

COMMENT DRAFT

NOT FOR RELEASE

ASTRONAUTICS AND AERONAUTICS

JUNE 1967

A CHRONOLOGY ON SCIENCE, TECHNOLOGY, AND POLICY

(HHR-23)

Text Drafted by Science and Technology Division
Library of Congress

NASA Historical Staff (EH)
Office of Policy
National Aeronautics and Space Administration
Washington, D.C. 20546

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June 1: U.S.S.R. launched Cosmos CLXII into orbit with 280-km (174-mi) apogee; 201-km (125-mi) perigee; 89.2-min period; and 51.8° inclination. All equipment was functioning normally. (AP, W Star, 6/1/67, 1)

. NASA's ATS II mission had been adjudged a failure "based upon review of the [spacecraft's] assessed performance...in its unplanned elliptical orbit," NASA announced. Satellite, launched from ETR April 5 on mission to evaluate gravity-gradient system for spacecraft stabilization, had remained in transfer orbit, tumbling uncontrollably, after Agena engines failed to ignite for second burn. All experiments were functioning, but possibility of obtaining useful data was poor. (NASA Proj Off)

. Final readout was completed on NASA's Lunar Orbiter IV [see May 8-June 1]. (NASA Proj Off)

. NASA personnel changes:

M/G James W. Humphreys (USAF), recently returned from a Vietnam assignment as Chief of the Public Health Service Div., Agency for International Development (AID), became Director of Space Medicine, OMSF, replacing B/G Jack Bollerud (USAF), who had been Acting Director since the December 1965 death of Dr. W. Randolph Lovelace II. General Bollerud returned to duty with USAF.

Jerome Lederer, vice president and technical director of Flight Safety Foundation, Inc., and director of Cornell-Guggenheim Aviation Safety Center, was appointed Director of Safety, OMSF. Lederer would develop policies and procedures related to manned spaceflight systems safety; act as focal point for consideration of and decisions on matters related to system and flight safety; and provide continuing review and evaluation of safety provisions on behalf of NASA Associate Administrator for Manned Space Flight Dr. George E. Mueller to identify any unresolved hazardous or unsafe practices and conditions.

M/G Charles R. Roderick, who retired May 31 from USAF where he was serving as Deputy Assistant to the Secretary of Defense for Legislative Affairs, was named Special Assistant to NASA Administrator James E. Webb.

Harold Sims, retired career foreign service officer currently serving as Mayor of Sparta, Tenn., and Gerald J. Lynch, president and chairman of the board of Menasco Manufacturing Co., were sworn in as consultants to NASA Administrator James E. Webb. Lynch would assist Bernard Moritz, Assistant Administrator for Special Contracts Negotiations and Review. Sims would work with Office of Technology Utilization to assure that results of NASA's R&D were effectively made available and utilized by industry. (NASA Releases 67-84, 67-138, 67-139, 67-140, 67-141)

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June 1: NASA turned on the last of 11 experiments onboard Explorer XXXIV satellite, launched from WTR May 24. Data from experiments, designed to measure solar and galactic rays, were being transmitted, and equipment continued to operate satisfactorily. (NASA Release 67-144)

- . Dr. Albert J. Kelly resigned as ERC Deputy Director to become dean of Boston College's School of Business Administration. He would continue to serve as a part-time consultant to NASA. (Tech Wk, 3/27/67, 13)
- . First nonstop helicopter crossing of the Atlantic was successfully completed when two USAF HH-3E helicopters landed at Le Bourget Airport, opposite the U.S. pavilion at the Paris International Air and Space Show, following 30-hr 48-min flight from New York [see May 26-31]. Helicopters, which followed the route taken by Charles Lindbergh in 1927 when he became first man to fly the Atlantic nonstop alone, traveled 4,160 mi and made nine refuelings in flight. First flight crew was commanded by Maj. Herbert B. Zehnder (USAF); second by Maj. Donald B. Maurras (USAF). Both crews were submitting claims to Fédération Aéronautique Internationale for new speed records from New York to London and New York to Paris. (UPI, P EB, 6/1/67, 1; NYT, 6/2/67, 17)
- . F-111B was "a very easy plane to fly" with outstanding low-speed qualities, V/Adm. T. F. Connolly, Deputy Chief of Naval Operations (Air), said in April 18 testimony released by the House Committee on Appropriations' Subcommittee on the Dept. of Defense. Admiral Connolly's description of the F-111 (formerly TFX), subject of increasing criticism since April 21 crash of USN test model, was described by Rep. George Andrews (D-Ala.) as "the most complimentary statement [about the F-111]...which has been made before this committee."
Basing his views on his personal inflight observations, Admiral Connolly conceded that there was "a lot of work to do on the airplane," including making configuration changes to improve pilot visibility. He asserted that when difficulties involving engine stall were overcome there should be no major problems and said that aircraft's anticipated weight satisfied USN requirements. (Transcript; AP, NYT, 6/2/67, 23)
- . Dr. Alexander H. Flax, Assistant Secretary of the Air Force for Research and Development, was awarded National Geographic Society's General Thomas D. White Space Trophy for outstanding contributions to U.S. aerospace progress. First civilian to receive the award since its establishment in 1961, Dr. Flax was cited for "his effective direction of Air Force aerospace research and development programs enhancing national security and advancing space technology." (NGS Release)

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June 2: Col. Joseph Cotton (USAF) and NAA test pilot Van Shepard flew XB-70 No. 1 to mach 1.43 and 42,200-ft altitude during two-hour performance evaluation flight at Edwards AFB. (XB-70 Proj Off)

- . NASA selected RCA to negotiate \$38-million contract to maintain and operate portions of the Space Tracking and Data Acquisition Network (STADAN) at Rosman, N.C., and Fairbanks, Alaska, STADAN sites, and at GSFC control centers for individual spacecraft. Effective Oct. 1 for three-year period with NASA options for two one-year extensions, contract covered actual cost-plus-incentive award based on performance. (NASA Release 67-142)
- . GAO, responding to March 14 request by Sen. Margaret Chase Smith (R-Me.), member of Senate Committee on Aeronautical and Space Sciences, had reviewed NASA's Apollo contract with North American Aviation, Inc. (NAA), and published a "Summarization of National Aeronautics and Space Administration Management Review of North American Aviation, Inc., Activities" based on the Phillips Report. According to GAO, the Phillips Report "stated that, at the start of the CSM and S-II programs, key milestones were agreed upon, performance requirements were established and cost plans were developed...[but] as the program progressed, there were slippages in key milestone accomplishments, degradation in hardware performance, and increasing costs." In evaluating the probability of NAA's ability to "meet future commitments, the report stated that, for both the S-II and the CSM, significant technical problems still remained which had to be resolved. The review team did not find significant indication of actions underway, for the S-II, to 'build confidence that future progress will be better than past performance.' While some progress was indicated to improve the outlook for the CSM, the report stated that 'there is little confidence that NAA will meet its schedule and performance commitments within the funds available for this portion of the Apollo program....'" (Text)
- . Astronaut Edwin E. Aldrin received first honorary membership awarded by International Assn. of Machinists and Aerospace Workers at IAM Aerospace Conference in Houston. Aldrin, considered by the Union to be the first space mechanic, was cited for his work with tools outside Gemini XII spacecraft Nov. 13, 1966. Astronaut Alan B. Shepard, Jr., received an Award of Merit for being first American in space. (Houston Chron, 6/2/67)

June 3: U.S.S.R.'s next manned space flight would use a Soyuz spacecraft similar to the one which crashed April 24, according to Astronauts Michael Collins and David Scott who had discussed future space plans

