William Markowitz in 'Science' for Sept. 15 and should be studied by all who wish to be informed on the subject," he added [see September 15]. (Harkins, Boulder Camera, 9/27/67; AP, LA Times, 9/28/67)

September 27-30: NASA launched for ComSatCorp the fourth of the INTELSAT II series of commercial communications satellites (INTELSAT II-F4) and the second of them in the Pacific. Launch was from ETR by a Thrust-Augmented Improved Delta (DSV-3E) launch vehicle. The satellite went into transfer orbit over the Pacific at approximately 176° East with 29,056-mi (37,104.6-km) apogee; 186-mi (299-km) perigee; 658.8-min period; and 26.4° inclination. The satellite would supplement the services of and replace the current Pacific satellite, INTELSAT II-B, (174°E) in the event of its failure. NASA support nominally would terminate after about three days, subsequent to providing backup transfer orbit data and calculations. Final orbit and spin axis orientation would be made by ComSatCorp with the on-board hydrogen peroxide system. Approximately 15 days after launch, the satellite would be available for commercial use. These satellites would be capable of handling television, data transmissions, or up to 240 voice channels (480 circuits) between "first class" ground stations such as Andover. Part of the satellite capacity would be used in support of the NCS/NASCOM for the Apollo program. It would serve as backup to provide against interruption of satellite communications

September 27-30 (continued)
service and would add communications capability across the Pacific.

On Sept. 30 the apogee motor was ignited at 7:45 pm EDT, on command from the ComSatCorp-operated earth station at Paumalu, Hawaii, and kicked the new satellite from its elliptical transfer orbit into a planned, near-synchronous orbit over the Pacific Ocean (initial orbit apogee, 22,531 mi (36,260 km); perigee, 21,805 mi (35,091 km); period, 1,430.5 min; drift rate 1° East per day. The INTELSAT satellite system, in addition to this new Pacific II satellite, included the Pacific I satellite and two satellites serving the Atlantic area, Early Bird, launched April 6, 1965, and Atlantic II, launched March 22, 1967. (NASA Proj Off; ComSatCorp Releases 67-45 and 67-48)

September 28: NASA Administrator James E. Webb testified before the Subcommittee on Independent Offices, Senate Committee on Appropriations. His prepared statement made these principal points: NASA would not be able to achieve for this Nation "a position of leadership in space" for less money than an annual budget of between $5.5-$6.0 billion a year. At the proposed level of funding, after launch vehicle #216, production of the Saturn IB and the earth-orbital portion of the Apollo Applications Program would be terminated. Rather than to continue to use the Apollo system for work in orbit at conclusion of Apollo flights, NASA would accept a hiatus in the continuous development of manned space flight, deciding on a fresh start for the years ahead. A new study would be begun in FY 68 and FY 69 on purposes and form of future development of manned space flight concerning spacecraft and "the national family of large launch vehicles that should be available in the 1970's." This "basic change in the United States space outlook" would make it "clearly prudent to preserve the physical facilities which have been built and paid for and which would be required if a decision is made to construct a large solid rocket vehicle." Because the budget level approved by the House would prevent beginning work on NERVA II, development of a flight weight engine of the NERVA I class, "with probably from 60,000 to 75,000 lbs of thrust" would be initiated in FY 68. Because we would have "no choice" but to accept the fact that Voyager cannot be initiated in FY 68, and, in order to preserve "a capability for future planetary programs," NASA would propose about $10 million for the "lunar and planetary program for studies and supporting research in the technology of planetary exploration." NASA would propose no changes in the budget for the Apollo program but would "accept the legislative history as a clear signal that we should proceed with a hard-hitting carefully managed effort to achieve the objectives of the Apollo program." NASA would be able to launch "a total of nine Saturn V unmanned and manned missions before the end of Calendar Year 1969." A further reduction in funding in FY 68 could only cause "complete havoc" and would be a blow to our national aeronautical and space effort from which it would be extremely

September 28 (continued)
difficult to recover.

The Senate hearing testimony developed these points [Mr. Webb's statements]. "In this situation, we cannot ask, as we otherwise would have done, that the Senate restore in full the amount reduced by the House.... We are here to ask the committee that the Senate approve the amounts passed by the House and accepted by the President, and to make a clear record in the legislative history that will give us the flexibility we will need to permit us to carry out the strongest possible program within the amounts made available to us.... Long leadtimes requiring timely initiation of new programs and implying commitment to proceed over a period of years would...make it perfectly clear to all that we cannot somehow find a way to carry forward the same program and give the Nation the same assurance of a strong position in aeronautics and space with a $517 million cut in out budget."

Mr. Webb told the Subcommittee that he had been in touch with the President in the last 24 hours and "he still believes the recommendations he made in January represent" the best budget for the country. But the President also believed his proposed 10 percent income tax surcharge "is more important to press for than extra money for the space bill," Mr. Webb said. Further, he stated that he had drastically reshaped the space program to comply with the $4.5 billion fund for this year voted by the House and approved by the President. But Subcommittee Chairman Warren G. Magnuson (D-Wash.) and several senators, with major space installations in their states, gave strong indications they would plan to restore some of the millions of dollars cut by the House. Mr. Webb promised to revise his multi-billion-dollar space plans again "and bring you the best program possible for the money." (NASA LAR VI/-101; Text; Testimony; NYT, AP, 9/29/67, A3; 9/30/67, 52)

. Senate Appropriations Committee activities were listed by Wall Street Journal: voted $142 million for this year's development of the SST; doubled the House-approved $20 million for highway safety grants; added $50 million to FAA's budget for improved air safety (versus the $7 million requested by the Administration); and, in all, voted nearly $1.7 billion for the Department of Transportation's FY 68 budget. Sponsor for the improved air safety figure of $50 million had been Sen. John Stennis (D-Miss.), chairman of the Appropriations Subcommittee that handled FAA's budget, who proposed $20 million for operation of air control towers and overtime payment for their crews, plus another $30 million for such new safety equipment as airport ground lighting and improved radar. Sen. Stennis had stated his hope that someday air safety projects could be financed partly with special user charges. (WSJ, 9/28/67, 3)

. The LTV Range Systems Division, LTV Aerospace Corporation, Dallas, was awarded a contract valued at about $10 million to provide facilities

September 28 (continued)
support services to the Manned Spacecraft Center, Houston. The services would cover a 12-month period, beginning December 1, 1967 and would include buildings and grounds maintenance, operation and maintenance of utilities and equipment, and associated engineering work related to the Center's plant facilities. The contract contained provisions for four one-year renewal options. (NASA Release 67-253)

. USAF Manned Orbiting Laboratory Systems Program Office, Los Angeles, Calif., issued a $3.5-million initial increment to an $8.7-million fixed-price contract to Hamilton Standard, Windsor Locks, Conn., for development, procurement, and support of astronaut pressure suit systems for the MOL program. USAF Space and Missile Systems Organization, issued a $4-million increment to an $8.1-million definitive contract for engineering services in support of the Agena space vehicle program. (DOD Release 912-67)

September 29: The Senate had unanimously passed S.J. Res. 109, which would mark the 50th anniversary of the Langley Research Center in October 1967. (NASA LAR VI/102)

. A recommendation that a lunar base be the post-Apollo goal had been made by Dr. W. F. Libby, director of UCLA's Institute of Geophysics and Planetary Physics, reported Space Business Daily. Libby had said that he would not have "the faintest idea" how much a lunar base or other post-Apollo programs would cost, but had added: "I believe this, it will cost a lot more if we don't do it, a lot more. Loss of benefits will be much more than the cost." (SBD, 9/29/67, 152)

. Dr. Donald H. Menzel of the Harvard College Observatory said in a letter to Time that naming of features of the moon's far side had been deferred by the International Astronomical Union until its 1970 meeting. Menzel planned to propose naming features for the three American astronauts and one Russian cosmonaut who lost their lives in accidents connected with space research. (Time, 9/29/67, 11)

. A contract for operation of NASA's Scientific and Technical Information Facility at College Park, Md., had been renewed by NASA. The contractor, Documentation, Inc., Bethesda, Md., would receive an estimated $5.6 million for one year of operation. The company had been operating the facility since its inception in 1962. The facility used modern computer techniques to store and retrieve a large volume of scientific and technical reports for the benefit of Government, university, and industrial users. (NASA Release 67-255)

September 29: Western Electric received a $43.4 million addition to an existing Nike-X research and development contract. Approximately $18.0 million of this was the result of the decision announced Sept. 18 by Secretary of Defense Robert S. McNamara to deploy a Communist Chinese-oriented ABM system. The $18.0 million was the initial implementation of the deployment decision. The remainder of the announced addition of $43.4 million would be for continuing research and development on the Nike-X system. This award would supplement the FY 68 contract which had been signed early in September. Under that contract Western Electric had received initially $215.3 million for continued research and development effort on Nike-X. The Communist Chinese-oriented ABM system which would be deployed would consist of two types of radar and two interceptor missiles. (DOD Release 992-67)

During September: Suggestions for restoring public confidence in and acceptance of the U.S. space program were advanced by William Leavitt in Air Force and Space Digest: "We can husband our resources by looking carefully at the question of whether we need two expensive and competitive manned orbital laboratories, one run by the National Aeronautics and Space Administration and one run for the Defense Department by the Air Force...

"We can increase the funding and sharpen the planning of the unmanned working satellites.... We can begin to look seriously at the potential of aerospace systems analysis and engineering in the solution of nonspace and nonmilitary public problems, with an emphasis on building into these techniques...social, economic and political factors.... And we can begin to put to work in our schools, suburban and urban, many of the space-age training techniques that have been a beneficial by-product of the technological age we live in." (AF/SD, 9/67, 158-159, 162, 165)

. M/G Alvin R. Luedecke (USAF, Ret.), Deputy Director of JPL, resigned. He had come to JPL on Aug. 1, 1964, after five years as general manager of the Atomic Energy Commission and 25 years as an Air Force officer. (JPL Lab-Oratory, Sept. 67)

. NAA announced that Igor I. Sikorsky, popularly known as the father of the helicopter, had been selected to receive the 1967 Wright Brothers Memorial Trophy. Presentation would be made at the Dec. 14, 1967, annual memorial dinner in Washington, D.C. (NAA Release)

. National Pilots Assn. reported CAB figures on general aviation's safety performance for calendar year 1966: fatal accidents were 2.5-per-100 million hours flown--an all-time low. (NPA News, 9/67, 1)

During September: The overall national security significance of space, in both tactical and strategic terms were discussed by Dr. Harold Brown, Secretary of the Air Force, in General Electric Forum. "The Department of Defense does not view space as a mission, but rather as a place." He further explained the broad Air Force responsibilities and goals in space in terms of overall DOD interests. He also cited certain representative features of the military unmanned space programs: (1) ballistic missile warning; (2) antisatellite defense; and (3) nuclear detonation detection. (Brown, General Electric Forum, Autumn 1967)

COMMENT DRAFT

N O T F O R R E L E A S E

A S T R O N A U T I C S A N D A E R O N A U T I C S

OCTOBER 1967

A CHRONOLOGY ON SCIENCE, TECHNOLOGY, AND POLICY

(HHR-23)

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O C T O B E R 1 9 6 7

October 1: Ninth anniversary of NASA, established by the National Aeronautics and Space Act of 1958.

. NASA Associate Administrator for Space Science and Applications Dr. Homer E. Newell became NASA Associate Administrator. His appointment had been announced Aug. 25. Dr. Newell would be replaced by Deputy Associate Administrator for Space Science and Applications (Sciences) Dr. John E. Naugle. [See also Oct. 12.] (NASA Release 67-228; Hines, W Star, 10/3/67, A4; NASA Ann, 10/20/67)

. NASA announced that solar radiation and magnetic properties around planet Venus as well as in interplanetary space would be studied as Mariner V (launched June 14) approached closer to Venus. Flight plan would take spacecraft within 2,500 mi of surface of Venus Oct. 19. NASA hoped to acquire valuable information to supplement that learned from Mariner II which in 1962 had detected no radiation belts and no magnetic field at miss distance of 21,600 mi. Added investigations included: properties of solar wind; electron count by radio beam passing through Venus' atmosphere; study of so-called "solar plasma cavity" on dark side of Venus; and investigation of unexplored region 54 million mi from sun. (NASA Release 67-248)

. Introduction to current U.S. research on use of spacecraft to study oceans, "United States Activities in Spacecraft Oceanography," was published by National Council on Marine Resources and Engineering Development; NASA, Naval Oceanographic Office, Bureau of Commercial Fisheries, and ESSA participated in preparation. Scientists reported on progress in photographic and spectral scanning; when done from orbital locations, data equivalent to that obtained by thousands of globally-distributed ocean-surface sensors was obtained. "Although data acquired from space will initially appear coarse compared with measurements from surface platforms, a sensing system with global coverage reporting as often as desired, and with increasing scope and accuracy will offer unique opportunities for broad unified synoptic analysis," study reported. (Text)

. New York Times editorial praised success of NASA's Surveyor V spacecraft launched Sept. 8: "If present indications are confirmed, Surveyor 5 has made one of the fundamental scientific discoveries of the century...that earth's natural satellite is made up of the same kind of material as is the earth.