June 3 (continued)

with Soviet cosmonauts at the Paris International Air and Space Show [see May 26-31]. In UPI interview Collins and Scott said they were "amazed by the similarities between the two [U.S. and U.S.S.R. space] programs." Collins said that Cosmonauts Pavel Belyayev and Konstantin Feoktistov indicated "that there would be several earth orbital flights and then...a circumlunar flight." (UPI, W Post, 6/4/67, A9)

June 4: USAF launched unidentified satellite by Atlas-Agena booster from Vandenberg AFB. (UPI, NYT, 6/6/67)

- . Dr. Lloyd V. Berkner, a leading scientific pioneer in the U.S. space program, died at age 62, apparently of a heart attack, while attending a Washington, D.C., meeting of the NAS Council, of which he was treasurer. Credited with being the "father" of the International Geophysical Year (IGY), Dr. Berkner was the principle administrator of the U.S. part of the IGY program during its operation in 1957 and 1958. From 1958-1962, he was chairman of NRC's Space Science Board, which advised the Government on the national program of space research. For his "outstanding and pioneering leadership," of SSB, he received NASA's Distinguished Public Service Medal Oct. 7, 1966. He served as President of the Graduate Research Center of the Southwest in Dallas from 1960 until 1965, when he retired because of a heart attack. He continued until recently as Chairman of the Board of Trustees. A Rear Admiral in the U.S. Navy Reserve, Dr. Berkner would be buried with full military honors in Arlington National Cemetery June 7. (NYT, 6/5/67, 41; W Star, 6/5/67, B5; Science, 6/9/67, 1349)
- . Charles F. Bingman, Director of Management Programs, OMSF, became Deputy Director of the Office of Organization and Management Planning. (NASA Ann, 6/9/67)
- . Heinrich K. Matt, one of the group of German scientists who associated with the U.S. space program following World War II, died at age 60 in Tullahoma, Tenn. Matt was manager of testing operations branch of the propulsion wind tunnel for ARO, Inc., contractor which operated USAF's Arnold Engineering Development Center (AECDC) in Tullahoma. AECDC was responsible for conducting wind tunnel tests of U.S. spacecraft and boosters. (AP, W Post, 6/6/67, B3)

June 5: Cosmos CLXIII was launched by U.S.S.R. into orbit with 616-km (329-mi) apogee; 261-km (162-mi) perigee; 93.1-min period; and 48.4° inclination. Instruments performed satisfactorily. (UPI, NYT, 6/6/67, 3)

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June 5: The Washington Post commented on the death of Dr. Lloyd V. Berkner: "In every generation there are a few men whose personal careers reflect with precision the great changes that have come over the country in their lifetime. Lloyd Viel Berkner built his first radio transmitter as a schoolboy in Sleepy Eye, Minnesota, and in 1928 he joined an expedition to the South Pole. Three decades later he emerged as one of the most effective advocates of American exploration in space.

"In those years American science had become a vast interwoven fabric of academic and Federal laboratories, foundations and private corporations, civilian operations and military operations. Mr. Berkner moved in this world, which he had signally helped to create, not only as a scientist of distinction but as an organizer and manager of extraordinary force and capacity...." (W Post, 6/5/67)

- . Comisión Nacional de Investigaciones Espaciales (CNIE) President Dr. Teofilo Tabanera visited MSC for a general orientation and tour. (NASA Off Int Aff)
- . NASA selected J. H. Lawrence Co. for negotiations on a one-year, \$2.25 -million contract to provide plant maintenance at GSFC. (NASA Release 67-145)
- . A manned Apollo spacecraft should be launched to recover Explorer I, first U.S. satellite, whose orbit was expected to decay in late 1969, G. Snowden of Melbourne, Australia, suggested in a Letter to the Editor of Aviation Week. "When Apollo swings into action, maybe one of the tasks could be a rendezvous and retrieval of man's first satellite. I say first because Sputnik 1 and 2 have decayed, leaving Explorer 1 at the head of the list. A replica can be built at a fraction of the cost of retrieval, but there is nothing like having the original. Not only would it have value as a historic memento of man's venture into space, but also to scientists. I am certain after nearly 10 years in space it would be valuable to them...." (Av Wk, 6/5/67, 110)
- . Cost of reserving future delivery positions for SST would be \$750,000 each, under new policy announced by FAA and Boeing Co., SST airframe contractor. In addition, all payments would be made directly to Boeing Co. and would be used in lieu of Government funds to help finance SST development. Original policy, established in November 1963 and applicable to 113 positions presently assigned, required airlines to deposit with U.S. Treasury a total of \$200,000 for each delivery position reserved--\$100,000 initially and \$100,000 six months after initiation of prototype construction. On Feb. 6, FAA asked 12 U.S. companies on SST delivery list to also contribute \$1 million per delivery position to the cost of prototype construction. (FAA Release 67-52)

June 5: Pilot performing with the French Patrol, the aerobatic team of the French Air Force, was killed when his jet aircraft crashed and burst into flames during final aerial display at the Paris International Air and Space Show. Aircraft failed to pull out of a dive, bounced along the airfield, and then exploded about 100 yds from the grandstand, injuring several spectators. (NYT, 6/6/67, 77M)

- . France exploded nuclear device from a balloon over Mururoa Atoll in the Pacific. Test was first of four in 1967 series designed to perfect a trigger for the hydrogen bomb France planned to explode in 1968. (UPI, NYT, 6/23/67, 2)

June 6: House Committee on Science and Astronautics filed \$4.9-billion NASA authorization bill (H.R. 10340) with the House and recommended that it be passed without amendment [see May 16]. (NASA LAR VI/64)

- . Japan Air Lines jet aircraft carrying American and Japanese scientists from San Francisco to Tokyo successfully maintained radio contact with Mojave, Calif., ground station via NASA's ATS I satellite. (NASA Proj Off; P EB, 6/8/67)
- . 37-yr-old Astronaut Edward G. Givens, Jr. (Maj., USAF), was killed near Houston when the car he was driving missed a curve and crashed into an embankment. Two other USAF officers with him were injured, one critically. Givens was the first U.S. astronaut to die while off duty. Six others had died in connection with the space program: three in air crashes and three in the Jan. 27 Apollo fire. He was selected to join the NASA astronaut team April 4, 1966. (MSC Roundup, 6/9/67, 1; UPI, NYT, 6/7/67, 30; UPI, W Post, 6/7/67, A7)
- . MSFC Director Dr. Wernher von Braun was presented the Smithsonian Institution's Langley Medal by Dr. Fred L. Whipple, Director of Smithsonian Astrophysical Observatory, in Washington, D.C., ceremony. Dr. von Braun was cited in "recognition of his creative vision of the practical application of rocket power to space flight leading to the first U.S. satellite, and of his technical leadership in development of the Saturn class of large launch vehicles upon which the Apollo moon flight is based." He was the 13th recipient of the award, which was established in 1908 to commemorate the aeronautical achievements of Samuel Pierpont Langley, third Secretary of the Smithsonian Institution. Other recipients included Orville and Wilbur Wright, Charles A. Lindbergh, Robert H. Goddard (posthumously), Dr. Hugh L. Dryden, and Astronaut Alan B. Shepard, Jr.

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June 6 (continued)

In making the presentation, Dr. Whipple said U.S. could have launched the world's first satellite if it had endorsed the proposal which he and Dr. von Braun developed in 1954 to launch small spacecraft from the equator using existing rockets. Government decision to fund, instead, USN's Vanguard project, allowed U.S.S.R. to win "the first space race." (Smithsonian Release; Marshall Star, 6/7/67, 1; AP, NYT, 6/6/67, 3)

- . President Johnson appointed Astronaut James A. Lovell, Jr., Special Consultant to the President for Physical Fitness, to replace Stan Musial who resigned in January. Lovell would assume the new position in addition to his regular duties as an astronaut. (PD, 6/12/67, 833-4)
- . Chairman of the House Committee on Science and Astronautics George P. Miller (D-Calif.), in a Letter to the Editor of the Washington Evening Star, commented on William Hines' May 25 column criticizing Committee member Joseph E. Karth's (D-Minn.) speech before the National Space Club May 17. "The article unfairly alleged that Rep. Joseph E. Karth...by speaking out...was the 'tool' chosen by the administration to do a public relations job for NASA and the space program...."
"What Mr. Hines failed to say was that Congressman Karth has led a number of hard-hitting congressional space investigations over the years for me. Both NASA and the contractors involved were 'taken to the woodshed.' The Apollo program is no exception. Mr. Karth has been critical--and made it clear that the accident responsibility falls squarely on NASA and the contractor."
"Very simply, Mr. Karth said that perhaps the Congress, the administration and the press could do a better job of giving the public objective information on the space program. The wide swings from 'everything is great' to 'everything is wrong' must be confusing...." (W Star, 6/6/67, A12)
- . NASA Associate Administrator for Manned Space Flight Dr. George E. Mueller outlined Apollo Applications (AA) program at AIAA meeting in Washington, D.C. Series of innovations would be made, he said, to permit sufficient reductions in unit costs: (1) re-use of Command Module (CM); (2) addition of land-landing capability which would facilitate CM reuse, permit increase in crew capacity, and, possibly, make use of naval recovery forces unnecessary; (3) "double use" of Up-rated Saturn I's 2nd stage as booster during launch phase and as Orbital Workshop in space; (4) repeated use of Orbital Workshop as an embryonic space station; (5) longer-duration flights of one year or more; and (6) use of Apollo flight hardware and physical plant

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June 6 (continued)

and employment of Apollo program officials and industrial organizations as they become available.

"...this is a program that provides for a detailed measurement of the utility of man in space at a relatively low cost. The measurement is obtained by doing useful things--astronomical observation, extended exploration of the moon and experiments with sensing equipment that can lead to benefits of enormous significance to all mankind." (Text)

- . Mrs. Lyndon B. Johnson presented Phoenix, Ariz., Mayor Milton Graham with FAA's Airport Beautification Award for the city's "outstanding community-wide program to make its airport premises a center of culture and beauty." Award, accepted at White House ceremony on behalf of the Phoenix Sky Harbor Municipal Airport, was first presented in FAA's new program to honor public and private organizations which had protected, restored, or enhanced airport beauty. (FAA Release 67-53)

June 7: Launch of the first manned Apollo mission by March 31, 1968,

"is a very difficult milestone to achieve, but it is possible,"

George M. Low, Manager of the Apollo Spacecraft Program at MSC, told the press at MSC. All changes in the Apollo spacecraft necessitated by the Jan. 27 Apollo fire had been planned, he said, but until daily scheduling was completed, no date could be set for the mission. Low noted that Apollo parachute landing system might require requalification because design changes had increased spacecraft's weight by 200-300 lbs, but he indicated that testing, if necessary, could be conducted in summer 1967 without seriously affecting the Apollo schedule. (Tech Wk, 6/12/67, 15; SBD, 6/8/67, 217)

- . Sen. William Proxmire (D-Wis.) warned the Senate that U.S. deficit could reach \$30 billion unless drastic cuts were made in Federal spending. He suggested that a \$5-billion reduction in proposed FY 1968 spending be made by: (1) postponing public works programs such as highway construction until economic and military demands were lowered; (2) foregoing the "expensive frill" of SST development; (3) curtailing military costs by further reducing U.S. troop strength in Europe; and (4) cutting NASA's post-Apollo funds by over \$1 billion by postponing "such projects as a soft-landing on Mars, which has nothing to do with our present goal of a Moon landing.

"The situation that we face in fiscal 1968 involves an economy dominated by a heavy Federal budget, no matter how it is measured. If these circumstances materialize, there is no question about the immediate urgency of substantial expenditure reductions.... We may need a tax increase too, but first priority by all means should go to the reduction of spending." (Text)

June 7: NASA selected Bendix Field Engineering Co. for negotiations on \$21-million contract to provide maintenance and operations services at two U.S. and four foreign Space Tracking and Data Acquisition Network (STADAN) sites, and at NASA Communications Center and Network Test and Training Facility, both at GSFC. Effective Oct. 1 for three-year period with NASA options for two one-year extensions, contract covered actual cost-plus-incentive award based on performance. It completed maintenance and operations arrangements for STADAN. (NASA Release 67-148)

- . OAR's AFCRL would launch four 812-ft-long balloon systems from Walker AFB in summer 1967 to complete series of five launches conducted by NASA to investigate possible parachute landing systems for Voyager program [see May 9], OAR Commander M/G Ernest A. Pinson announced. Scheduled for June 27, July 20, Aug. 9 and 24, flights would evaluate performance of different types of parachutes at pressures and velocities equivalent to a descent through the Martian atmosphere. Each balloon would carry, for release at high altitude, a simulated Voyager capsule and a parachute designed to softland the capsule on Mars. Five cameras--two on the capsule and three on the parachute--would be used to evaluate each test. First flight in the series was conducted Aug. 30, 1966. (OAR Release 67-17; AP, NYT, 6/8/67, 3)
- . MSFC had awarded Lockheed Missiles & Space Co. a \$334,031 contract to study methods of increasing the number of astronauts that could be delivered to the moon with the Saturn V booster and to determine the most promising concepts for efficient delivery of logistic payloads. For the purposes of the study, Lockheed would consider: (1) a hypothetical 1975 mission involving two "product improved" Saturn V boosters--one to launch a modified Apollo spacecraft and one to launch a cargo payload; and (2) a hypothetical 1980-82 mission in which two Up-rated Saturn V boosters would launch a six-man spacecraft directly to the moon. (MSFC Release 67-123)
- . Widow of NASA X-15 test pilot Joseph A. Walker filed \$1-million damage suit for the June 8, 1966, death of her husband when his F-104 fighter aircraft collided with an XB-70 experimental bomber near Barstow, Calif. Aircraft had been flying in tight formation "to allow photographic coverage of aircraft powered by General Electric engines" for publicity purposes. Mrs Walker's suit, filed in Federal Court in Los Angeles, charged negligence on the part of General Electric Co. and its chief test pilot John M. Fritz, and North American Aviation, Inc., manufacturer of the XB-70. (UPI, W Post, 6/9/67, A2)

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June 7: Scientists have an increased responsibility to relate the merit of their research to the public "in understandable terms," M/G Ernest A. Pinson, commander of USAF Office of Aerospace Research, suggested at 12th Annual Science Seminar in Albuquerque, N. Mex. "Science has to do a better job in making known its values and its needs. Science has to remember that the past 25 years, when everything came comparatively easy for financial support of research, are gone and that science has to compete with many other high priority sectors of the economy" for operating funds. (OAR Release 67-13)

- . Two ten-week programs for college faculty members, administered jointly by Auburn Univ., Univ. of Alabama, and MSFC, opened at MSFC. First program, a summer institute in space-related sciences conducted by Univ. of Alabama, was one of six such institutes sponsored by NASA and the American Society for Engineering Education. Second, administered by Auburn Univ., was the 1967 NASA Engineering Systems Design Summer Faculty Fellowship Program. (MSFC Release 67-124)