"Surveyor 5's historic finding, if backed by later experiments, must force new consideration of the possibility that the moon was torn from the earth.... Certainly much more evidence is required... [but] Surveyor 5 has performed a notable feat. Moreover it has demonstrated again how much can be learned from instruments delivered

October 1 (continued)
by relatively inexpensive unmanned rockets without the great dangers and huge costs required to send a man to the moon and return him safely to earth." (NYT, 10/1/67, 12E)

October 2: NASA Administrator James E. Webb announced resignation of Deputy Administrator Dr. Robert C. Seamans, Jr., effective Jan. 1, 1968. "Dr. Seamans joined the government with a commitment to serve two years, but...served seven years...[and] has now decided to return to private life," Webb said. "His departure will leave a wide gap [in NASA leadership]." A former MIT aeronautical engineering professor, RCA engineer, and member of NACA technical committees, Dr. Seamans joined NASA in 1960 as Associate Administrator. In 1965 he was appointed Deputy Administrator and was presented NASA's highest award, the Distinguished Service Medal, for distinguished service to U.S., outstanding leadership of NASA, and "ability to bring together into a framework of effective action thousands of industrial organizations, tens of thousands of scientists and engineers, and hundreds of thousands of aerospace workers." He had also received Naval Ordnance Development Award (1945); AIAA Lawrence Sperry Award (1961); and Godfrey L. Cabot Aviation Award (1965). (NASA Release 67-257; O'Toole, W Post, 10/3/67, A3)

. NASA awarded supplementary or new research grants and contracts totaling $2,059,104 to 23 universities, colleges, and private institutions. (NASA Release 67-254)

. Texas' role in U.S. space program was summarized by NASA Associate Administrator for Manned Space Flight Dr. George E. Mueller for the Texas State Society. "Many thousands of Texans working for dozens of Texas firms are creating through their...[R&D] effort the new technology required for space exploration. One measure of Texas contributions may be made in terms of the $771,000,000 of work that...[its] firms have performed on NASA's programs. In addition, Texas colleges and universities are not only conducting high level research for NASA, but are training future space scientists and engineers under NASA grants." He noted also that Texas was birthplace of seven astronauts and five astronaut wives and "home town" of all 56 astronauts, based at MSC. (Text)

. Soviet satellites were studying solar x-ray sources in an effort to protect cosmonauts from deadly radiation storms, according to Pravda. Cosmos CLXVI (launched July 17) and Electron II (launched Jan. 30, 1964) had gathered "extensive information" about x-ray sources and had discovered that "in principle, by recording an x-ray flare, it is

October 2 (continued)
possible to warn cosmonauts of the approach of radiation danger...[and] enable spaceship crews to take necessary protective measures." (UPI, NYT, 10/3/67, 2)

. Under reduced gravity conditions on moon, most natural and comfortable gait for an astronaut would be "a lope at about ten feet per second," advised Amos A. Spady, Jr., LaRC scientist. He and fellow scientist, Donald Hewes, had tested subjects on specially constructed device--simulating effects of astronauts moving in moon's lower gravity. Simulated lunar gravity had not guaranteed that all motion would be higher, faster, or farther. Scientists had discovered that, at most speeds, lunar stride would be longer--sometimes twice as long--but number of steps per minute would be reduced by as much as half. (Weil, W Post, 10/2/67, B4)

. In response to charge by Harry Schwartz in the New York Times that "the costs to both countries [U.S. and U.S.S.R.] of...ten years of space rivalry have been enormous" and prediction that "the economic and technical problems ahead will force the space race to stop at the moon with cooperation replacing rivalry," AIAA Executive Secretary James J. Harford defended space program in letter to New York Times Editor. "The modest scientific dividends which he [Schwartz] credits the space program with producing are puny, indeed, compared to the effects space technology will certainly have on civilization in eons to come.... Technologically, both the U.S. and the U.S.S.R. are enormously stimulated.... Politically, the space program has produced the first international treaty in history.... Philosophically, the space program has made the world vividly aware that it is, itself, a spacecraft with three billion passengers, traveling in a solar orbit, in a vast universe....

"Everyone is for international cooperation, but two nations with ICBM's aimed at each other have understandable problems working out cooperative programs.... Perhaps the time for serious joint effort is coming. Mr. Schwartz will not be the only one happy about it when it comes. In the meantime, a peaceful program costing less than 1 per cent of the G.N.P., which has produced new technology at a rate that only wars have equaled in the past...should not be diminished because of serious domestic problems." (Schwartz, NYT, 10/2/67, 47; NYT, 10/14/67, 26)

. Ralph K. Bennett, writing in the National Observer, described F-111 aircraft [formerly TFX] as "an Airplane Lemon" and questioned its capabilities: "On paper it is the most sophisticated, flexible, yet economic air-weapons system yet devised--a single airplane capable of performing the divergent missions of both Navy and Air

October 2 (continued)
Force...[but] in reality it may be the most costly bungle in the... history of military procurement...."

Sen. John L. McClellan (D-Ark.) later told Senate he agreed with Bennett: "...I am not implying that commonality [of one aircraft for USAF and USN] cannot be a valid and economical concept. There is no way, however, to build with identical parts an effective single weapons system which will carry out separate and widely diverse military missions. Mr. Bennett's article points out that the TFX program was an attempt to combine...drastically different design and performance characteristics.... The result is...[a] hybrid craft that cannot capably perform to the requirements of either service." (Bennett, Natl Obs, 10/2/67; CR, 10/4/67, S14225-7)

October 3: NASA Nike-Tomahawk sounding rocket launched from NASA Wallops Station ejected barium vapor at 75-, 115-, and 140-mi altitudes, forming three distinct green and purple clouds visible for hundreds of miles. Experiment was conducted for AFCRL to: (1) measure electric fields and wind motion in upper atmosphere by photographing and tracking movement of ionized barium clouds; and (2) measure attenuation on passage of radio signals through ionized barium plasmas. (WS Release 67-32; UPI, W Star, 10/4/67, D2)

. NASA Aerobee 150 sounding rocket launched from WSMR carried GSFC payload to 114-mi (184-km) altitude on flight test of SCAT Solar Pointing System. Other objectives were: to obtain x-ray photographs and semimonochromatic EUV photographs of sun; and to measure solar flux using grazing incidence telescope, Fresnel Zone-Plates, and proportional counters. This was first flight test of SCAT. Satisfactory results were obtained. (NASA Rpt SRL)

. Maj. William J. Knight (USAF) set new winged aircraft speed record when he flew X-15 No. 2 to 4,534 mph (mach 6.72) and 99,000-ft altitude in flight at Edwards AFB to: (1) test Martin ablative coating and ramjet local flow; (2) check out stability and control with dummy ramjets and characteristics of external tank separation and wing tip accelerometer; and (3) conduct fluidic temperature probe. Previous speed record of 4,250 mph (mach 6.33) had been set by Major Knight Nov. 18, 1966. (X-15 Proj Off; FRC X-Press, 10/20/67, 3)

. U.S.S.R. successfully launched sixth Molniya I comsat to relay television signals from the Soviet Far East to Moscow and on to Paris. Orbital parameters: apogee, 39,870 km (24,774 mi); perigee, 499 km (308 mi); period, 11 hr 55 min; and inclination, 64.96°. Tass said comsat would relay television, radiotelephone, and telegraph messages and form

October 3 (continued)
part of new television network scheduled to be in operation by 50th anniversary of Bolshevik Revolution Nov. 7. (GSFC SSR, 10/15/67; W Post, 10/4/67, A17; UPI, NYT, 10/4/67, 3)

. Per Congressional resolution President Johnson issued Proclamation 3811 designating first week in October for commemoration of LaRC's 50th anniversary. He noted some of LaRC's numerous contributions to astronautics and aeronautics since its establishment in 1917 as the first national laboratory to conduct basic aeronautical research: (1) cowling for radial air-cooled engines developed in late 1920's; (2) scientific information and technical skills needed to increase performance and utility of World War II aircraft; (3) research facilities for advancement of SST; (4) investigations into concepts of advanced supersonic and hypersonic vehicles, helicopters, and V/STOL aircraft; (5) research which contributed to development of Scout launch vehicle and to management of Project Mercury, Lunar Orbiter Program, and Project Fire; and (6) support services for Gemini and Apollo programs through use of simulators and special laboratories.

Messages of congratulations from President Johnson, Vice President Humphrey, and Director of U.K.'s Royal Aircraft Establishment Sir Robert Cockburn were inserted in Congressional Record by Rep. Thomas N. Downing (D-Va.), who said: "...this Nation can be proud today and always of the system that maintains the Langley Research Center." At LaRC the week was marked by a daily inspection, with hundreds of industry, university, and Government visitors. (NASA Release 67-251; CR, 9/29/67, S13885; 10/2/67, H12787-9; 10/3/67, H12913-4; PD, 10/9/67, 1387-8)

. Senate Appropriations Committee ordered favorably reported, with amendments, NASA FY 68 appropriation bill (H.R. 12474). Action restored $96 million of $516 million cut by House [see Aug. 22]. Two projects--Voyager Mars and NERVA II--were restored by increased funding in Senate move; as approved, bill totaled $4.7 billion. Bill moved to floor of Senate. (NASA LAR VI/104; O'Toole, W Post, 10/4/67, A2)

. Mass meeting in U.S.S.R.'s Palace of Congresses inside the Kremlin Wall heard L/Col. Aleksei A. Leonov recall heritage of fellow pioneers; he had been an associate of Col. Komarov who had been killed on Apr. 24 in the first flight of third-generation Soyuz-I spacecraft. Cosmonaut Leonov said: "We cannot help recall our friend, test pilot Vladimir Mikhailovic Komarov. Grateful mankind will always preserve the memory of these wonderful people in its heart." The mass meeting was the highlight of Soviet celebration of the 10th anniversary of Sputnik I's launching [see Oct. 4].

In the Soviet press on the same day, scientist Konstantin P. Feoktisov, veteran of three-orbit flight in 1964, listed a manned

October 3 (continued)
laboratory in orbit as first among coming space developments, then a moon landing, then a "...starting to Venus and Mars." (UPI, AP, NYT, 10/5/67, C20)

October 4: 10th anniversary of the space age, inaugurated with the launching of first man-made satellite, U.S.S.R.'s 184-lb Sputnik I. During first decade of space age 803 spacecraft were successfully orbited: U.S. orbited 529; U.S.S.R., 269; France, 4; and Italy, 1. U.S. total included 14 manned orbital space flights with 677 orbits and 1,993.4 man hours; U.S.S.R. had 9 flights with 310 orbits and 532.5 man hours.

Of 45 worldwide flights related to the moon, 20 were successful--including 5 softlandings--providing high-quality photos and on-site analyses of lunar surface. Some 24 planetary flights provided close-up photos of Mars and atmospheric data on Mars and Venus. Some 17 bio-science payloads, including mice, dogs, mold spores, plants, insects, a chimpanzee, and an anthropomorphic dummy, were successfully launched and recovered, providing data on effects of space flight on living systems. Space applications satellites totaled 292; advanced technology satellites, 26; and military support and observation satellites, 158.

Highlights of U.S. space program included 146 launches in 201 attempts, with highest percentage of success in 1967--13 successful launches in 15 attempts, or 87%. U.S. X-15 supersonic research aircraft was flown 189 times, and XB-70 experimental bomber, 67 times. (EH; Sheldon, "Review of the Soviet Space Program," Report of the House Committee on Science and Astronautics)

. NASA test pilot William H. Dana flew X-15 No. 3 to 250,000-ft altitude and 3,886 mph (mach 5.35) at Edwards AFB. Purposes of test flight were to check: ultraviolet exhaust plume; solar spectrum measurement; micrometeoroid collection; air density; x-ray air density; ARC boost guidance; and tip-pod camera. (NASA Proj Off)

. MSFC used AEDC facilities to investigate preparation of spent rocket stage for human occupancy in space by dumping 840 gal of super-cold liquid nitrogen through "dead" or inactive J-2 rocket engine. Simulating 100,000-ft altitude, dumping experiment would pave way for astronauts to then move inside orbiting stage and use tanks as living quarters for space station. (MSFC Release 67-203)

. Static launch from motionless rocket sled of F-111 aircraft's crew escape module at Air Force Missile Development Center (AFMDC) was successful. Under severe conditions pilot might encounter in emergency before takeoff, module would allow crew to escape. (Av Wk, 10/16/67, 19)

October 4: For the Saturn V program NASA purchased nine S-IVB stages from McDonnell Douglas Corp. for $146.5 million, fulfilling requirements for currently approved 15 Saturn V and 12 Uprated Saturn I launch vehicles. Delivery would begin in April 1968 and end in May 1970. This brought total S-IVB contract for both vehicles to $957,-182,093.

McDonnell Douglas also received a $24-million, cost-plus-fixed-fee contract extension for S-IVB launch services at KSC, which increased total value of contract to $34 million. Included were stage receipt, checkout, launch, and launch evaluation. (NASA Releases 67-258, 67-259)

. To commemorate first decade of space age Deputy Assistant Secretary of Interior S. Fred Singer, first Director of U.S. Weather Satellite program, wrote in the Washington Post under novel dateline, "Oct. 4, 2007": "It is now a half century since the first man-made satellite went into orbit around the earth, and an opportune time to examine how space technology and exploration have contributed to the economic development of the United States and to human welfare generally. The effects have been subtle--none of the early spectacular predictions have come to pass: the planets have been explored but not colonized; rockets have become more powerful but rocket transportation has not replaced aircraft and ramjet vehicles." He cited three major technological changes as a result of space program: increased reliance on electronic computer and data processor; a managerial revolution which created highly trained technologist-managers; and increased understanding of natural environment. (Singer, W Post, 10/1/67, F1)

. NASC Executive Secretary Dr. Edward C. Welsh was interviewed by Christian Science Monitor's Neal Sanford. Comparing American and Soviet space budgets, he expressed belief that U.S.S.R. was spending more than twice the percentage of gross national product on space than U.S. "Their [GNP] is less than half of ours. While they are spending about the same amount of money that we are on space it is about twice the percentage of GNP. They are putting a greater priority on space than we are." Soviet space program for 1967 had been "the most active in... [their] history, so far as launches go," he said. "I don't know if they are cutting [their budget] back. They are going along at a good rate...[and] from the progress they are making, we assume they are going along at about the same funding." (Stanford, CSM, 10/4/67, 5)

. News on failures of Soviet manned space flights was "at least in part, 'managed' by Washington," Julius Epstein, research associate at Hoover Institution on War, Revolution, and Peace, wrote in Los Angeles Times: "According to reliable information, the CIA submitted a confidential document to the White House early this year reporting the deaths of at

October 4 (continued)
least 11 cosmonauts in addition to that of Komarov. The Washington decision not to disclose information on...failures was made during the last days of the Eisenhower Administration, presumably to protect intelligence sources." This decision, he said, was recorded in DOD-NASA agreement, Jan. 13, 1961. Mr. Epstein asked that the U.S. give an honest accounting of what it knew about Soviet space losses, so that U.S. losses could be assessed with proper perspective. (Epstein, LA Times, 10/4/67)

October 5: NASA Aerobee 150 sounding rocket launched from WSMR carried NRL payload to 107-mi (173-km) altitude on flight to measure, with EUV heliograph and coronagraph, micrometeoritic particles close to rocket and to take pictures of solar disc. Excellent results were obtained; coronagraph package yielded more than 50 photographs of white-light solar corona from three to 10 solar radii. (NASA Rpt SRL)

. Senate, in approving (71-1) DOT's FY 68 appropriations bill (H.R. 11456), accepted figures of its appropriations committee, where special attention had been given to air and highway safety programs [see Sept. 28]. Despite persistent efforts of Sen. William Proxmire (D-Wisc.), who would have allowed only $1 million for SST development, amount was fixed at $142 million. Senate-approved bill was sent to conference committee. (CR, 10/5/67, S14299-333)

. Astronaut Clifton C. Williams, Jr. (Maj., USMC), was killed during routine flight when his T-38 jet aircraft crashed and disintegrated near Tallahassee, Fla., apparently after he had blacked out from an oxygen deficiency. A Lunar Module specialist and Gemini X backup pilot, Williams was eighth astronaut to be killed in an accident and third to die in a T-38 crash: one other astronaut had died in an air crash; three in Jan. 27 Apollo fire; and one in an automobile accident. He would be buried in Arlington National Cemetery Oct. 9 with full military honors. (W Post, 10/6/67, A1; 10/10/67, B3)

. Displeasure with NASA's administrative officials was voiced by Rep. William F. Ryan (D-N.Y.), member, House Committee on Science and Astronautics, on floor of the House. "NASA continues to evade the serious responsibility of candor," said Representative Ryan, while inserting a series of documents in Congressional Record, including Feb. 15 letter from MSFC Director Dr. Wernher von Braun to S. K. Hoffman, NAA Rocketdyne Div. president, on "...hardware failure, most...traceable to human error, inadequate manufacturing, quality control, or test procedures."

NASA Hq. news conference, called same day by NASA Administrator James E. Webb, accompanied by key NASA and industry officials, responded

October 5 (continued)

to Representative Ryan's charges, and explained that letter to Hoffman had been a case of normal Government-contractor business. Webb pointed out that subcommittees of the House Committee on Science and Astronautics were kept informed each month so that emergency matters could be brought to their attention.

MSFC Director Dr. Wernher von Braun explained how inspection and quality control procedures were continued as rocket engines were processed at contractor's plant and at Government test sites. He stated that NASA-Rocketdyne coordination on matters of inspection continuity and quality control were applied to both the rocket engine as an entity and the rocket engine/launch-vehicle-stage complex.

As trend of news conference discussion turned from quality control to Saturn/Apollo weight problems, M/G Samuel C. Phillips, Apollo Program Director, said the heavier Lunar Module resulted from fire-hazard-type design changes. He stated that LM was now 31,500 lbs against a 32,000-lb control weight. Referring to weight-lifting capability of Saturn V, NASA Associate Administrator for Manned Space Flight, Dr. George E. Mueller, said lunar payload had increased from 90,000 to 100,000 lbs by increasing engine efficiency. Similar improvement was expected in LM's propulsion, which would ease the weight problem. (CR, 10/5/67, H13046-8; Transcript)

. Boeing Co. won seven USAF Industrial Zero Defects Program awards, including one for the largest value engineering change submitted to and approved by USAF--an improved cable connection for Minuteman missile launch facilities which saved USAF $7,749,258. Other awards: Award of Achievement to Boeing's Aerospace Group; two additional awards for value engineering to Boeing's Minuteman organization; and three awards to individual Boeing employees for cost-reduction ideas. (Boeing Releases S-9429, S-9434)

. Brian Todd O'Leary, one of NASA's 12 new scientist-astronauts, was appointed assistant professor of Astronomy Dept., Univ. of Texas. Although flight training portion of astronaut's program would continue for next two years, 30% of O'Leary's time would be available for scientific activities. (AP, B Sun, 10/6/67)

. F-111 aircraft, adapted for use by USAF and USN, was defended by Secretary of the Air Force Dr. Harold Brown in letter to Sen. Stuart Symington (D-Mo.), ranking member of Senate Armed Services Committee's Preparedness Investigating Subcommittee: "There has never been and will never be a major development program that does not provide grist for the critic's mill, and I say this without questioning either the sincerity of the critics or the utility of the function they perform." He professed confidence in "comprehensive testimony" before Congressional

October 5 (continued)
committees and asserted "the F-111 is the aircraft we want and need." Letter was later inserted in Congressional Record by Senator Symington. (CR, 10/9/67, S14445)

October 5-6: JPL engineers conducted series of exercises with NASA's Mariner IV spacecraft (launched Nov. 28, 1964) to demonstrate techniques for controlling Mariner V (launched June 14, 1967) in case its startracker were to fail during Venus flyby Oct. 19. Mariner IV, after traveling more than 1.3-billion mi in solar orbit, successfully responded to commands by breaking lock on its unidentified guide star and locking instead on Canopus; breaking lock on Canopus; maintaining stability by turning on inertial control gyros for first time since December 1964; and pointing high-gain antenna toward earth and using it--with a 20-db signal strength increase at DSN ground stations--for first time since October 1965. Practice of procedures gave JPL engineers confidence in ability to stabilize Mariner V by gyros and to keep it oriented by ground command. Spacecraft would remain on inertial control with high-gain antenna oriented toward earth until completion of planned second midcourse maneuver motor firing and other engineering tests [see Oct. 25-27]. (NASA Proj Off; NASA Release 67-264)

October 6: NASA announced that OGO IV Orbiting Geophysical Observatory, launched from WTR July 28, had passed its primary test objective of collecting scientific data while remaining stable in all three axes for more than 50 days and was continuing to radio data from 18 of its 20 experiments. Unexpected oscillation in 60-ft-long experiment boom, apparently caused by heat from the sun, had been controlled by manually operating satellite's control system and thus expending less control-jet fuel than with automatic control. (NASA Release 67-252)

. Senate, in approving (60-5) NASA FY 68 appropriations bill (H.R. 12474) of $4.7 billion, accepted figures of Senate Committee on Appropriations. Measure would go to conference to reconcile differences between House and Senate versions. NASA FY 68 funding in three categories tallied: R&D Senate appropriation of $3.955 billion was increase of $96.0 million over House appropriation, decrease of $152.1 million from authorization, and decrease of $356.5 million from budget. Construction of Facilities Senate appropriation of $55.4 million was increase of $19.5 million over House appropriation, decrease of $14.6 million from authorization, and decrease of $21.3 million from budget. Administrative Operations Senate appropriation of $628.0 million was decrease of $20.0 million from House appropriation, decrease of $20.2 million from authorization, and decrease of $43.3 million from budget.

October 6 (continued)

Sen. John C. Stennis (D-Miss.), Chairman, Senate Committee on Armed Services' Preparedness Investigating Subcommittee, said: "Ten years ago we did not have the knowledge or the equipment to meet the Russian challenge.... But today...we are at the crossroads of decision as to what our space program is going to be in 1970 and beyond...." Sen. Margaret C. Smith (R-Me.), ranking minority member, Senate Committee on Aeronautical and Space Sciences, stated: "[President's signing of FY 68 authorization bill] clearly signaled a new policy of relegating the space program to a secondary position...." (Testimony; CR, 10/6/67, S14367-82)

. Vexing problem of the direction and period of Venus' rotation had acquired a new dimension in recent ultraviolet photographs, according to an article in Science by Bradford A. Smith of the New Mexico State Univ. Observatory. Smith recounted the history of 60 yrs of visual and spectroscopic observation of Venus that produced inconclusive evidence. Radar observation begun in 1961 by 1967 had produced what was considered firm evidence that the solid globe of Venus in 244 days rotated once in a direction retrograde to that of its planetary neighbors earth and Mars. Recent ultraviolet photos taken at the New Mexico State Univ. Observatory with a new 61-cm reflector indicated that ultraviolet clouds of the Venutian atmosphere rotated retrograde in five days. This large discrepancy between movement of the globe and atmosphere of Venus could only be explained by the existence in the Venutian atmosphere of a persistent and widespread planetary wind system blowing at more than 180 mph, Smith noted. Although earth's jet stream reached such speeds, it was narrow and zonal, in contrast to the massive system that would have to exist on Venus if these observations were correct. (Science, 10/6/67, 114-6)

October 7: Launches of military espionage spacecraft dominated U.S. space program, Soviet scientists Dr. V. Denisov and F. Soluyanov charged in Krasnaya Zvezda. According to the scientists, of 455 U.S. spacecraft launched by mid-1967, 346 were military satellites which the Pentagon "...proposed to use...for reconnaissance on a so-called real-time scale, followed by an immediate transmission of information." Although U.S. "continues to persist that its aspirations are the peaceful utilization of space," they noted, officials "do not hide the fact that NASA builds the scientific-technological foundation for the development of military-space facilities... [while DOD] finances and controls the planning...of space armament." (Miles, P Inq, 10/8/67, 13C)

October 8: President Johnson addressed International Conference on World Crisis in Education, Williamsburg, Va.: "...I would like to suggest...these challenges: How can we use what we already know about educational television to accelerate the pace of basic education for all the children of the world? How can we use modern technology to economize on that most essential and that most needed educational resource: the good teacher?" He added: "If future historians...seek a name for this period in America, I hope they will give consideration to calling it the age of education. If our children's children want to measure what we tried to achieve, I hope they will remember one thing: The American Government in only 3 years multiplied its commitment to education and to health four times over. Congress passed more laws and committed more funds to education and health in the last 3 years than in all previous history." (PD, 10/16/67, 1419-23)

October 9: Sen. Joseph S. Clark (D-Pa.), member of Senate Foreign Relations Committee, speaking on Senate floor called proposed Nike-X ABM system "a very expensive flying 'erector set'" and said that Secretary of Defense Robert S. McNamara was following an unwise course, "militarily, economically, and diplomatically.... Even if we were to spend forty billion dollars or more on a so-called massive system, the resulting increase in our security would be zero.... The result would be a waste of a great deal of money..." at a critical time. He cited three flaws in arguments supporting ABM system: (1) justification based on approaching threat of Communist Chinese nuclear tipped missiles. "We have the capacity to devastate China many times over...and the Chinese know that"; (2) assumption that a thin ABM system would be effective against Communist China for any appreciable time period; and (3) assumption that during so-called safe period in Chinese nuclear development, U.S., behind an ABM defense, would be genuinely safe from nulcear attack. "The inevitable conclusion," Senator Clark noted, "is that the proposed...system simply will not do the job which its proponents say it will do." (Text; CR, 10/9/67, S14413-27)

October 10: Planned launch of Saturn V-Apollo 4 for Oct. 17 was postponed until early November, according to NASA spokesmen at ETR, reported UPI. Troubles with ground support equipment had stalled countdown rehearsal. Once rehearsal was finished, engineers would evaluate results and set date for unmanned launch. (UPI, W Post, 10/11/67, A18)

. President Johnson, in White House ceremony marking entry into force of space law treaty, greeted ambassadors from 13 countries and key U.S. officials and renewed America's offer to cooperate fully with any

October 10 (continued)
nation in exploring planets and solar system; using tracking facilities; mapping the earth; exchanging bioscientific information; and communicating via comsats.

Responding, Soviet ambassador Anatoli F. Dobrynin said: "These [international legal] principles...are aimed at insuring peaceful activities of states in outer space for the benefit of all mankind. We hope that [the treaty] will contribute to the settlement of major international problems still facing the mankind on our planet."

Responding, British ambassador Sir Patrick Dean said: "We welcome [the treaty] all the more because the treaty removes outer space from the effect of the rivalry and dissension between nations.... It is a treaty about...rule of law and the extension of that field within which international law is to regulate the conflicts of interests, which arise between men and nations."

Responding, Secretary of State Dean Rusk said: "The treaty also takes steps to limit and reduce the competition in armaments, a terrible burden on peoples everywhere." He added: "It is evident that men and nations can, in fact, achieve the maturity necessary to embody in binding form their points of agreement, despite political differences in other areas." (PD, 10/16/67, 1425-8)

. R/A Albert C. Read (USN, Ret.), commander of first heavier-than-air aircraft to cross the Atlantic (USN NC-4 seaplane), died in Miami, Fla. He had received the Distinguished Service Medal for the 4,500-mi, 23-day flight he made in May, 1919, from Rockaway, N.Y., to Plymouth, U.K. and in 1965 was elected to the Aviation Hall of Fame in Dayton. (W Post, 10/12/67, B6)

October 11: NASA test pilots Fitzhugh Fulton and Donald L. Mallick flew XB-70 No. 1 to 58,000-ft altitude and 1,581 mph (mach 2.43) in flight at Edwards AFB. Purpose of test: lateral-directional stability, control, and handling qualities at mach 2.35 and 55,000 ft; inlet unstart at mach 2.4 and 57,500 ft; variable nose ramp functional test at mach 1.6 and 38,000 ft, and at mach 1.4 and 32,000 ft. Flight was successful. (XB-70 Proj Off)

. U.S.S.R. successfully launched Cosmos CLXXXI into orbit with 863-km (536-mi) apogee; 668-km (415-mi) perigee; 101.1-min period; and 99.16° inclination. (GSFC SSR, 10/15/67)

. USAF launched unidentified satellite from Vandenberg AFB employing a Thor-Burner II booster. (UPI, P EB, 10/11/67, 2)

October 11: NASA announced organizational changes in preparation for changes that would occur when Deputy Administrator Dr. Robert C. Seamans, Jr., left NASA Jan. 1: (1) General Counsel Paul G. Dembling and Executive Secretary John R. Biggs would report directly to NASA Administrator James E. Webb; (2) Assistant General Counsel for Procurement Matters S. Neil Hosenball would fill new post of Deputy General Counsel; and (3) OMSF Secretariat representative Frank J. Magliato would serve as Special Assistant to the Administrator and direct organization of a Headquarters Communications Center. (NASA Release 67-263)

. Executive Order 11374, abolishing Missile Sites Labor Commission, and transferring its functions and responsibilities to Federal Mediation and Conciliation Service, was signed by President Johnson. (PD, 10/16/67, 1430-1)

. The Netherlands, West Germany, and Belgium would cooperate to develop and sell commercially a fast-breeder nuclear reactor capable of producing its own fuel while generating energy, Clyde Farnsworth reported in the New York Times. The 300-mw prototype, cooled by liquid sodium, would be constructed within six or seven years by an industrial consortium at cost of $100 million, 70% of which would be paid by West Germany. Decision to construct the reactor outside framework of the European Atomic Energy Community (EURATOM), together with France's plan to build her own commercial prototype, represented a failure for the community--France, West Germany, Italy, The Netherlands, and Belguim. "The two competing efforts inside the community...show some of the difficulties Europe faces in trying to pool her industrial skills, narrow the technological gap with the...[U.S.] and fight American commercial penetration," he said. (Farnsworth, NYT, 10/12/67, 69)

. Sen. Henry M. Jackson (D-Wash.) expressed concern about current U.S. defense policy in speech to the Hoover Institution on War, Revolution, and Peace meeting at Stanford Univ. He cited three specific ideas with which he disagreed: (1) exaggerated picture of U.S. as catalyst in Soviet desire to "possess a first-rate military establishment...." Some scientists and defense planners, he said, had "a mirror image interpretation of Moscow's [military] decisions...seeing them as reflex actions" and believed that if U.S. did not act U.S.S.R. would not act; (2) theory that military technology had reached a plateau and stabilized: "Ordinary economic technology is always finding better ways to do things and there is no reason to suppose that military technology will cease in this effort"; (3) seeming trend toward nuclear parity: "...international peace and security depend not on a parity of power but on a preponderance of power in the peace-keepers over the peace-upsetters. Our aim is not...an

October 11 (continued)
unlimited accumulation of weapons...[but] to create and maintain...a relationship of forces favorable to the deterrent of adventurism and aggression." (Text)

October 12: NASA announced that Lunar Orbiter II (launched Nov. 6, 1966) and Lunar Orbiter III (launched Feb. 4, 1967) had been intentionally crashed on lunar surface to free their radio frequencies and that Lunar Orbiter V's orbit had been adjusted in preparation for Oct. 18 lunar eclipse. Orbit adjustment, made by burning spacecraft's velocity-control engine for 41 sec, increased spacecraft's period by 37 min to shorten length of time it would be in darkness during eclipse. Scientists speculated that spacecraft's power system would not be able to survive the expected five-hour dark period without the adjustment. (NASA Release 67-265)

. Vertical probe launched by U.S.S.R. carried instrumented payload to 4,400-km, (2,734-mi) altitude to study "characteristics of ionosphere...general intensity of cosmic rays...doses of radiation for various protections at the time of the flight in radiation belts... [and] density of neutral hydrogen." Equipment and instruments--including a telemetry system--functioned normally. (UPI, P Inq, 10/14/67, 1; SBD, 10/16/67, 239)

. NASA Administrator James E. Webb held press conference on management changes [see also Oct. 1 and 11]: (1) George S. Trimble, Jr., Director of Advanced Manned Missions Program, OMSF, was appointed Deputy Director of MSC. (2) NASA Deputy Associate Administrator for Space Science and Applications Edgar M. Cortright was appointed Deputy Associate Administrator for Manned Space Flight. He would be replaced by Donald P. Heath, Voyager Program Manager. (3) MSFC Deputy Director Eberhard F. M. Rees was named to serve as Special Assistant in Manufacturing Problems to MSC Apollo Spacecraft Program Manager George M. Low.