June 8: U.S.S.R. successfully launched Cosmos CLXIV. Orbital parameters: apogee, 320 km (199 mi); perigee, 202 km (126 mi); period, 89.5 min; and inclination, 65.7°. (AP, NYT, 6/9/67, 3)

- . Adjustments of Lunar Orbiter IV's orbit were successfully conducted June 5 and 8 to place spacecraft on path similar to that intended for Lunar Orbiter V. Adjustments, which lowered apolune to 2,450 mi (3,943 km) and perilune to 48 mi (77 km), were made to enable LaRC engineers "to gather useful tracking and gravitational field experience" in preparation for flight of Lunar Orbiter V. (NASA Release 67-154)
- . Memorial services in Houston for Astronaut Edward G. Givens, Jr., were attended by many of his fellow astronauts and their families. Givens would be buried June 9 in Quanah, Tex. (MSC Roundup, 6/9/67, 1; AP, W Post, 6/9/67, B8)
- . Single global time zone would be advantageous with the speed of communications and transportation in the space age, OSSA Director of Space Applications Programs Leonard Jaffee told the Armed Forces Communications and Electronics Assn. in Washington, D.C. "We are almost approaching the point where the remaining obstacle to global business, aside from the political problems, will be the zonal time differences.
"At the moment time differences are aggravations to the total realization of our new-found communications and transportation capabilities, but not complete deterrents.... Today, if it is important enough, we make allowances for and tolerate time differences--tomorrow we may

June 8 (continued)

have to do something about [them]...because as our business and cultural patterns change in this space era, these time differences will become intolerable.

"...the space age has already contributed the concept of 'one world - one time.' By creating a common time and acceptance of a day not geared to the rising and setting of the Sun, we may be able to extend this to an acceptance of 'one day' consisting of 24 hours...during which we will make optimum use of our roads, our schools, our factories, our communications and transportation facilities...[with] 3-shift use...[so that] current facilities could handle three times as many people."
(Text)

- . FAA Administrator Gen. William F. McKee received Washington, D.C., Air Line Traffic Assn.'s 1967 "Man of the Year" award. (Av Wk, 6/19/67, 13)

June 9: USAF launched an experimental reentry vehicle by Atlas-F booster from Vandenberg AFB as part of Advanced Ballistic Re-Entry Systems (ABRES) program. (Tech Wk, 6/19/67, 15)

- . The recent lack of support for the construction of large ground-based telescopes which were "necessary for the orderly advance of astronomy" was criticized by Horace W. Babcock, Director of the Mt. Wilson and Palomar Observatories, in Science. A 200-in telescope in the Southern Hemisphere, which would cost about \$20 million, was urgently needed, Babcock said, and the resulting gains to science "would be tremendous. By contrast, one cannot refrain from pointing out that the first of the four scheduled orbiting astronomical observatories...cost American taxpayers \$62 million.... Unfortunately, this well-conceived experiment transmitted no data because of an equipment failure. Expenditures for this one orbiting observatory, which, at best, might have had a lifetime of 1 year, would have been ample for the construction of three 200-in telescopes on the ground, completely equipped. Certainly a more equitable distribution of funds would have a great and valuable impact on basic science...." (Babcock, Science, 6/9/67, 1318-9)
- . Rep. J. Edward Roush (D-Ind.) introduced to the House H.R. 10674, a bill to rename the Indiana Dunes National Lakeshore in honor of Astronaut Virgil I. Grissom who died in Jan. 27 Apollo accident. (NASA LAR VI/65)
- . U.S., France, and U.K. had had excellent displays at Paris International Air and Space Show [see May 23-31], but visitors had seemed most impressed by U.S.S.R. exhibit, Time magazine editorial noted. "The greatest Soviet surprise was the launch vehicle that in 1961 sent Pioneer Cosmonaut

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June 9 (continued)

Yuri Gagarin into orbit in Vostok 1.... Visitors at the show flocked to a huge mock-up of the 13.6-ton Proton satellite, [to]...a model of their advanced Molniya communications satellite, [and to]... the variety of new Russian jet liners.

"...the U.S. went all out...[and] Britain and France also put their best fleet forward.... But it was the Russians who stole the show, simply by taking the wraps off space hardware--some of it a decade old --that they had never before displayed in the West...." (Time, 6/9/67)

- . Decrease in worldwide air temperature since the 1940's might be due to emission of man-made pollutants into the atmosphere, National Center for Air Pollution scientists Robert A. McCormick and John H. Ludwig suggested in Science. Increasing amount of solid material made atmosphere more turbid and thus reduced amount of solar radiation reaching earth. Although excessive amount of carbon dioxide in atmosphere as a result of prolonged coal and oil burning should have made earth warmer, the authors noted, its effect had been offset by the turbidity caused by the pollutants. (McCormick, Ludwig, Science, 6/9/67, 1358-9)

June 10: LaRC selected Lockheed California Co. for negotiation of a \$750,000 contract for a 19-mo R&D program leading to design of a hypersonic aircraft wing structure. Lockheed would "assess the validity of several wing structural concepts...and provide the technology required for NASA to determine which combination of concepts is best...." (NASA Release 67-152)

- . President Johnson announced that he had accepted "with deepest reluctance and regret" the resignation of Cyrus R. Vance as Deputy Secretary of Defense, effective June 30. Vance would be succeeded by Secretary of the Navy Paul H. Nitze. (PD, 6/19/67, 860)

June 11: Recent experiments by USAF scientists had proved that satellites could communicate directly--unaided by relay stations--from opposite sides of earth, AFSC announced. Experiment, in which HF and VHF signals were transmitted between two satellites launched Nov. 3, 1966, confirmed theory that ionosphere resembled a "whispering gallery" in which sound waves traveled along a curved area with only minor volume loss. (AFSC Release 116.67)

- . U.S. and Australian scientists would begin extensive survey off coast of western Australia Aug. 8 to test continental drift theory--hypothesis that earth's continents were once part of one or two

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June 11 (continued)

"supercontinents" that broke apart millions of years ago and have since been constantly drifting in earth's mantle. Survey, which would be conducted as part of a global expedition currently underway by USC&GS Oceanographer, would use echo soundings to determine depths and angles of ocean floor and measure seismic waves produced by underwater explosions in an effort to determine whether Australia was once joined with Antarctica, and possibly India. (ESSA Release 67-51)

- . A 236-in-wide mirror which would be used by U.S.S.R. in world's largest reflector telescope was nearing completion, Walter Sullivan reported in the New York Times. After cooling from a molten state for $1\frac{1}{2}$ years, mirror had been cut to produce concave, parabolic configurations and was currently undergoing final grinding at a factory near Moscow. It would soon be shipped to a new observatory in the northern Caucasus, which would be operated directly by the Soviet Academy of Sciences. Largest reflector telescope in use at present time was 200-in-wide instrument at Mt. Palomar Observatory. (Sullivan, NYT, 6/11/67, 15)

June 12: Cosmos CLXV was launched by U.S.S.R. into orbit with 1,542-km (958-mi) apogee; 211-km (131-mi) perigee; 102.1-min period; and 81.9° inclination. Equipment was functioning normally. (UPI, W Star, 6/13/67, A70)

- . Venus IV unmanned probe was successfully launched by U.S.S.R. on a four-month journey toward Venus. Tass announced that the 2,438-lb spacecraft--heaviest Venus probe ever orbited--had been launched into a parking orbit and then injected on a trajectory "close to the prescribed one." All onboard equipment was functioning normally. There was no indication whether spacecraft--launched two days before scheduled launch of NASA's Mariner V Venus flyby mission--would attempt a flyby of the planet or a soft-landing. (NYT, 6/13/67, C19; AP, W Post, 6/13/67, A11; Nordlinger, B Sun, 6/13/67)
- . Rep. William F. Ryan (D-N.Y.), speaking on the House floor, urged Congress to reopen its investigation of NASA, with particular emphasis on management policies and procedures. He said the Phillips Report indicated NASA "has had grave difficulty in enforcing standards of workmanship, implementing safety and inspection procedures and in properly supervising contractor costs and time schedules. The results of more recent reviews of North American and reviews of other contractors have again not been made public.

June 12 (continued)

"Under such unsatisfactory conditions, accidents and failures can well be expected. Congress should be less concerned with the technical cause of a particular fire and more with the space agency's lack of control over its own program. It is with this in mind that I have regretted the untimely close of the congressional hearings and requested further substantive investigation into the area of NASA management...." (CR, 6/12/67, H7033)

- . Although ARC was the smallest NASA field center, Newsweek said, it was producing "some of the agency's biggest ideas." Summarizing ARC history, the article noted that when center opened in 1940 it had been primarily a site for testing warplane aerodynamics. "Ames still maintains its original wind tunnel--the world's largest--as well as 29 others, [but aeronautics]...represents only a quarter of the effort at Ames today. Most of the scientists are otherwise engaged in pure research in such fields as planetology, exobiology...and chemical evolution.
"...the center's laboratories enable more than a thousand scientists, engineers and technicians to pursue as wide a variety of problems as their imaginations and the broad guidelines of the space program permit. The problems now range from designing a new hard space suit to studying the effect on mice of reproducing in a 2G environment."
(Newsweek, 6/12/67)
- . ERC awarded MIT a three-year, \$7.9-million contract for R&D of high-performance gyroscopes and accelerometers "to guide and control the vehicles planned for the complex aeronautical and space missions of the 1970s and 1980s." It was anticipated that instruments would make possible systems which would navigate advanced supersonic aircraft to intercept runway landing beams without present runway aids; provide highly-precise pointing references for satellites; and guide interplanetary vehicles on missions lasting one year or more. (NASA Release 67-155)
- . NASA awarded Aerojet-General Corp. a two-year, \$17-million contract extension for R&D work on SNAP-8 nuclear reactor electrical power system. (NASA Release 67-156)
- . NASA was consulting with Aerospace Industries Assn. (AIA) and with individual aircraft companies on a proposed research program which would support areas of general aviation, Technology Week reported. At the request of several users, NASA had identified a number of technical areas where the application of advanced technology seemed warranted but emphasized that NASA's efforts should be with aircraft designers and it should have no responsibility for the application of technology. (Tech Wk, 6/12/67, 3)

- June 13: Twenty-one U.S. astronauts began a week of training at USAF's Tropical Survival School in Panama. Their first meal was iguana thermador and baked armadillo. (W News, 6/13/67; AP, C Trib, 6/14/67)
- . Donald L. Mallick, a pilot and engineer at FRC, and L/Col. Emil Strumthol (USAF), chief of AFFTC's bomber section, were selected as pilots in joint NASA-USAF XB-70 research program. (FRC Release 17-67)
 - . NASA test pilot Milton O. Thompson received AIAA's 1966 Octave Chanute Award in Los Angeles for "his contributions both as an engineer and a pilot in the development and conduct of the manned lifting body flight test program." Award was presented annually to the pilot who had contributed most to the aerospace sciences during the preceding year. (FRC Release 15-67)
 - . Average U.S. taxpayer would not help finance any space program beyond manned lunar landing unless he could understand it and identify with its purpose, M/G John B. Medaris (USA, Ret.) told AAS Symposium in Huntsville. "Putting a man on the moon was a good objective. People can see the moon. They can understand communication and weather information and possible defense benefits from a moon landing.
 "But after the astronaut puts an American flag on the moon's surface and satisfies the public, what will happen to our program then? We have to have a steady commitment of great resources to keep this program going. We have got to convince the public that there is a link between them and our next objectives...[and] give them some sort of objective they can identify with their own welfare."
 Noting that "people recoil in fear from the concept of the endlessness of interstellar space," General Medaris suggested that public would approve of an objective such as establishment of a lunar colony. "We better forget the spectacular and use a public relations approach like the soap companies do and figure out what the public will pay for."
 (Houtz, B News, 6/14/67)
 - . ITT had signed contract "involving several million dollars" with Indonesian Government to build Indonesia's first satellite communications earth station near Djakarta. Project was subject to obtaining financing under investment guarantees requested from Agency for International Development (AID). ITT predicted that station would be operational within 16 mos after final financial arrangements had been completed. (DJNS, W Star, 6/13/67, A21)
 - . Sen. Howard W. Cannon (D-Nev.) inserted in the Congressional Record a UPI dispatch stating that U.S.S.R.'s Tu-144 supersonic aircraft would be test-flown "within a few months." Noting that U.S. SST program was

June 13 (continued)

- "from 3 to 3½ years behind the time when the [Anglo-French] Concorde and the TU-144 will enter into commercial service," Senator Cannon urged the House to quickly approve the \$198-million authorization request for SST construction. "The supersonic transport is an important program...[and] it is imperative that this country proceed with the construction.... This is an arena of industrial competition in which the United States cannot afford to finish second." (CR, 6/13/67, S8141-2)
- . U.S.S.R. preferred "to wait for technical reasons" until its Il-62 aircraft was ready and thus was postponing first direct Moscow-New York flights until "later this year," U.S. State Dept. announced. Commercial service by Aeroflot and Pan American World Airways had been scheduled to begin in late spring under Nov. 4, 1966, agreement. (AP, NYT, 6/14/67, 47)
 - . Prime Minister Harold Wilson confirmed U.K.'s decision against the purchase of U.S. Poseidon missiles [see May 11]. Asked in the House of Commons if he planned to keep the House informed on any major changes in the British nuclear armory, Wilson replied: "If you are referring to a proposal to replace Polaris by Poseidon, the answer is that the Government has no such intention." (NYT, 6/14/67, 11)
 - . Current FAA R&D programs were discussed by FAA at its first annual "Report to Industry" meeting in Washington, D.C. Meeting was designed to keep aviation public informed of R&D programs which would result in the introduction of new elements in the National Airspace System. (FAA Release 67-8)
 - . USAF had developed new transportable "fold away" radar system which could be assembled or dismantled in less than 20 min. Called TPS-44, system would be used in tactical aerospace operations. (AFSC Release 88.67)

June 14: NASA's Mariner V (Mariner E) spacecraft was successfully launched from ETR by Atlas-Agena D booster on four-month, 212-million-mi Venus flyby mission--NASA's only attempt to conduct a Venus flyby during the 1967 launch window. Agena stage separated from Atlas on schedule and ignited to reach 115-mi (185-km) -altitude parking orbit, where it coasted for 13 min before reigniting to inject spacecraft onto transfer trajectory toward Venus. Spacecraft then separated from Agena, deployed its four solar panels, and locked its sensors on the sun and the star Canopus. Midcourse maneuver was successfully conducted June 19 to assure that spacecraft would fly with 2,500 mi of Venus Oct. 19. [U.S.S.R.'s Venus IV, launched June 12, was expected to reach Venus around same time.]