Discussing space law treaty [see Oct. 10] after making announcements, Webb said it was a valuable further advance of the rule of law into space but noted that laws could be broken. "We have an agreement in the Antarctic...not to introduce military operations or equipment and this has well worked well.... We now have this agreement in space, and...the most important enforcer of these that relate to space technology is momentum and continued development of technology. The forward capability is what in essence has produced coperation when we have had it.... [U.S.S.R.] and other nations must recognize that they're not going to have a monopoly in this field. [Our being]...there is the most important way to make sure we get the benefits of the treaty. Without continued development of this kind I am not sure what the treaty means." (Transcript; NASA Release 67-268)

October 12: All weather landing system (AWLS) was certified by FAA for use on USAF C-141 Starlifter aircraft under 1,200-ft-visibility and 100-ft-minimum decision altitude. Capable of bringing the 316,000-lb fanjet transport to a landing within 12 ft of either side of the runway center line and within 300 ft of either side of a touchdown point AWLS would considerably improve all weather landing capability. Developed by AFSC and FAA and produced by Lockheed-Georgia Co., AWLS would program aircraft's flight path, speed, angle of approach, and attitude; generate and provide data to pilot or autopilot; and be nearly self-sufficient. Ultimate goal of AWLS was to enable aircraft to make totally blind landings when ceiling and visibility both were zero. (AFSC Release 185.67)

. Satellites should be used to enable land-based air traffic control centers to constantly track commercial airliners flying over oceans, urged Pan American World Airways' chief electronic engineer Ben F. McLeod at NATO's Advisory Group for Aerospace Research and Development (AGARD) meeting at New York City. McLeod said that within five to 10 years traffic increases and new aircraft would demand improved air traffic control system with positions of hundreds of aircraft being sent automatically by satellites to ground stations for plotting. (NYT, 10/12/67, 50)

October 13: President Johnson presented Harmon International Aviation Trophies for 1967 to Astronauts James A. Lovell, Jr. (Capt., USN), and Edwin E. Aldrin, Jr. (L/Col. USAF), and Alvin S. White, former NAA test pilot. Lovell and Aldrin were cited for successful Gemini XII mission (Nov. 11-15, 1966) during which Aldrin spent 5 hrs 28 min outside spacecraft. White was cited for mach 3 XB-70 flights. British aviatrix Sheila Scott, scheduled to receive award for her record-setting solo flight around the world in a single engine aircraft, was unable to attend ceremony. (PD, 10/16/67, 1436-7; AP, NYT, 10/14/67, 7)

. NASA announced it had asked Grumman Aircraft Engineering Corp. to deliver second Lunar Module (LM-2) in unmanned configuration, changing earlier plan for manned configuration [see Sept. 28--announcement of this change by NASA Administrator James E. Webb at hearings before Senate Committee on Appropriations' Independent Offices Subcommittee]. With the change, for the Apollo V launch scheduled for early 1968, NASA could provide a backup for the mission and launch without a wait for modifications. In event backup for LM-2 were not needed, manned launch would make use of LM-2 at later date. (NASA Release 67-266; Transcript)

. NASA Deputy Associate Administrator for Space Science and Applications (Engineering) George Hage was named Deputy Director (Engineering) of the Apollo Program, OMSF. (NASA Ann, 10/13/67)

October 13: Inquiry into economic impact of building SST was made by Dael Wolfle in Science editorial. Congressional arguments on whether to build SST "illustrate why members of Congress want to increase congressional competence to assess the consequences of technological developments and proposals.... What Congress needs in deciding about the SST or other technological matters is essentially what it needs in deciding about taxes, military affairs, education, or other matters with which it deals: ability to ask the right questions and ability to evaluate critically the information it receives from advocates and opponents of proposed actions." (Wolfle, Science, 10/13/67)

. In its fourth year of full operation ESRO was entering a more expensive and ambitious phase and consequently was encountering financial, political, and organizational difficulties, John Walsh reported in Science. ESRO was currently appraising its eight-year program and seeking ways to coordinate its activities with ELDO, European Conference on Communications Satellites (CETS), and new European Space Conference. According to 1962 convention which became effective in 1964, ESRO was to have launched 300 sounding rockets and 10-12 satellites within eight years under $300-million budget. Although ESRO council was empowered to adjust budget authorization in response to major scientific and technical developments, it lacked unanimity necessary for change. As a result, Walsh noted, scheduled number of satellites--including $170-million Large Astronomical Satellite (LAS)--would probably not be launched. Expenditures for buildings and equipment for ESRO's new four station satellite tracking, telemetry, and telecommand network, and its five main research installations had been particularly heavy. European Space Technology Center (ESTEC), for example, responsible for applied research and payload development, had a 456-man staff--nearly half of total ESRO staff--which was expected to reach 1,000 by the end of 1967. In addition to financial problems caused by expansion, Walsh said, ESRO had to overcome a sensitivity to what national aerospace industries would get back in relation to national contributions; differences over selection of projects; and lack of unity and coordinated effort. Differences of opinion between larger countries such as U.K., Germany, and France, which contributed 23.13%, 24.31%, and 20.17% respectively to ESRO budget, and smaller countries such as Denmark, which contributed 2.15%, had to be resolved before a real sense of purpose could be acquired, Walsh said. "ESRO until now has been primarly an agency providing technical services and support for university scientists who prepare actual experiments. As experiments grow more complex, more work will be done in ESRO labs and by industry," and new dimensions would be added to its tasks. (Walsh, Science, 10/13/67, 242-4)

October 14: Saturn V's countdown rehearsal was completed; final flight preparations would be completed for scheduled launch in about three weeks, reported UPI. (UPI, W Star, 10/14/67, A3)

. Apollo spacecraft would carry two fire extinguishers, designed and built for NASA by Southwest Research Institute, the New York Times reported. Shaving-cream-like foam from new extinguishers would provide fire protection for astronauts. Extinguishers would weigh about eight pounds, measure nine inches long with five-inch diameter, and would have removable safety pin and pistol-type grip with thumb button for release of foam. (NYT, 10/15/67, 29)

October 14-15: Three NASA Nike-Cajun sounding rockets--first in series of five three-rocket launches--were successfully launched from Natal, Brazil, in GSFC program to isolate effect of changing sun angle on mesospheric temperature structure over six-month time period. Altitude would be computed by sound arrivals in track-through-grenade-soundings method. Of 19 grenades, 18 ejected and exploded. (NASA Rpt SRL)

October 15: A 2,000-mph USAF SR-71 reconnaissance aircraft on routine training flight from Beale AFB, Calif., crashed near Lovelock, Nev. Its two crew members ejected safely. Aircraft, built for USAF by Lockheed Aircraft Corp. as successor to the U-2, was third SR-71 to crash on routine flight; others had crashed Jan. 25, 1966, and April 13, 1967. (AP, NYT, 10/27/67, 41)

. JPL announced development of double vacuum chamber, designed by JPL's James B. Stephens, to simulate extreme effects of interplanetary space on spacecraft. Called Molsink (molecular sink of outer space), chamber was expected to determine what happened to paint, components, and even microorganisms on spacecraft. The eight-foot-diameter chamber would be capable of capturing 99.97% of all condensable molecules emanating from test item by freezing the molecules to the walls at -400°F with super-cold helium gas. Conventional vacuum chambers had not been able to pump, or capture, more than half of gas molecules flying off test item. During typical space flight, particle bombardment, radiation bombardment, and friction dislodged minute bits of hardest-finished surfaces, causing equipment breakdowns. Space scientists believed Molsink chamber would provide reliable tool to measure and counteract problem of spacecraft out-gassing. In testing with Molsink chamber, long periods would simulate actual flight time of spacecraft to planets--four months to Venus, seven months to Mars, for example. The chamber was expected to be fully operational early

October 15 (continued)
in 1968 when testing would be stepped up for NASA's Mariner Mars '69 exploration program. (JPL Release 459)

October 15-31: Surveyor V responded to commands on Oct. 15. Spacecraft had been in hibernation for its first lunar night that had begun Sept. 24, and had survived in fair condition. TV camera had weak video level; alpha-backscattering instrument was noisier; and thermal control was reduced in Compartment A. Thermal data, which exhibited effects of lunar eclipse on Oct. 18 (03:58-08:59 EDT) would be analyzed for both engineering and scientific implications.

Local sunset for second lunar day occurred on Oct. 23. Spacecraft operating time from turn-on command until second sunset was 232 hrs. Total of 1,043 TV pictures were obtained. By sunset Surveyor V had been configured for hibernating through second lunar night. Estimates were that engineering interrogations and compartment heating would be discontinued Oct. 31. (NASA Proj Off; UPI, W Post, 10/16/67, A3; AP, NYT, 10/17/67, 9)

October 16: Cosmos CLXXXII was successfully launched by U.S.S.R. Orbital parameters: apogee, 355 km (221 mi); perigee, 210 km (131 mi); period, 89.9 min; and inclination, 65°. (GSFC SSR, 10/30/67; NYT, 10/17/67, 12)

. FAA issued forecast of aviation activity at 22 large air transportation centers and selected airport facilities required to service increases in air activity. By 1980, operations (takeoffs and landings) were expected to increase by 270%; air passengers by 433%; air cargo on scheduled airlines by 1,400%; and general aviation (non-airline) aircraft by 146%. (FAA Release 67-77)

. U.S.S.R. had invited U.K. to help track its Venus probe, Venus IV, in telegram from Mstislav V. Keldysh, President of U.S.S.R. Academy of Sciences, to Sir Bernard Lovell, Director of Jodrell Bank Observatory, reported Washington Post. U.S.S.R. did not furnish code to signals; Sir Bernard had said that tapes of signals would be sent to Moscow. Keldysh's telegram referred to "this experiment's extraordinary importance and significance for mankind." Sir Bernard speculated that U.S.S.R. might attempt softlanding on planet Venus. Not since launch of Venus I in 1961 had the Soviets requested British working assistance. (Schmidt, NYT, 10/17/67, 13; W Post, 10/17/67, A17)

. Three military reasons why U.S.S.R. used one-orbit spacecraft in Cosmos series during period from Sept. 17, 1966, through Aug. 8, 1967, when seven were launched, were suggested by Phillip J. Klass in Aviation Week. Launches tested: (1) missile defense radars and evaluated

October 16 (continued)
ICBM penetration aids; (2) very-long-range ICBM attacking from south; or (3) orbital weapon. Other reasons had been noted--including test of recovery systems for Soyuz manned spacecraft. In all cases, a principal object reentered after one orbit and other objects after a day or two. Soviets had never mentioned orbital period nor had they explained low perigee of 90 mi--an indication spacecraft would remain in space for only one orbit or less.

Orbital weapon theory was also suggested by Evert Clark, in New York Times: "Most analysts...now believe the flights are exploring the techniques of bringing down a nuclear warhead from an orbiting platform." Such tests would not violate space law treaty which became effective Oct. 10 because treaty did not prohibit engineering tests necessary to station weapons in orbit. Nor would it prohibit nuclear armed flights that were less than one full orbit, as these were.

Schedule for series of seven launches had been: two in 1966--Sept. 17 and Nov. 2, both unannounced--and five in 1967--Cosmos CXXXIX Jan. 25, Cosmos CLX May 17, Cosmos CLXIX July 17, Cosmos CLXX July 31, and Cosmos CLXXI Aug. 8. First two in series had exploded into large numbers of fragments during day of launch. (Klass, Av Wk, 10/16/67, 26-7; Clark, NYT, 10/17/67, 1)

October 17: Maj. William J. Knight (USAF) flew X-15 No. 3 to 3,818 mph (mach 5.18) and 277,000-ft altitude, becoming fourth USAF X-15 pilot to meet 264,000-ft-minimum-altitude requirement for USAF astronaut rating. Purposes of flight: (1) ARC boost guidance system evaluation; (2) solar spectrum measurement; (3) micrometeoroid collection; and (4) ultraviolet plume and tip-pod camera evaluation. (X-15 Proj Off; FRC X-Press, 10/20/67, 1)

. The five-out-of-five successful missions of $200-million Lunar Orbiter project to photograph moon to aid in selecting Surveyor and Apollo landing sites and to contribute to scientific knowledge of moon were reviewed at NASA Hq. press conference. Photographic data provided by Lunar Orbiters I, II, and III and Surveyor I resulted in selection of eight candidate sites. Lunar Orbiter IV provided basis for extending cartographic grid system for front-face mapping around to moon's hidden side by photographing eastern limb areas. Lunar Orbiter V photographed scientifically interesting areas on moon's front side, completed farside coverage, and provided supplementary photography of potential Apollo landing sites.

Apollo Program Director, M/G Samuel C. Phillips, described accuracy needed for Apollo landing: "...approaching on a pretty flat trajectory at about 30 miles from the landing site...details of

October 17 (continued)

the topography and the radar return which is coupled into the automatic control and landing system [must be known]." In planning details of approach and landing maneuvers, Phillips said: "...we have learned a very great deal from Orbiter about the rather unusual light conditions and the effect of light reflections from the lunar surface under various angles...."