June 14 (continued)

Mariner V, fifth in a series of interplanetary probes, had originally been built as a Mars probe to back up Mariner IV but was re-modeled to accomplish Venus '67 mission. Primary mission for the 540-lb spacecraft was to fly by Venus to obtain scientific data which would complement and extend data obtained by Mariner II pertaining to the origin and nature of Venus and its environment. Spacecraft's secondary mission was to obtain data on interplanetary environment during a period of increased solar activity and provide engineering experience in converting and operating spacecraft designed for flight to Mars into one flown to Venus. Mariner V carried automatic sensing devices to record data on radiation levels, temperatures, pressures, magnetic fields, and atmospheric density near Venus.

First Venus probe, Mariner I, was destroyed during launch July 22, 1962; second, Mariner II, was successfully launched Aug. 27, 1962, and flew within 21,600 mi of Venus Dec. 14, 1962. Mariner III, a Mars probe launched Nov. 4, 1964, failed to achieve desired orbit when shroud remained attached to spacecraft. Mariner IV was successfully launched Nov. 28, 1964, and transmitted first close-up photos of Mars in July 1965. Mariner program was directed by OSSA Lunar and Planetary Programs Div.; project management and responsibility for spacecraft, mission operations, and tracking and data acquisition were assigned to JPL; and Atlas-Agena launch vehicle was managed by LRC. (NASA Proj Off; NASA Release 67-124)

- . NASA announced incorporation of at least seven changes in Apollo Lunar Module (LM) program "to reduce the possibility of fire and to increase crew safety" in accordance with Apollo 204 Review Board findings [see April 9]. Changes, which would increase total weight by 25-125 lbs, included: (1) reassessing combustibility of all nonmetallic materials and substituting or redesigning where necessary; (2) reevaluating material acceptability by intentionally starting fires in LM mockup; (3) modifying water hose and providing a hose nozzle to permit use of water as a fire extinguisher; (4) using a built-in handle, rather than a removable tool, to open hatches; (5) instituting more stringent standards and controls on electrical systems and wiring; (6) adding isolation switches to electrical systems to ensure that no connector is "hot" while being connected or disconnected; and (7) installing TV camera to monitor activity inside LM cabin during ground tests. Changes were being made at Bethpage, N.Y., plant of Grumman Aircraft Engineering Corp., LM prime contractor. (NASA Release 67-159)
- . Special tests to determine best way to recover and reuse Saturn V 1st stage (S-IC) were being conducted at MSFC. In tests, a 1/10 scale model of the S-IC was dropped from altitudes of up to 156 ft into a

June 14 (continued)

- 20-ft-deep water tank to simulate descent of stage through earth's atmosphere and into the ocean. Tests were studying a "soft splash" concept designed to bring back S-IC with a minimum of damage. MSFC engineers said a workable recovery method would save "millions of dollars" in future years. (MSFC Release 67-127)
- . Astronaut James A. Lovell, Jr., told the press at MSC that he did not foresee any problems in combining his new assignment as President's Consultant on Physical Fitness [see June 6] with his duties as an astronaut. He said he would devote about one fourth of his time to the fitness program and the rest to keeping "in a state of readiness" for future space flights. "The fact that I am not spending all of my efforts on my new assignment does not mean I consider it any less important than my role in space. In fact, I can't think of any mission more important than that of persuading the American people to keep themselves healthy and fit. These qualities are basic to everything we do. Whether we are trying to reach the moon, or merely running to catch a bus, it helps to be in good physical condition.... A healthy population is the backbone of a strong nation." (Text)
 - . KSC awarded General Electric Co. a \$7.7-million, cost-plus-fixed-fee contract modification for additional Apollo engineering support services. Modification, effective through Sept. 30, 1967, increased total value of original contract to \$49 million. (NASA Release 67-158)
 - . Four U.S. universities--Cal Tech, Univ. of California, Univ. of Michigan, and Stanford Univ.--had formed Associates for Radio Astronomy to design, build, and operate world's largest, fully-maneuverable radiotelescope. The 328-ft-dia dish-shaped radiotelescope--78 ft larger than one at Jodrell Bank Experimental Station which was largest in operation at present time--would be constructed northeast of Pasadena in Owens Valley, Calif. (UPI, St. Louis P-D, 6/14/67)
 - . Joint Senate-House Atomic Energy Committee approved Weston, Ill., as site for AEC's 200-billion electron volt (bev) proton accelerator. (UPI, WSJ, 6/15/67, 5)
 - . Secretary of Transportation Alan S. Boyd received National Aviation Club's Award for Achievement in Washington, D.C., for "leadership in the development and establishment of...[DOT] and for his long and successful career in...air transportation and public utilities." (NAC; Av Wk, 6/12/67, 23)
 - . Aircraft flown by pilots "lacking professional ability"--usually those in general aviation--were responsible for most air accidents, according to study by Cornell Univ.'s Daniel and Florence Guggenheim Aviation Center.

June 14 (continued)

Fatalities involving general aviation aircraft in 1966 in U.S. totaled 1,069, compared with a loss of 59 passengers by scheduled domestic airlines, the study noted. "It is apparently futile to try to persuade the majority of pilots to secure and maintain instrument proficiency.... It would seem more effective to attack the problem of requiring manufacturers to incorporate better aircraft stability and controllability characteristics...." Other methods suggested to improve air safety included: (1) raising airport standards by improving lighting and increasing landing aids, anti-collision devices, and weather data accuracy; (2) reviewing pilot certification procedures and incorporating more "human factors" into aircraft design; and (3) intensifying methods of crash fire protection and reevaluating emergency evacuation procedures. (NYT, 6/15/67, 81)

- . AEC published recently declassified production figures on the capacity of its three gaseous diffusion plants that produced nuclear materials for weapons and power reactor fuels. Plants--at Oak Ridge, Tenn.; Portsmouth, Ohio; and Paducah, Ky.--separated Uranium-235 from natural uranium. There was speculation that production figures were released to aid U.S. representatives negotiating a non-proliferation treaty in Geneva. Officials could use figures to assure "nuclear have-not" nations that U.S. could meet their nuclear fuel needs, thereby dissuading them from seeking to become nuclear powers. (AP, NYT, 6/15/67, 23; Myler, W Post, 6/15/67, A10)

June 15: Maj. Michael J. Adams (USAF) flew X-15 No. 1 to 3,570 mph (mach 5) and 227,000-ft altitude in test to build up pilot altitude and check out horizon scanner and horizontal stabilizer. (X-15 Proj Off)

- . New \$1.3-million science laboratory for extensive research on problems of fatigue in aircraft structures and space vehicles was being placed in operation at LaRC. Laboratory would utilize 50 testing devices to simulate loads, temperatures, and other environmental conditions encountered by the materials in the structures of aircraft and space vehicles. (LaRC Release)

June 16: U.S.S.R. launched Cosmos CLXVI into orbit with 578-km (359-mi) apogee; 283-km (175-mi) perigee; 92.9-min period; and 48.4° inclination. Instruments performed satisfactorily. (UPI, W News, 6/16/67)

- . USAF launched an unidentified satellite by Thor-Agena booster from Vandenberg AFB. (AP, KC Times, 6/17/67)

June 16: NASA, in cooperation with West Germany's Ministry for Scientific Research (BMwF) and Brazilian Space Activities Commission (CNAE), successfully launched an Argo D-4 (Javelin) sounding rocket from Barreira do Inferno range near Natal, Brazil, on ballistic trajectory through Van Allen radiation belts to 650-mi (1,000-km) altitude. Purpose of mission was to flight-test instruments being developed for West German research satellite, scheduled for launch in 1969 to investigate earth's radiation belts. Several German organizations provided scientific experiments; CNAE provided range and launching services; NASA provided sounding rocket, downrange telemetry, and radar. (WS Release 67-23)