Harold Masursky, USGS, explained similarities between earth and moon shown by Lunar Orbiter photographs: "...apparently the earth and the Moon are very similar in their distribution of high and low ground." Hopefully, he said, "...by examination and comparison of...geologic plot with the selenodetic information...[from] the Orbiter series, we will be able to plot the geopotential field...and tie it in with geology.... By studying the Moon we know that it has a long, complex geologic history, that many of the same kinds of things that happen on the earth happen on the Moon. We can now play these two against each other, compare their similarities, contrast their differences, and perhaps be able to arrive at a greater understanding of the fundamental processes that affect the earth."

Strange moon features looking like watercourses might be dry-gulch arroyos, NASA cartographer L. Harold Spradley said. Because watercourses had originated in volcanic craters and carried "fluidal materials," volcano's output--possibly slurry of ash and water--would exist long enough to cut its way through dry lunar surface material. Scientists agreed that orthodox existence of water on "the airless moon" was improbable.

Clifford Nelson, LaRC Lunar Orbiter Project Manager, described results of experiments: "...density distribution [very nearly homogeneous] in the moon now seems to be resolved [and]...center of mass of the moon is displaced toward the earth from the center of its geometrical figure, a situation which would have interesting scientific implications as to the stability of the moon and its origin and history." Meteoroid penetration rate "in the region covered by lunar orbiter spacecraft is less than one-half the rate in the near earth environment...." Referring to status of MSFN's use of Lunar Orbiter spacecraft, he said: "...all 13 stations have successfully tracked and communicated with [spacecraft, and]...orbit determination programs... in the initial stages of checkout...will continue with Lunar Orbiter V."

NASA Associate Administrator Dr. Homer E. Newell stressed overall significance of Lunar Orbiter program: "Before the first Lunar Orbiter mission this country had never placed spacecraft into orbit about any other celestial body other than the earth. In all five...missions, the spacecraft were not only placed into initial orbits as desired, but then the orbits were changed in accordance with a plan...set up beforehand, in...a precision type of operation.... Lunar Orbiter and its companion, Surveyor, have shown that we can use sophisticated technology in complicated spacecraft for automated missions to other

October 17 (continued)
bodies of the solar system. And it is this kind of capability that we will be using again and again as we continue the exploration of our solar system." (Transcript)

. NASA's Mariner V would fly within 2,500 mi of planet Venus at 1:34 pm EDT, Oct. 19, at communications (direct) distance of about 49 million mi from earth, NASA announced. Launched from ETR June 14, spacecraft would have traveled about 217 million mi in its arching trajectory. Scientists and engineers hoped their instruments would record precise data on planet's atmosphere, ionosphere, temperatures, and perhaps even surface qualities. As Mariner V approached Venus, its scientific instruments would begin measuring planet's magnetic field, charged particles, gases present in upper atmosphere, and radiation levels. Spacecraft's flight path would curve behind Venus and would vanish from view of tracking stations on earth. Just before spacecraft went behind planet (as seen from earth) its radio signals would pass through atmosphere of Venus. Effect of Venutian atmosphere on Mariner V's radio signals would be measured, thereby providing measure of density of planet's atmosphere. Current scientific theory on density ranged from five times earth's atmosphere to several hundred times. Density measurement by occultation was one of prime objectives of spacecraft's flight.

Since launch of spacecraft, engineering and science subsystems had performed as planned. Master timer had commanded Canopus cone angle update as scheduled on Aug. 24, Sept. 10, Sept. 26, and Oct. 10; timer had also commanded spacecraft transmitter to switch to high-gain antenna on Oct. 2. Encounter sequence would be initiated by command from DSN station in Australia, at 10:49 pm EDT, Oct. 18. (NASA Proj Off; NASA Releases 67-260, 67-267)

. FAA adopted new rule banning unauthorized aircraft from designated manned and unmanned spaceflight recovery areas to prevent interference with aircraft and pararescue personnel participating in recovery operations. Areas selected by NASA and DOD and effective dates would be published prior to launch in a Notice to Airmen. (FAA Release 67-78)

. NASA Administrator James E. Webb reviewed NASA-university relationships at dedication of Univ. of Illinois' Coordinated Science Laboratory building in Urbana, Ill.: "During NASA's first year of operation...[$3 million] was invested in research at universities.... The second year, approximately $6 million went to universities, and the third year about $14 million...[primarily for] solution of immediate problems...." Appraisal of program in 1961 concluded the universities were already making significant contribution to the space

October 17 (continued)

program, but that with the right kind of help they could do more for themselves and for NASA. Expansion included support of research, construction of facilities, and establishment of graduate fellowships, until program reached peak in 1966 with 10,600 campus participants. Today, however, need was "to reduce expenditures for research, to preserve at minimum cost the essential strength needed for the future, and to increase the multidisciplinary flux that will magnify the values the nation can derive from the activities we can support." To find the best ways of reducing the program, he said, NASA had formed a "special task force to evaluate all our relationships with the academic community and to come up with specific recommendations as to least harmful methods we can use. There is no longer any doubt that NASA's university support programs will have to be redefined quite drastically in some areas." Since much of the program was funded in three one-year steps, this would help spread the impact over a longer time period. Ph.D. candidates now holding NASA grants would be able to obtain their degrees. Looking to the future, Webb urged the universities to think, reorganize, and work in interdisciplinary groupings. "The development of a few university teams working together across the traditional disciplines, combining the best efforts of technology, the social sciences and management capability which they have created and which make them the best available source of trusted information in our society can write a new chapter of history of problem solving in this nation." (Text)

. Progress in F-111B aircraft development was discussed by Assistant Secretary of Navy (R&D) Robert A. Frosch, at 1967 Electronics and Aerospace Systems Technical Convention, Washington, D.C. "...we are convinced that in its primary air defense interceptor role the F-111B, equipped with the PHOENIX airborne missile control system, and firing multiple shots of the long range PHOENIX air-to-air missile, represents the finest fleet air defense system available in the immediate future." He further stated: "...aircraft will probably not meet all of the initial specifications and the contractor will have to accept some responsibility for this lack. It is, of course, not unusual for a military aircraft that uses advanced state-of-the-art to fail to meet some of the specifications, the real question is whether it meets military needs." He added: "...we find that it meets our fleet air defense requirements better than any competing system available for study." (Text)

. F-5 supersonic fighter aircraft manufactured by Northrop Co. could be sold to Latin American governments, Covey T. Oliver, Assistant Secretary of State for Inter-American Affairs, was reported to have told key members of Congress. Because of shortage of pilots, facilities, and

October 17 (continued)
financial resources, only five nations would be interested--Peru, Brazil, Argentina, Chile, and Venezuela. Initial Congressional reaction was reported to have been favorable, the decision being displayed as no change in U.S. policy. State Dept. informants, however, conceded that recent reports of Peru's negotiations with France on purchase of 12 Mirage V jet fighters had a major effect in hastening DOD's and State Dept.'s action. (Welles, NYT, 10/18/67, 1)

October 18: NASA's OSO IV (OSO D) Orbiting Solar Observatory was successfully launched from ETR with three-stage Thor-Delta booster to study the sun and its influence on earth's atmosphere. Orbital parameters: apogee, 358.8 mi (577 km); perigee, 336.7 mi (542 km); period, 95.8 min; and inclination, 32.9°. Fourth of eight spacecraft in NASA's OSO program to provide direct observation of the sun during most of an 11-yr solar cycle, OSO IV weighed 599 lbs, carried nine experiments, was designed for a six-month lifetime, and had two main sections: the wheel (lower) section provided stability by gyroscopic spinning and housed the telemetry-command equipment, batteries, electronic controls, gas spin-control arms, and five experiment packages; the sail (upper) section was oriented toward the sun and contained solar cells and solar pointing experiments.

Primary purpose of OSO IV was to obtain high-resolution spectral data from pointed solar experiments during major portion of one solar rotation and adequate operational support of spacecraft subsystems--including solar disk raster scans--to carry out acquisition of these scientific data. Secondary objective was to obtain useful data from nonpointed experiments and from pointed experiments during more than one solar rotation. Experiments, designed to continue and extend work of OSO I (launched March 7, 1962), OSO II (launched Feb. 3, 1965), and OSO III (launched March 8, 1967) by collecting data on solar x-rays, gamma rays, ultraviolet radiation, and other solar activity, were provided by two American and two British universities, one U.S. Government agency, and one private company. OSO IV was first in series to carry foreign experiments and second (OSO II was the first) capable of scanning entire solar surface by means of a Solar Ultraviolet Scanning Spectrometer which could record a "picture" (digital number) of the sun and transmit it to receiving stations. Spacecraft also had an improved ground-control system which permitted it to receive up to 140 different commands--compared to 10 for OSO I, 70 for OSO II, and 94 for OSO III. Project officials at GSFC turned on two experiments and reported that satellite spin rate, power level, charge rate, and temperatures were normal and that both tape recorders were operating; all experiments were fully operational by Oct. 25. OSO program was managed by GSFC under OSSA direction. (NASA Proj Off; NASA Release 67-262)

October 18: U.S.S.R.'s Venus IV planetary probe (also designated Venera IV) entered atmosphere of planet Venus at 12:34 am EDT and ejected instrumented capsule intended for softlanding on Venus. After aerodynamic braking, automatic parachute system provided gradual descent through 15-mi dense, hot, windy atmosphere, and capsule made [purported] softlanding at 2:08 am EDT. Mstislav Keldysh, President of Soviet Academy of Sciences, later presented scientific proof for softlanding [see Oct. 30]. Launched June 12, the 2,438-lb Venus IV had traveled trajectory of more than 210 million mi; 49 million mi would be covered by transmitted signals from capsule to earth antennas.

According to Soviet scientists, atmosphere as recorded by instrumented capsule, had almost whole carbon dioxide composition with about 1.5% oxygen and water vapors; no significant traces of nitrogen; and a temperature range of 104-536°F. Reports indicated no noticeable magnetic field and no radiation belt, but detectable weak hydrogen corona. "Because Venus rotates so slowly around its axis [purported to be once in 244 earth days] half the planet is cold," said Soviet scientist Josif Shklovski. Because the other half heated to "monstrous temperature," he said surface of Venus would appear to be "a dry hot desert." He noted that temperature extremes would cause constant winds on Venus "of about 450 mph" [accounting for large amount of drift of capsule during descent].

Moscow news reports from Izvestia and Tass said: Venus IV's mission had been accomplished and instruments had ceased functioning after radioing data from softlanding site on heat, pressure, and carbon dioxide hostile to most forms of life; mother spacecraft burned in Venus' atmosphere. Some reports did not claim softlanding. Soviet astronomer Vitali Bronshtein's claim that radio contact was being maintained with instrumented capsule was unconfirmed. Also, cessation of signals from instrumented capsule received varied explanation from international sources. Tass reported antenna of package had failed to point in the right direction and that package's bulk had blocked direct contact with earth. Jodrell Bank Observatory Director Sir Bernard Lovell expressed doubt that any electronic device could withstand high temperatures on Venutian surface. (Friendly, W Post, 10/18/67, 1; Kamm, NYT, 10/19/67, 1; Bishop, WSJ, 10/19/67, 4; AP, B Sun, 10/20/67; AP, W Star, 10/22/67, A3; SBD, 10/24/67, 283-5)

. U.S.S.R. launched Cosmos CLXXXIII into orbit with 212-km (132-mi) apogee; 145-km (90-mi) perigee; 89.9-min period; and 49° inclination. Equipment and instruments functioned satisfactorily. (GSFC SSR, 10/30/67; UPI, NYT, 10/20/67, 40)

October 18: A total lunar eclipse began at 3:10 am EDT, during which the earth cast an almost 900,000-mi-long moving shadow on its journey around the sun. A meteor shower--the Orionids--added to the meteorological event. Weather permitting, these events would have been visible over most of North America. Schedule for meteor shower was Oct. 16-21.

During eclipse infrared studies of lunar soil were made by MSFC Space Sciences Laboratory and Univ. of Georgia research team. Perfect weather at Athens, Ga., permitted 20 traverses of moon during the eclipse. Using university observatory equipment--infrared radiometer attached to large telescope--to look for volcanic hot spots, crater Tycho was seen against cooler background during eclipse. The more general radiation pattern would be heat being radiated from lunar surface, including anomolies. Results were highly successful, reported Space Sciences Laboratory's deputy director Gerhard B. Heller. (W Star, 10/15/67, B6; McCandlish, NYT, 10/19/67, 49; MSFC Release 67-214)

. Communist Party and Soviet government leaders hailed Venus IV's instrument package landing on planet Venus as honor to Bolshevik Revolution's 50th anniversary, Nov. 7. (Shub, W Post, 10/19/67, A9)

. California study of education in urban poverty communities and accompanying social problems was made by Lockheed Missiles & Space Co. and California State Dept. of Education's Office of Compensatory Education. Systematic Effort to Analyze Results (Project SEAR) used systems approach and aerospace techniques in studying impact of compensatory education on students, parents, and communities. (Lockheed Release)

. Government authority to ground private planes during poor weather would lead to a substantial reduction in accidents, Flight Safety Foundation President M/G J. D. Caldara (USAF, Ret.) told fourth biennial convention of National Assn. of Air Traffic Specialists in Atlantic City. Study of 5,300 general aviation accidents in 1965 showed 250 charged to pilots who took off, lost control, or continued visual flight in poor weather. (AP, NYT, 10/19/67, 81)

. U.S.S.R. and North Vietnam signed agreement to establish a satellite tracking station in North Vietnam and cooperate in synchronic photography of earth satellites. (Reuters, NYT, 10/19/67, 9)

October 19: NASA's Mariner V made successful flyby of planet Venus to obtain scientific data on nature and origin of planet. Distance from surface of Venus at time of closest approach--estimated at 1:39:21 pm, EDT--was 2,544 mi (4,094 km). Launched June 14, Mariner V was 49 million mi from earth at time of flyby.

October 19 (continued)

All scientific instruments and spacecraft subsystems performed properly during encounter sequence, as they had throughout flight. Sequence of 15 significant events during encounter, occultation, closest approach, exit occultation, and return to cruise mode, had begun at 10:49 pm EDT Oct. 18, and had ended at 3:55 am EDT Oct. 23. Full recorded account of experiments performed by Mariner V--first and second playbacks--exhibited clear and steady signals; JPL scientists obtained meaningful scientific data from all of spacecraft's experiments.