- . NASA had completed post-launch evaluation of Essa V meteorological satellite and adjudged the mission a success. Launched by NASA from WTR April 20, satellite had been turned over to ESSA for operation May 8. (NASA Proj Off)
- . NASA and Boeing Co. signed a \$20-million letter contract extending the scope of Boeing's work with NASA to include integration of Apollo spacecraft's three modules with Saturn V launch vehicle [see May 9]. Boeing would: (1) assist and support NASA and its three manned space-flight centers--MSC, MSFC, and KSC--in performance of certain technical tasks for Apollo missions AS-501 through AS-515; and (2) be responsible for supporting Apollo Program Office in integrating Saturn V booster with Apollo Command Module (CM), Service Module (SM), and Lunar Module (LM). Work would be performed under overall direction of OMSF Apollo Program Office. Boeing Co.'s currently contracted Saturn work included engineering, construction, and testing of Saturn V 1st stage; support of assembly and system integration of Saturn V 2nd and 3rd stages with the 1st; and design engineering support of certain ground support equipment at KSC. (NASA Release 67-161)
- . NASA approved Phase II of a Dec. 14, 1966, contract and awarded Goodyear Aerospace Corp. \$650,000 to design, fabricate, and test a full-scale model of a 30-ft-dia parabolic antenna. Antenna, planned as part of experimental package on proposed second-generation Applications Technology Satellites (ATS F and G), would be used for advanced communications research. (GSFC Release G-32-67)
- . The use of ammonia as a fuel for central power plants, turbine-driven busses, trucks, and trains, and possibly private cars, would solve the problem of air and water pollution, Lockheed Aircraft Corp. executive Leon Green, Jr., wrote in Science. He suggested that fossil fuels such as gasoline oil, coal, and natural gas be converted into ammonia rather than burned directly. Heat for the conversion could be provided by nuclear power plants. The economic feasibility

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June 16 (continued)

of the process would depend on "the economic value of the byproducts of sulphur, carbon dioxide, water and possibly nitrogen," Green said, "and upon the price we are willing to pay for a clean environment." (Green, Science, 6/16/67, 1448-50; AP, NYT, 6/17/67, 15)

June 17: Cosmos CLXVII was successfully launched by U.S.S.R. into orbit with 286-km (178-mi) apogee; 201-km (125-mi) perigee; 89.2-min period; and 51.8° inclination. (SBD, 6/20/67, 280)

- . Nation's most powerful 260-in solid-propellant rocket motor, SL-3, developed 5.7 million lbs thrust and burned 1.6 million lbs of propellant in 80-sec test-firing conducted for NASA by Aerojet General at Homestead, Fla. Only flaw was explosion of a portion of the exhaust nozzle at the end of the test. Purpose of firing, third in NASA's Large Solid Rocket Technology Program, was to test "a large, submerged-type, ablative nozzle; the use of inert slivers to control the burn-out of propellant; elements of a motor failure warning system; and a higher burning rate propellant." First two 260-in motors, SL-1 (fired Sept. 25, 1965) and SL-2 (fired Feb. 23, 1966), both operated about two minutes and produced 3.5 million lbs thrust in tests to check strength of the maraging steel motor case, structural integrity of the case propellant, insulation and ablative nozzle, and the repeated performance of test hardware. Managed by LRC under OART direction, program was designed to demonstrate feasibility of building and operating solid motors of greater size than those in current use for multistage launch vehicle systems carrying heavy payloads into space. (NASA Release 67-151; Lewis News, 6/9/67, 1; Reistrup, W Post, 6/18/67, A2; NYT, 6/18/67, 6; Marshall Star, 6/21/67, 10)
- . NASA Administrator James E. Webb received an honorary Doctor of Science in Commerce degree from Drexel Institute of Technology in commencement exercises in Philadelphia. (NASA PAO; P SB, 6/18/67)
- . Communist China successfully exploded her first hydrogen bomb over the western region of the country, Hsinhua, the Chinese Communist press agency, announced. (NYT, 6/18/67, 1, 3)

June 18: NASA published Earth Photographs from Gemini III, IV, and V, an atlas containing reproductions of 244 high-quality earth photos taken by Gemini astronauts. Pictures, which were taken with hand-held cameras from 100- to 215-mi altitudes as scientific, meteorological, and terrain experiments, showed major natural features and some

June 18 (continued)

man-made ones in 50 countries around the world. (NASA SP-129; NASA Release 67-153)

- . Citizens League Against the Sonic Boom, an organization with 230 members in 18 states, had started a campaign to stop the construction of a U.S. SST, New York Times reported. Harvard Univ. physicist Dr. William A. Shurcliff, director of the campaign, said in a Cambridge, Mass., interview that the League would attack the SST program in Congress. "The amount of money provided thus far by Congress is less than one-quarter of what is needed to get a prototype in the air. The government must put about \$1.1 billion together, and to date Congress has only supplied \$200-million or \$299-million.
"I think our chances of stopping the program are good." (NYT, 6/18/67, 60)

June 19: Tiros VII, oldest U.S. meteorological satellite in operation, completed its fourth year in orbit. Designed with a three- to six-month operational lifetime, satellite had traveled 594,000,000 mi, completed 21,600 earth orbits, and taken over 124,500 photos of 50,000,000,000 sq mi of earth and its cloud cover. NASA said Tiros VII, which had tracked the major hurricanes of 1963, 1964, and 1965, was now commanded to transmit photos only occasionally. (AP, NYT, 6/18/67)

- . NASA and USAF were expected to sign an agreement in fall 1967 for a joint lifting-body vehicle research program, Technology Week reported. NASA would probably have overall management responsibility of program, which would include test flights by USAF's SV-5P and NASA's HL-10 lifting-body vehicles. (Tech Wk, 6/19/67, 3)
- . McDonnell Corp. was proposing an enlarged 9- to 12-man version of the Gemini spacecraft to meet NASA's requirements for a manned advanced logistics space ferry in the 1970's, George Alexander reported in Aviation Week. He predicted that MSC would award a \$150,000 extension to a \$300,000 study contract already held by McDonnell to further explore the concept. (Alexander, Av Wk, 6/19/67, 20)

June 20: NASA successfully conducted sixth of 10 planned rocket-launched flight experiments to investigate possible parachute landing systems for Voyager program. Two-stage Honest John-Nike rocket launched from WSMR ejected 40-ft cross-type parachute, one of three designs being

June 20 (continued)

studied, at 130,000-ft altitude, where earth atmosphere resembles that of Mars. Parachute descended to earth carrying 200-lb payload. Test was part of LaRC's Planetary Entry Parachute Program. (NASA Release 67-162)

- . USAF launched an unidentified satellite by Titan III-B booster from Vandenberg AFB. (Tech Wk, 6/26/67, 15)
- . Apollo spacecraft 017 was mechanically mated to Saturn V booster at KSC in preparation for AS-501 unmanned mission scheduled for launch in third quarter of 1967. KSC officials said no major problems had been discovered in additional inspection of Saturn V's 2nd stage [see May 24]. (Marshall Star, 6/21/67, 1)

June 21: NASA Argo D-4 (Javelin) sounding rocket launched from NASA Wallops Station carried 120-lb payload containing an ionosphere experiment prepared by GSFC and Southwest Center for Advanced Studies to 493-mi (793-km) altitude. Flight was coordinated with the over-passes of Alouette II, the Canadian satellite, and Explorer XXXI, the U.S. satellite, launched pick-a-back by NASA Nov. 28, 1965. Primary purpose of mission was to measure properties of the ionosphere and to correlate results with simultaneous measurements made by the two ISIS satellites. (WS Release 67-24)