On Oct. 31 NASA's Program Manager for Mariner V, Glenn A. Reiff announced results of experiments: solar plasma probe and magnetometer showed existence of solar wind/Venus interaction; trapped radiation found no energetic particles or radiation belts, and found magnetic moment less than 1% of earth's; S-band occultation estimated carbon dioxide and found ionospheric observations on day-time side indicated electron density; dual-frequency radio propagation provided data on night-time and day-time ionosphere; celestial mechanics indicated Venus mass as 81.50% of earth's mass, and astronomical unit determination agreed with radar computations; and ultraviolet photometer found hydrogen corona comparable with that of earth, detected no oxygen, and found night airglow to be very faint ultraviolet emission detected at dark limb of planet--probably result of chemical reactions, particle bombardment of electrical discharge. Spacecraft's mission also was to accumulate data on interplanetary environment during period of increased solar activity.

Comparison of data obtained from Venus IV and Mariner V flights showed variations: JPL scientists reported definite magnetic activity from weak magnetic field, while Soviets reported no sign of field apart from slight indication before closest approach; JPL reported Venutian atmosphere thinner than that in Soviet report; JPL said Venutian clouds contained hydrogen and did not confirm Soviet announcements on carbon dioxide; and no immediate information from either confirmed or denied present beliefs concerning rotation of Venus and its atmosphere [see Oct. 6].

After return to cruise mode, Mariner V would resume report on interplanetary space weather. By end of November 1967, when earth was no longer in direction of high-gain antenna pattern, communications would be terminated; however, three-month-duration communications would be possible during next five years. (NASA Proj Off; Wilford, NYT, 10/20/67, 1; Sullivan, NYT, 10/22/67, 12)

. Cone-shaped RAM C-1 spacecraft was successfully launched from NASA Wallops Station by four-stage Scout booster at 1:33 pm, EDT. On termination of eight-minute ballistic flight, impact occurred 725 mi downrange about 150 nm northeast of Bermuda. Spacecraft, 15 in long and 26 in in diameter with 12-in-dia hemisphere nose, plunged back

October 19 (continued)
into earth's atmosphere at 17,000 mph in flight test to study methods for preventing loss of radio signals from reentering spacecraft. No recovery was attempted.

NASA's Project RAM (Radio Attenuation Measurement) was to measure effectiveness of water addition concept in maintaining communications during reentry. Additional experiments were also included to evaluate X-band telemetry system as a means of overcoming blackout; study plasma and ablation effects on antenna performance; measure attenuation as a function of signal frequency; and obtain measurements of ion densities in the flow field of the spacecraft in the presence of ablation and water injection.

Water was injected at three points on spacecraft--on nose cap and on each side--with nitrogen gas as presurizing agent. Ion density changes, due to varying amounts of water injection, were measured. X-band frequency experiment showed blackout period of communications was reduced by 6 sec, using water-injection method.

Series of Arcasonde meteorological rockets were launched from Bermuda before and after RAM C-1 experiment to collect upper atmosphere density, temperature, and wind data. (NASA Proj Off; NASA Release 67-261; WS Releases 67-33, 67-34)

. NASA Aerobee 150 sounding rocket launched from WSMR reached 118-mi (182-km) altitude in flight to observe profile of solar hydrogen Lyman-Alpha line and to measure radiation in relation to earth's planetary hydrogen. Experiments performed satisfactorily, but range schedule delay caused loss of coordination with Mariner V experiment. (NASA Rpt SRL)

. USAF F-111A aircraft crashed near Bowie, Texas; two crew members ejected safely in detachable cockpit. According to General Dynamics Corp., pilots David Thigpen and Max Gordon, aircraft had faulty hydraulic system which made maneuvering impossible. Crash was second for USAF test model; first had crashed Jan. 19, killing one crew member. USN test model (F-111B) had crashed April 21, killing both pilots. (AP, W Star, 10/20/67, A9; UPI, W Post, 10/20/67, A7)

. Injectors for Apollo Lunar Module's ascent engine had performed in over 100 test firings at Rocketdyne Div.'s laboratory near Los Angeles, the company reported. Injectors had returned automatically to stable combustion after explosive charge was set off to deliberately create rough combustion in several tests. These injectors were developed as backup to the original injectors after rough combustion was noted in test firings. Three designs would be continued through feasibility testing; then the best design would be chosen for development. (Rocketdyne Release)

October 19: Great Britain's Ministry of Technology had released funds to build 400-ft, fully-steerable, dish radiotelescope, said Dr. H. C. Husband, British delegate to international conference on large antennas for radioastronomy held in Cambridge, Mass. New telescope would be world's largest--almost twice as large as 210-ft Goldstone model. Dr. Husband's announcement had come just one day after announcement by West German delegate, Prof. O. Hachenberg of Univ. of Bonn, that West Germany planned to complete a 330-ft dish in 1969. (W Post, 10/20/67, A7)

. Congressional role in space program and possibilities for improved international cooperation in space, discussed in General Electric Forum interview by Rep. Olin E. Teague (D-Tex.), Chairman of House Committee on Science and Astronautics' Manned Space Flight Subcommittee, was inserted in Congressional Record by Rep. W. J. Bryan Dorn (D-S.C.). Congress' role, Representative Teague said, was "to examine periodically how well the work is being done and what return we are gaining in new knowledge and practical utility from the space program.... Each decision...involves the setting of a relative order of priorities for the use of the Nation's resources for science and technology." Expressing conviction that international cooperation in space would increase, he noted that there was "great potential in the use of space for human betterment.... More than 60 per cent of the world's people, for instance, are protein-deficient today. If, by earth orbital surveys, in cooperation with the less-developed countries, we can improve that situation, our entire space program will have paid for itself many times over." (GE Forum, Autumn 1967, X/3, 11-12; CR, 10/19/67, H13719-20)

. Czechoslovokian magazine Vencerni Praha reported that unidentified flying objects (UFOs) had been sighted over Prague in 1130 and 1142. Early sightings, described by Prague historians as "fiery flying dragons," were later followed by frequent sightings in 18th and 19th centuries identified by one contemporary scientist as "a mass of damp particles, ignited by friction and static electricity." (AP, NYT, 10/19/67, 83)

October 20: NASA contract awards: (1) IT&T Federal Electric Corp. received a $4.6-million, one-year, cost-plus-award-fee contract extension for logistical and technical information support services at MSC; (2) IBM Federal Systems Div. was selected for negotiations on a three-month, $998,000 contract extension for computer programming and engineering support services at GSFC's Real Time Computer Complex (RTCC); and (3) Bendix Corp. was selected for negotiation of a $4,500,000, 18-mo, cost-plus-incentive-fee contract for "design, development,

October 20 (continued)
qualification, and delivery of long-duration cryogenic gas storage tanks" for first 56-day manned Apollo Applications (AA) flight. Contract award would not be made until NASA's FY 1968 appropriation and expenditure levels were established. (NASA Releases 67-269, 67-270, 67-271)

October 22: Seventh Molniya I comsat was launched by U.S.S.R. into orbit with 39,740-km (24,693-mi) apogee; 456-km (283-mi) perigee; 11-hr 54-min period; and 64.7° inclination. Tass said comsat would form part of new system to relay telephone, television, and telephone signals. (GSFC SSR, 10/30/67; AP, NYT, 10/24/67, 31; SBD, 10/24/67, 287)

. Informed U.S. military sources said U.S.S.R. had now been convinced the aircraft carrier would be vital to international conflicts of today, and was even now building its first aircraft carrier, a "baby flattop," reported UPI. Adm. Ephraim P. Holmes, Supreme Allied Commander, Atlantic, and his chief of staff, V/A William E. Ellis, said little was known of specifications but believed it would have long-range capabilities. (Oestreicher, UPI, W Post, 10/23/67, A3)

October 23: NASA announced that primary mission objectives of Biosatellite II (launched Sept. 7) had been accomplished. Biological experiments had been conducted to investigate synergistic and antagonistic effects of weightlessness and controlled gamma radiation aboard attitude-controlled spacecraft. Spacecraft recovery--essential to success--had been completed as planned. Environmental control of capsule and experiment packages had kept organisms alive while radiation source was exposed for flight duration. Dr. Rudolph H. T. Mattoni, principal investigator for bacteria experiment, said bacteria had increased 20 to 30% faster in weightless condition. He concluded: "...cellular turnover may be higher in man" during weightlessness and could be harmful to astronauts during long-duration space flights. He suggested that if further research proved growth of human cells to be faster in weightless state, future spacecraft might have to be equipped with some form of artificial gravity or astronauts might have to carry drugs to prevent too-rapid turnover of their body cells. Since the 45-hr experiment with bacteria equalled many years of human life, this would not be significant on flights of a few weeks or even a few months. The pepper plant experiment showed abnormal growth, indicating that plant leaves also depend on gravity. Other experiments did not show significant change and were still being analyzed. (NASA Proj Off; AP, NYT, 10/15/67, 46)

October 23: Passage of P.L. 90-112, DOT's FY 68 funding, provided general funds of $1.5819 billion--including $142 million for SST development and $70 million for advanced-funding airport grants [see Sept. 28 and Oct. 5]. (P.L. 90-112)

. House adopted conference report on amended NASA FY 68 appropriations bill (H.R. 12474) and sent report to Senate, which adopted report, leaving two amendments in disagreement. Senate had added $96 million to original House bill for R&D on Voyager and Nerva programs. House approved only $10 million of Senate's increase on R&D item; insisted on its original approval of $35.9 million for construction facilities for Voyager and Nerva programs, turning down Senate boost of $19.5 million; and approved Senate-voted $20 million cut for NASA's operations. (CR, 10/23/67, H13785-93; S15142; NASA LAR VI/115)

. Rep. James G. Fulton (R-Pa.), ranking minority member of House Committee on Science and Astronautics, during debate on NASA appropriations bill on floor of House, reviewed Communist China's progress in space, atomic, and nuclear sciences: "China is now proceeding with the development of a rocket with nuclear propulsion. The Chinese nuclear rocket program is based upon a nuclear reactor through which passes liquid hydrogen that is stored in the rocket. This same fuel...is also used as a coolant for the nozzle of the rocket."

Representative Fulton described the scope of Communist Chinese research and development programs: "They are proceeding with the development of a sounding rocket called Caditi...[and] telecommunications satellites....

He explained that: "...[they believe] that in order to operate successfully in space, big booster power, high energy fuels, and nuclear propulsion are necessary. The University of Nanking...is conducting training courses in various applications of rocket programs. The Chinese space research center of Sinkiang now has programs in the study of materials necessary for space experiments. In addition, it should be seriously considered that the Chinese rocket institute--Balon Roditi--is interested in the development of rockets 'for all purposes.' This, of course, includes military as well as peaceful uses. Peking is not a signatory to the recent peace treaty for the peaceful uses of outer space....

"The nations of the West, including Russia, should not underestimate Chinese competence in these matters and the pace of their research and development programs. The U.S. Government and the American people must be alerted to the swift progress of the Red Chinese nation in space research and development, high energy propulsion, and large boosters...[and they] must realize the tremendous advances being made in the Red Chinese nuclear research field.... It is my belief and prediction that the [Communist] Chinese will orbit...[their] first...satellite by January 1968...." (CR, 10/23/67, H13785-93)

October 23: U.S.S.R.'s intensified study of near-earth environment indicated their scientists planned long-duration manned orbital flights, reported Aviation Week. Two investigations were cited: Cosmos CLXVI, launched June 16, near-earth radiation study for protection of future cosmonauts in orbit during high sunspot activity; and "vertical cosmic probe," reaching altitude of 2,734 mi on study of upper atmospheric layers, ionosphere, and near-earth space. The "vertical cosmic probe," launched Oct. 12, provided Soviets with information on electron and positive ion concentrations, general intensity of cosmic rays, and radiation doses through various types of protection during flight within radiation belts. Cosmos CLXVI satellite provided solar flare data for continuous three-month period. Similar to these Soviet studies were those conducted using NASA's OSO IV (launched Oct. 18) which would monitor sun so scientists could better determine how phenomena such as radio "blackout" and weather on earth were affected by solar activity. (Av Wk, 10/23/67, 27-8; NASA Release 67-273)

. Engine noise survey designed to study noise prediction during ground runups was postponed by NASA, reported Aviation Week. Tests, which would have been combined with USAF studies of propulsion system calibration for AMSA, were given lower priority because these experiments would have caused two-week stand-down between flights. (Av Wk, 10/23/67, 23)

October 23-27: AIAA's Fourth Annual Meeting and Technical Display was held in Anaheim, Calif.

Reviewing history of NACA and NASA, GSFC Executive Officer Arthur L. Levine noted that forces which accounted for creation of NACA in 1915 were both different from and far less intense than those involved in the creation of NASA in 1958. NASA played a much more significant role in the Nation and in Federal activity in science and technology than NACA, he said, and NASA's leadership was subjected to a wider variety and greater intensity of pressures from within Government and from outside interests.

NASA Historian Eugene M. Emme reviewed historical evolution of U.S. aeronautics and astronautics in context of major national policies and decisions. Citing effects of World Wars I and II, the "cold war" of the 1950's, and launching of Sputnik, he described how they helped determined the pace and utilization of technological advances and reviewed major U.S. turning points and relevant factors contributing to the Apollo decision. (Program)

M/G J. D. Caldara (USAF, Ret.), President of Flight Safety Foundation, Inc., suggested idea of commonality between safety problems and solutions for underwater, aircraft, and space systems based on recognition, reasoning, and responsibility: "This process

October 23-27 (continued)

[of problem solving] spells out the basic building blocks in the structure of the man/machine relationships...involving safety." Responsibility was most vital, he indicated: "If every scientist-engineer accepts his rightful responsibility and applies his imagination and experience to his task, the end result will be...[operations that are] 100% efficient and...100% safe." (Text)

GSFC engineers F. O. Vonbun and J. T. Mengel proposed development of a worldwide tracking and communications system for manned planetary missions similar to that used for Apollo. Planetary Manned Space Flight Network (PMSFN)--consisting of three 30- to 50-ft-dia ground stations, three 210-ft-dia dish antennas, and three synchronous orbiting tracking stations (SOTS)--would obviate need for other radar, ships, and aircraft. SOTS, they said, while providing continuous communications, tracking, and telemetry functions, would be more cost-efficient by removing requirement for numerous new tracking stations. (Text; Program)

Addressing Honors Banquet, USC President Dr. Norman Topping stressed need for expanded program to search and disseminate data produced in space research. Although such data did reach social problems occasionally, "the arrival in the right place at the right time is largely a coincidence," he noted. To realize the total potential of modern discovery scientists had to communicate outside their separate, narrow fields, find a common language with the layman, and work together to "find places for their discoveries within the social, ethical, and moral framework of our civilization." Man's ignorance of science and the scientist's apathy toward this ignorance had led to "the indiscriminate use of certain scientific discoveries, the unimaginative use of some others, and the non-use of still others," he said. Any meaningful extension of life in space depended upon excellence of life on earth--which would be possible "...if all men... speak and work together with dedication." (Text)

Princeton Univ. economics professor Oskar Morgenstern, participating in President's Forum, "The Worth of the Space Program," contended that the space effort, as a public investment of natural resources, had to be evaluated by comparing its benefits with other ways the resources could have been used. Although no basic discoveries as important as atomic fission, the transistor, or the laser could be attributed to space exploration, he said, U.S. could still afford a high degree of space exploration and could expect discoveries "of a magnitude that will astonish even this generation which has seen so much and is prepared to expect that our knowledge will increase without limit."

October 23-27 (continued)

Dr. T. Keith Glennan, President of Associated Universities, Inc., and first NASA Administrator, submitted that the most important enduring contribution of the space endeavor to U.S.' future was education. Progress in higher education, he said, had occurred as a result of the compelling challenge of space exploration along with NASA's "clear and evident desire to assure an adequate flow of highly trained manpower...." Current statistics on NASA investments in higher education were very impressive, he noted, but if NASA's budget were trimmed further its support to education would have to be diminished.

Dr. Willard F. Libby of UCLA predicted that space program would "come out to be the best bargain the American people have ever made--both for its practical value in technological developments, and for its contributions to pure knowledge through science." Space program had already contributed to and answered questions about geosciences, interplanetary sciences, astronomy, and chemistry, he noted, but most consuming scientific question yet to be answered was whether extraterrestrial life existed in our solar system. (Texts)

Major AIAA awards presented at Honors Convocation included: Louis W. Hill Space Transportation Award to LeRC Director Abe Silverstein for "imagination, technical excellence and leadership which have led to practical application of high energy liquid hydrogen fueled propulsion for space transportation, and for initiating and contributing to the free world's first manned space transportation system"; De Florez Training Award to Edwin A. Link, chairman of General Precision Equipment Corp.'s Link Aviation Div., for "conceiving and implementing the idea of ground-based flight training equipment"; G. Edward Pendray Award to Columbia Univ. professor Robert A. Gross for "original contributions to gas-dynamics and plasma physics especially in the field of shock wave ionization phenomena"; and Lawrence Sperry Award to MSC Flight Director Eugene F. Kranz for "outstanding contributions in directing spacecraft mission planning in developing flight control teams, and as Flight Director of manned Gemini spaceflight missions." (Av Wk, 10/30/67, 13; AIAA Facts)

October 24: Two Boosted Arcas I sounding rockets launched from Resolute Bay, Canada, without tracking facilities carried GSFC experiment to obtain D region ionospheric data in vicinity of magnetic north pole. First rocket lost telemetry at seven seconds; recovery search would be attempted if arctic conditions permitted. Second rocket had 255-sec burn (300+ sec planned), so altitude was probably insufficient. Both experiments used ground-based transmission of RF energy to rocketborne receivers (Faraday-rotation experiment). These were first U.S. rocket launchings from this facility. (NASA Rpt SRL)

October 24: NASA's Eighth Annual Honor Awards Ceremony was held in Washington, D.C.

Dr. Roger W. Heyns, Chancellor of Univ. of California, discussed impact of space program on university curricula and research efforts in his keynote address. "Through the stimulation of NASA programs, new fields of study have been created...and NASA...[has become] one of the world's most ambitious attempts to pool the talents and learning of thousands....

"...NASA has been doing pioneering work of immense significance to modern society that has nothing to do with the exploration of space per se. Objectives have been defined, scientific and technical knowledge and talent have been collected, trained and aimed at research objectives and results produced. That is a massive accomplishment of human engineering...[and] an inspiration to all of us.... Just how much...is transferrable to other situations remains to be seen, but... it certainly is not inconceivable that what we have learned, and what we will learn, about public administration from NASA may, in the long pull, mean every bit as much as the scientific and technological developments from the exploration of space itself."

Recipients of Distinguished Service Medal: NASA Associate Administrator Dr. Homer E. Newell; Deputy Associate Administrator for Manned Space Flight Edgar M. Cortright; LaRC Director Dr. Floyd L. Thompson; and former Associate Administrator for Advanced Research and Technology Dr. Raymond L. Bisplinghoff. NASA's second Distinguished Public Service Medal was presented to Dr. Charles S. Draper, director of MIT's Instrumentation Laboratory. Special Group Achievement Award was presented to Canadian government for outstanding success of Alouette I satellite (launched Sept. 28, 1962). Exceptional Service Medal: Astronaut Roger B. Chaffee (posthumously); Charles F. Hall, ARC; Donald R. Bellman and Robert D. Reed, FRC; William J. Boyer, Laurence K. Loftin, Jr., James S. Martin, Jr., and Clifford H. Nelson, LaRC; James S. Kramer and H. Warren Plohr, LeRC; Robert H. Gray, KSC; Howard H. Haglund and Robert J. Parks, JPL; Paul G. Marcotte, GSFC; William Cohen, George C. Deutsch, Arthur F. Hood, Joseph B. Mahon, Benjamin Milwitzky, Lee R. Scherer, and William M. Shea, NASA Hq. Recipients of Exceptional Scientific Achievement Award: Michel Bader, Donald E. Gault, and Maurice D. White, ARC; Walter B. Horne, William H. Phillips, and Israel Taback, LaRC; Samuel S. Manson, LeRC; and Eugene M. Shoemaker, USGS. Group Achievement Award: Apollo 204 Review Board; NASA SST Evaluation Team; Lunar Orbiter Spacecraft and Operations Team; and 260-in Solid Motor Project Team. Public Service Award: William Feldman, Eastman Kodak Co.; Robert J. Helberg, Boeing Co.; Mark Sasso, RCA; Robert L. Roderick, Hughes Aircraft Co.; and Richard Cottrell and Paul B. Datner, Aerojet General Corp. Exceptional Bravery Medal was presented for "courageous and heroic action" in attempting to rescue the Apollo 204 crew to Donald O. Babbitt, Stephen B. Clemmons,

October 24 (continued)
James D. Gleaves, Jerry W. Hawkins, and L. D. Reece, NAA; and Henry H. Rogers, KSC. (Text; NASA Release 67-272; Program)

. Commercial service via Pacific II comsat, launched by NASA from ETR Sept. 30, would begin Nov. 4, ComSatCorp announced. (ComSatCorp Release 67-52)

. Overall NASA aeronautics program was undergoing "expansion and change to meet the ever growing needs" of air transportation industry and general aviation, NASA Deputy Administrator Dr. Robert C. Seamans, Jr., told the Aero Club in Washington, D.C.: "Less than 1400 direct man-years were applied to our aeronautical effort in 1962 and only $15 million in R&D funding was applied to support their activities. The trend has now been clearly reversed and in [FY 67] twice the manpower (27.2 directs) and three times the funding ($45.7 million) were applied to NASA's aeronautical program." Although FY 68 program had not been clarified, NASA planned to increase aeronautical R&D funding to $81.4 million, he said.

Major aeronautical advances in the past had been exploited by DOD, he noted, which bore development costs and proved out designs before adoption by commercial aviation. Since solutions for many problems could no longer rely heavily on precursor military development, NASA would continue NACA-established role to conduct broadly applicable basic aeronautical research and solve specific problems with reimbursement for special costs. In addition, Dr. Seamans said, NASA would attempt to reduce aircraft noise by modifying engines on existing aircraft, developing quieter engines, and revising operational procedures; cooperate with FAA and industry to solve safety and utility problems of general aviation; and conduct extensive R&D programs for V/STOL, supersonic, and hypersonic aircraft. (Text)

. Fred Friendly, Columbia University professor and consultant to Ford Foundation, delivering Granada Lecture in London, warned that communications satellites' promise of international "common market" of high-quality TV was threatened by commercial and government avarice. In U.S., he said, TV "can make so much money doing its worst, it cannot afford to do its best." Consequence had been that early promise of quality programs had been lost while educational TV, which could fill breach, had been "under-funded, undernourised and under-observed." But even in nations where TV was nationalized, tendency would be for governments to seek profits from it to offset other communications deficits, he said. Thus, he argued, "a promising world village, linked by satellites," could be turned into "an electronic slum," because ambitious corporations and separate governments insisted on going their own ways, concerned more with earnings, national appetites, and images than with

October 24 (continued)
what their satellite systems carried. What was required, he suggested, was "an electronic Magna Charta" guaranteeing rights of public to quality TV. (Friendly, W Post, 10/25/67, D14)

October 25: Cosmos CLXXXIV was launched by U.S.S.R. into 635-km (394-mi) -altitude circular orbit with 97.14-min period and 81.2° inclination. Equipment and instruments functioned normally. (GSFC SSR, 10/30/67; SBD, 10/30/67, 320)

October 25-27: Mariner IV, launched Nov. 28, 1964, responded to a series of commands 56 million mi out in space after three years in orbit. On Oct. 25, the spacecraft was commanded to switch data rate from 8 1/3 to 33 1/3 bps (bits per sec); receive via low-gain antenna; reorient spacecraft so high-gain antenna pointed directly at earth; change to all-engineering data format; and burn midcourse guidance engine for 70 sec. On Oct. 26, commands were sent to actuate planetary scan subsystem and tape recorder. Lines 139 through 199 of picture No. 16, and lines 1 through 59 of picture No. 17 were played back. Initial indications were that photographic data were the same as when first recorded July 14, 1965. On Oct. 27, spacecraft responded to commands to test certain redundant equipment--such as transmitter and attitude-control apparatus--and was placed in normal cruise condition by acquiring Canopus. Attitude-control gas in one section of system was thought to be depleted, leaving about 0.2 lb in other section. This would last until early December; when gas was depleted, Mariner IV would no longer be able to retain its orientation with respect to the sun and Canopus.

JPL scientists were "delighted" with the firing of midcourse guidance engine, and with transmission of pictures of Mars taken by Mariner IV more than two years ago. Scientists reported "...a flawless burn...[which] proved we can restart engines in space years after we've put them there." Future spacecraft, exploiting this success, could be launched to distant planets where they could take close-up photographs, swing back toward earth, and, on command, transmit pictures.

Mariner IV had taken pictures of Mars from an altitude of 5,500 mi; 21 frames had been exposed and recorded on magnetic tape to be telemetered to earth over a 10-day period. As of 8:00 pm EDT Oct. 27, Mariner IV was in its 1,062nd day of flight, 35,604,255 mi (57,299,604 km) from earth, and traveling at 3.91 mps (6.29 kps) relative to earth. (NASA Proj Off; O'Toole, W Post, 10/27/67, A3)

October 26: First flight test of Saturn V, designated Apollo 4, was scheduled no earlier than Nov. 7, announced M/G Samuel C. Phillips,

October 26 (continued)

Apollo Program Director. "This is a target date," he said. "We are in a very complex learning process and we are going to take all the time we need on this first launch." Launch vehicle and Apollo spacecraft combination was 363 ft tall and weighed six million pounds. Thrust of Saturn V's first stage was 7.5 million pounds. Key objective of flight planned for Nov. 7 would be evaluation of Apollo command module heat shield under conditions encountered on return from moon mission. Flight would also test thermal seals for use in new quick-release spacecraft hatch which would be installed on all manned Apollo missions.

Apollo 4 flight plan would call for Saturn V to place spacecraft and launch vehicle 3rd stage (S-IVB) into 117-mi circular orbit. After completing two orbits, 3rd stage would be re-ignited to place spacecraft into orbit with apogee of 10,800 mi. After separation from 3rd stage, service module propulsion system would be fired to raise spacecraft apogee to 11,400 mi. During descent the service module motor would fire again, boosting velocity of spacecraft to about 25,000 mph, the reentry speed of a lunar return flight. (NASA Release 67-274; B Sun, 10/26/67, A6)

. GSFC officials completed week of checkout of OSO IV and turned on last of nine experiments. All experiments were performing well and spacecraft was transmitting satisfactory data. The 599-lb spacecraft, launched from ETR Oct. 18, had received 1,500 commands. It was 3,000th object in orbit since Sputnik I in 1957; 100th satellite orbited in 1967; and 50th satellite orbited by Delta launch vehicle in 53 attempts. (NASA Release 67-273)

. Senate and House adopted conference report on amended NASA FY 68 appropriations bill (H.R. 12474) totaling $4.6 billion, and legislation was cleared for President's signature. Report approved $3.925 billion for R&D, decrease of $152.1 million from authorization and decrease of $356.5 million from budget; report approved $35.9 million for Construction of Facilities, decrease of $14.6 million from authorization, and decrease of $21.3 million from budget; report approved $628.0 million for Administrative Operations, decrease of $20.2 million from authorization, and decrease of $43.3 million from budget.

Rep. James G. Fulton (R-Pa.), ranking minority member of House Committee on Science and Astronautics, discussing NASA appropriations bill on floor of House, stated: "...Voyager and NERVA II programs should be funded this fiscal year. Voyager is the only major planetary exploration program this Nation will have in the 1970's. If this program is abandoned, we will be abdicating our responsibilities.... This is particularly significant following the recent Russian Venus IV

October 26 (continued)
soft landing on the planet Venus [see Oct. 18]."

Sen. Gordon L. Allott (R-Col.), ranking minority member of Senate Committee on Appropriations' Space Appropriations Subcommittee, was forced to accept no specific funding for Voyager and Nerva programs (in final version) but said in statement read by Sen. Margaret C. Smith (R-Me.) on floor of Senate: "...agreement was reached to add $15.5 million to [R&D] over the House figure...." Senator Allott said further that the agreement would provide that NASA's Administrator "...may reprogram funds...with approval of the appropriate committees of the Congress." He added: "...conferees share this belief, that this country must move ahead now in [R&D] leading to interplanetary exploration." (CR, 10/26/67, H14036-8, S15405-8)

. Dr. Harvey H. Nininger, leading authority on meteorites and tektites, was honored at Meteoritical Society's 30th annual meeting at ARC by having a special issue of the Journal of the Geochemical Society published in his honor and being presented Society's annual Leonard Medal. First to propose, in 1940, that tektites came from moon, Dr. Nininger later proved that coesite--a quartz-like material created by very high pressures--could be found in meteoroid craters. Presence of coesite was currently being used to determine whether a crater was formed by meteorite impact. (ARC Release 67-21)

October 27: NASA Aerobee 150 sounding rocket launched from WSMR reached 99-mi (160-km) altitude in flight to measure, with moderate and high resolution, spectral irradiance of Venus (1,000 to 3,000 Å), and star B Oriones (Rigel). No data was acquired from Venus because tracker was ineffective; Rigel was acquired and five-second exposure sequence was completed. (NASA Rpt SRL)

. U.S.S.R. successfully launched three Cosmos satellites: Cosmos CLXXXV entered orbit with 888-km (552-mi) apogee; 522-km (324-mi) perigee; 98.7-min period; and 64.1° inclination. Cosmos CLXXXVI, launched into orbit with 235-km (146-mi) apogee; 209-km (130-mi) perigee; 88.7-min period; and 51.7° inclination, later docked with Cosmos CLXXXVIII and softlanded on earth [see Oct. 30]. Cosmos CLXXXVII entered orbit with 210-km (131-mi) apogee; 145-km (90-mi) perigee; 87.8 min period; and 50° inclination. All three spacecraft performed satisfactorily. (GSFC SSR, 10/30/67; W Post, 10/29/67, A16; SBD, 10/30/67, 320)

. Atlas-F carrying unidentified payload exploded shortly after launch by USAF from Vandenberg AFB. (SBD, 10/30/67, 316)

October 29: U.S.S.R. would "shortly" launch a manned spacecraft which might land outside Soviet territory--possibly in India--Soviet Ambassador to India Nikolai M. Pagov told reporters in Madras, India, according to AP. Permission to recover spacecraft in India had been requested and granted in early September, he said. Offical U.S. sources, noting that several other countries had been approached for such permission, speculated that an unmanned rehearsal for a manned circumlunar flight had been scheduled for late September and postponed because of technical problems. Oct. 27 launches of Cosmos CLXXXVI and Cosmos CLXXXVII--which were apparently Soyuz-type spacecraft--could be "practice shots" for the planned manned flight. (AP, W Post, 10/30/67, A3; Clark, NYT, 10/30/67, 54)

. JPL Director Dr. William H. Pickering announced appointment of Fred H. Felberg, Assistant Laboratory Director for Technical Divisions, to the new position of Assistant Laboratory Director for Plans and Programs. He would be succeeded by Jack N. James, Deputy Assistant Director for Flight Projects. In his new position Felberg would be responsible for "planning JPL's total program, including...effective distribution of manpower and resources." (JPL Release 460)

October 30: U.S.S.R. launched two Cosmos satellites.

Cosmos CLXXXVIII entered orbit with 276-km (171-mi) apogee; 200-km (124-mi) perigee; 89-min period; and 52° inclination. At 4:20 am, EDT, spacecraft was automatically docked with Cosmos CLXXXVI (launched Oct. 27). Tass later announced: "...both satellites, equipped with special approach and docking units, carried out a number of complicated maneuvers in space, automatically finding each other, drawing closer, berthing and docking rigidly." It was history's first automatic docking in space and was filmed by TV cameras onboard both satellites. U.S. had successfully accomplished first manned docking March 16, 1966, with Gemini VII and Gemini Agena Target Vehicle (GATV); in this docking experiment, astronauts controlled the meneuver. After automatic docking, the two satellites continued in orbit with altitude ranging from 124-171 mi. At 7:50 am, EDT, after completing 2 1/3 orbits, spacecraft were undocked on command from the ground, and placed into different orbits by restarting rocket engines. Cosmos CLXXXVI, larger of the two spacecraft, softlanded Oct. 31 after 65 orbits.

Cosmos CLXXXIX was launched into orbit with 600-km (373-mi) apogee; 535-km (332-mi) perigee; 95.7-min period; and 74° inclination. (Shub, W Post, 10/31/67, 1; Kamm, NYT, 10/31/67, 1; AP, W Star, 10/31/67, A3; Winters, B Sun, 11/1/67)

. U.S.S.R. announced successful completion of rocket tests in the Pacific northeast of Midway Island to test equipment for spacecraft landings

October 30 (continued)
at sea. Series, which began Sept. 2, was first to last as long as scheduled. (UPI, NYT, 10/31/67, 44; M/S Daily, 10/31/67)

. Scientific proof that instrumented capsule from U.S.S.R.'s Venus IV had made softlanding on planet Venus Oct. 18 was presented at Moscow news conference, by Mstislav Keldysh, President of Soviet Academy of Sciences: Instrumented-capsule-station's transmitters, programmed to broadcast for 100 min, on the basis of the best previous estimates of the pressure in the atmosphere of Venus, "stopped transmitting after 94 minutes [exact time for descent]. The station recorded both its own speed and the remaining distance to the surface throughout the descent...[and] also recorded the changing atmospheric pressure and recalculations on earth...." Thus, based on this information and other known data, Keldysh confirmed that the station stopped transmitting the instant it landed. (Shub, W Post, 10/31/67, 1)

. Cornell Univ. professor Hans A. Bethe, director of Los Alamos Atomic Weapons Laboratory's theoretical physics section during development of atomic bomb and recipient of AEC's 1961 Enrico Fermi Award, was awarded the 1967 Nobel Prize in physics for proving that the sun and other stars produced energy through synthesis of helium from hydrogen. He was cited specifically for "his contributions to the theory of nuclear reaction, especially his discoveries concerning the energy production of stars."

Nobel Prize in chemistry was presented jointly to George Porter and Ronald G. W. Norrish of U.K. and Manfred Eigen of West Germany, for their studies of extremely fast chemical reactions occurring at speeds of one-one-thousandth of a millionth of a second. Nobel Peace Prize was withheld for second consecutive year. (UPI, W Star, 10/30/67, 1; Wiskari, NYT, 10/31/67, 1)

. Soviet-French space treaty of June 30, 1966, had produced results during September when two Soviet MR-12 sounding rockets carrying French payloads were launched to altitudes of 75 mi and 112 mi over Franz Josef Land in Soviet arctic. Payloads released sodium clouds to measure upper-atmosphere temperatures. (Av Wk, 10/30/67, 13)

October 31: Sprint, launched from underground cell as the high-speed, short-range missile for ABM system, completed successful test flight at WSMR when it hit intercept point in sky after several planned sharp maneuvers. Interception simulated actual one for incoming enemy missile and was programmed into computer for 27-ft-long missile. Sprint tests had been conducted since March 29, 1965. (DOD Release 1040-67)

October 31: Boeing Co. revealed proposal to NASA for a low-cost unmanned planetary orbiter which could orbit Mars or Venus for more than a year taking close-up photos, recording seasonal changes, and transmitting weather data. Described as "the answer to [NASA's] budgetary squeezes on planetary missions," proposed spacecraft would weigh 2,000 lbs, compared to 12 tons for Voyager spacecraft originally scheduled to be used; cost much less than Voyager; be able to carry a number of experiments; be able to drop instrumented probe through planet's atmosphere; and be operational in time for launch during 1971 Mars launch window. Proposal was for six spacecraft, two for Mars, two for Venus, and two for testing or backup. (Boeing Release S-9460)

. Georgi Petrov, director of Soviet Academy of Sciences' Space Exploration Institute, claimed that docking of Cosmos CLXXXVI and Cosmos CLXXXVIII, "for its technical perfection and the possibility it has opened for space exploration, is of greater importance than the American experiment in manual docking...[of Gemini VII and GATV]. Since the completely automatic linkup, despite the difficulty of its realization, will always be more economical as regards the payload which is so expensive on an orbit, this will make it possible to solve the tasks of helping the crews of space vehicles and open up new prospects for arranging experiments that demand a great weight on an orbit around the earth." (SBD, 11/1/67, 3)

During October: Press commented on space law treaty which went into effect Oct. 10.

New York Times: "...the very important treaty...forged in the conference room of the United Nations, has reaffirmed the principle first stated in the General Assembly that outer space is the province of all mankind," said Secretary General Thant. "...recent statements by the Soviet Union's leading space scientist, Prof. Leonid Sedov, indicate that the Russians too may be coming around to the conclusion that the costs of going it alone to the moon and beyond outweigh the dimming propaganda magic. The ceremonies...mark not only the first major East-West agreement since the nuclear test ban treaty of 1963 but a potential starting point for an even more momentous accord." (NYT, 10/5/67; 10/11/67)

Christian Science Monitor noted that space exploration had evolved space law treaty which banned military installations and nuclear weapons from moon and planets and which could evolve into space cooperation between U.S. and U.S.S.R. Treaty did not halt use of reconnaissance satellites but it provided for international inspection of vehicles and installations on moon and other bodies. Although there would be no right of inspection to see whether satellites were carrying nuclear

During October (continued)

weapons, and vigilance would always be vital in this regard, treaty was one more visible proof that Moscow and Washington could make useful progress. Space law treaty was agreement, following Antarctic Treaty, which could remove installations of war from one more section of mankind's expanding environment. (CSM, 10/14/67)

. Press commented on Congressional cuts in NASA's FY 68 budget.

New York Times: "The Senate, ignoring the most obvious of all opportunities to cut nonessential spending, has not only matched the $4.5 billion the House voted for space excursion but tacked on nearly $100 million more to start new programs after the first Americans land on the moon. The certainty that another huge space appropriation will come out of conference on Capitol Hill [see Oct. 26] adds special interest to the fact that twice recently the leading space scientist of the Soviet Union, Prof. Leonid Sedov, has publicly stressed the importance of large-scale international cooperation for manned flights beyond the moon. Now that Professor Sedov has opened the door, the Administration has an opportunity to begin diplomatic explorations to see if the Russians really are serious about replacing senseless rivalry in space with rational international cooperation." (NYT, 10/7/67, 28)

Wall Street Journal: "Plans to launch unmanned satellites to Mars or Venus in 1971 and 1973 and conduct extended exploration of the moon by astronauts face probable abandonment because of a lack of funds. There will also be sharp curtailment of proposals for long-duration manned flights in orbit about the earth to enhance the nation's space technology and exploit practical and scientific applications of space. Thus, say space officials, the present outlook is that only a limited national space program will continue in the 1970s after the lunar landing." (Spivak, WSJ, 10/11/67, 24)

. Senate action in voting $142 million for FY 68 SST development costs was criticized.

Wall Street Journal: "The SST will be a considerable technological achievement, but it's hard to see, in the current fiscal crisis, that the project's present swift pace is essential." Senate's action "lent at least some support to the President's argument that his suggestions for spending cuts should await completion of action on the appropriations bills. It would do no good for him to propose reductions in a few items if Congress then proceeded to inflate everything else." (WSJ, 10/2/67)

Baltimore Sun: "Approval of these sums [for major Federal programs] by the Senate underscores, once again, the need for a set of Federal priorities--for establishing firm control over 'the course of fiscal developments,' as Chairman Mills of the House Ways and Means Committee put it." (B Sun, 10/9/67)

During October (continued)

Letter from Gerhardt C. Clementson, Director of Space Information Systems Div., inserted in the Congressional Record by Sen. Peter H. Dominick (R-Colo.): "...Congress should establish a select committee to explore in detail and recommend an agency similar to [ComSatCorp] for the purpose of financing and managing the Supersonic Transport." (CR, 10/6/67, S14363-4)

. Secretary of Defense Robert S. McNamara's decision to go ahead with "thin" Nike-X antiballistic missile (ABM) [see Sept. 18] system was criticized by several Congressmen.

"I urge the administration to reconsider its decision, which I believe to be wrong on three counts--militarily, economically, and diplomatically," Sen. Joseph S. Clark (D-Pa.), member of Senate Foreign Relations Committee, said on floor of Senate. He anticipated "...resulting increase in tensions between the United States and the Soviet Union which this new escalation of the arms race is bound to provoke."

Sen. Gale W. McGee (D-Wyo.), member of Senate Appropriations Committee, told Senate: "...there is a touch of tragedy involved. It lies in the fact that such a system, designed to guard us against possible attack by the unstable Chinese nation, can be effective in neutralizing the danger of nuclear holocaust but not the danger of continued guerrilla warfare as practiced by Mao Tse-tung and his followers."

Rep. W. J. Bryan Dorn (D-S.C.) speaking on floor of House, said: "...the best defense is an offense. Command of the skies, space, and the seas is the way to keep war and destruction from the shores of our homeland." He recommended use of "sea-based anti-ballistic missile intercept system." (CR, 10/4/67, A4923; 10/6/67, S14359; 10/9/67, S14413-27)

. JPL Director Dr. William H. Pickering stressed importance of unmanned space exploration in Astronautics and Aeronautics: "During the past decade of space exploration, unmanned spacecraft have demonstrated a remarkable versatility in performing a wide variety of scientific tasks. The success of these robots is due largely to the ingenuity of the designers in building complex but reliable automated devices, capable of withstanding the constraints imposed by the hostile space-flight environment.

"It is clearly evident that many difficult engineering and scientific problems remain to be solved. The experience of the past decade demonstrates, however, that within the next decade unmanned spacecraft can initiate a detailed surface exploration of our neighboring planets.

During October (continued)

"The unmanned exploration of the solar system is technically and scientifically possible. It presents a unique opportunity to step boldly forward into new areas of both technology and science." (Pickering, A&A, 10/67, 80-4)

. Rep. Joseph E. Karth (D-Minn.), Chairman, Senate Committee on Aeronautical and Space Sciences' Space Sciences and Applications Subcommittee, called for "...developing a greater public awarness of the benefits of the total space program and on driving home the point of how close we are to realizing magnificent achievements in bettering our lives." Writing in Astronautics and Aeronautics he said "...the space program is no longer insulated from the tough competitive struggle for resources.... More bluntly, the NASA part of the national space program no longer has a very high priority." He explained that "...scientific and technological programs are the least understood of our national efforts. Tracing national growth and prosperity directly back to research and development is admittedly a tough job, but I am convinced that space technology stimulates social and economic progress." Raising question of budget levels through early 1970's, he said: "Compared with earlier forecasts, it seems that a considerably stretched-out program will be characteristic...." In spite of his pessimistic outlook for the present, Representative Karth said: "This outlook should not cause despair because the long-range prospects for progress are enormous...[but] prospects must be sold to the public and top policymakers in terms of what makes sense for the overall benefit of society." (Karth, A&A, 10/67, 86-92)

. U.S.S.R.'s Academician Dr. Anatoli A. Blagonravov, chairman of Soviet Commission for Exploration and Use of Outer Space, reviewed first decade in space in AP article: "The Space Era is not a chance phenomenon in the development of natural sciences. It is a legitimate and indispensable stage in the history of development of human society." He tied in the heavy increases in available scientific information with modern development of humanity, and stated: "...it is only at this pace that it actually becomes possible to meet the objective requirements of the modern developments of society."

Writing in Astronautics and Aeronautics, he explained that general trend of Soviet space program was similar to that of U.S. program, and refrained from "any forecasts [on]...further programs in space research." He said work planning was difficult "because [it] calls for additional checkups or presents prospects of new and unforeseen investigations." He believed "realistically" in prolonged manned space flights, and said there was "no doubt that it will be possible to overcome all the difficulties...." (AP, Blagonravov, W Star, 10/1/67, C3; Blagonravov, A&A, 10/67, 70-8)

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