- . All-weather landing capability would be a requirement for SST operations because long-range SST used fuel too quickly to permit prolonged holding in airport traffic patterns, Dr. Richard M. Head, ERC, told NASA Hq. press briefing on aeronautics research. He predicted that landings under zero visibility could be practical within a decade. Dr. Head also noted that, because of sun's influence on the ionosphere, SSTs with VHF radios might be subject to communications blackouts during the 1,200 mi of a trans-Atlantic flight when they were too far from land for line-of-sight VHF reception. Use of satellites to relay communications might be a possible solution to the problem, he suggested. (Schmeck, NYT, 6/22/67, 6)
- . MSFC had awarded three parallel contracts--\$94,000 to Boeing Co.; \$95,000 to TRW, Inc.; and \$96,000 to General Electric Co.--for further project definition work on the Voyager program. Objectives of the contracts, effective through Oct. 15, were to furnish NASA with current data on Voyager spacecraft systems design and perform engineering study tasks. (MSFC Release 67-129)

June 21: U.S.S.R., East Germany, Czechoslovakia, Hungary, and Poland withdrew from live international telecast scheduled for June 25 [see Feb. 7] for political reasons. U.S.S.R. charged that Western broadcasters were conducting "a slanderous campaign" against the Arab nations in the current Middle East crisis. (Gent, NYT, 6/22/67, 67M)

- . Astronomers at Lick Observatory, Santa Cruz, Calif., were beginning a new study of star movement against the background of galaxies so distant they appeared to be fixed in space, Lick astronomer Dr. Stanislaus Vasilevskis told a Santa Cruz news conference. "The Lick proper motion study will open a new approach to research in astronomy using modern electronic equipment." A primary purpose of the study would be to gain further information on the rotation of the earth's galaxy, he said. Completely automated equipment installed at Lick for the study was financed by \$367,120 NSF grant. (AP, NYT, 6/25/67, 12)

June 22: Senate Committee on Aeronautical and Space Sciences voted to report \$4.851 billion NASA authorization bill (S. 1296)--\$249 million less than \$5.1 billion NASA had requested for FY 1968. Committee reductions included \$120 million from Apollo Applications (AA) program and \$71.5 million--total amount requested--from Voyager program. Responding to Committee report, NASA Deputy Administrator Dr. Robert C. Seamans, Jr., issued a statement saying that the affected programs were of "first-rank importance to mankind. The scientists of this country have expressed deep concern that the United States is not making enough progress in the exploration of the planets.

"We feel that many members of Congress will want to give further consideration to the President's recommendations" for the AA program. (Reistrup, W Post, 6/24/67)

- . House completed general debate on NASA FY 1968 authorization bill (H.R. 10340) and was scheduled to resume discussion of bill June 27 when amendments would be considered and final vote taken. During debate Rep. Delbert L. Latta (R-Ohio) criticized the \$444.7 million recommended by Committee on Science and Astronautics for the Apollo Applications (AA) program: "...we could spend [that money] toward research and possible cure of cancer, stroke, and heart disease, rather than some nebulous undefined program that will take place when--and I emphasize this point--and after we get to the moon. This money is to be spent on hardware after we get to the moon. No one knows when we are going to get there...[and] if we spend this money perfecting these vehicles and this hardware today, it might be out of date when we get to the moon...." Rep. Olin Teague (D-Tex.),

June 22 (continued)

Chairman of House Committee on Science and Astronautics' Subcommittee on Manned Space Flight, defended the \$444.7-million recommendation. "The manned space flight program--Apollo, Apollo applications and advanced manned missions--drives the Apollo effort into its final phases and begins the work of realizing benefits for man on earth. It supports national security, fosters national growth, expands knowledge, and retains options for the future at a cost the country can well afford. To delay this program is, in effect, to cancel it. Such a decision would put the space plum in the hands of the Soviet Union...." (NASA IAR V/68; CR, 6/22/67, H7782, H7797)

- . NASA test pilot William H. Dana flew X-15 No. 3 to 82,000-ft altitude and 3,682 mph (mach 5.52) in flight at Edwards AFB. Purposes of test: (1) cold-wall heat transfer; (2) step-panel heat transfer; (3) boost guidance checkout; (4) sonic boom study; and (5) PCM checkout. (NASA Proj Off)
- . NASA test pilots Fitzhugh Fulton and Donald Mallick flew XB-70 No. 1 to mach 1.8 and 55,000-ft altitude in test to check out stability and control of handling qualities, by pass airflow calibration, and nose ramp flutter. (XB-70 Proj Off)
- . MSFC awarded contract extensions--\$149,914 to Bendix Corp. and \$149,485 to Boeing Co.--to conduct specified design study tasks on the Local Scientific Survey Module (LSSM), a vehicle being proposed for transporting men on the lunar surface. Modifications extended through August 1967 two parallel six-month contracts awarded the firms June 29, 1966. (MSFC Release 67-130)

June 23: NASA and Dept. of Interior's Bureau of Sport Fisheries and Wildlife announced an agreement whereby KSC would add 11,436 acres to the 46,530 acres currently available for controlled public usage under Bureau-managed programs. (NASA Release 67-163)

June 24: Christopher C. Kraft, Jr., Director of Flight Operations at MSC, received Virginia Press Assn.'s (VPA) "Virginian of the Year" award at joint banquet of the VPA and National Newspaper Assn. (NNA) during NNA's annual meeting in Richmond. Kraft said U.S. might miss 1970 target date to land the first man on the moon. "If we are lucky, and if everything works well, we can probably do it. But if we have a normal share of problems, as happens with any large research effort, then I don't think we can." (AP, W Star, 6/26/67, B5)

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June 25: 13 nations participated in first live global telecast linking five continents. Program was transmitted to a potential viewing audience of nearly 500-million persons in more than 30 countries via NASA's ATS I and ComSatCorp's Early Bird I and Intelsat II-B comsats. Entitled "Our World," two-hour telecast featured the Beatles, Van Cliburn and Leonard Bernstein, Japanese shrimp fishermen, a Canadian mermaid, and a Wisconsin farmer. Five Communist nations--including U.S.S.R., whose Molniya I comsat was to have been used to transmit the telecast--had withdrawn from the program June 21 as a protest against Western involvement in current Middle East crisis. (NASA Ann 6/20/67; NET Proj Off)

During week of June 25: Ceremonies at NASA's Rocket Engine Test Site at Edwards AFB marked delivery of the millionth ton of cryogenic rocket propellants and pressurants. Fluids were used by North American Aviation, Inc.'s Rocketdyne Div. to test fire F-1 engines prior to shipping them to MSFC for use in Saturn V 1st stages. (MSFC Release 67-139)

June 26: NASA's Mariner V spacecraft successfully completed two of last scheduled maneuvers in preparation for Oct. 19 Venus flyby mission by switching its amplifiers to increase radio transmitting power and, 30 min later, turning off its battery charger on commands from Goldstone, Calif., Deep Space Network station. All systems onboard spacecraft, launched from ETR June 14, were continuing to operate satisfactorily. (NASA Release 67-165)

- . KSC awarded Federal Electric Corp. a one-year, cost-plus-award-fee contract containing provisions for four additional one-year renewals to provide operational communications and instrumentation support services at KSC. Estimated value for five-year period beginning July 1 was \$85 million. Federal Electric would operate and maintain instrumentation for telemetry, tracking, instrument calibration, and computation equipment and would provide computer programming services. (NASA Release 67-167)

June 27: Both House and Senate considered NASA FY 1968 authorization bills. Final votes would be taken June 28. (NASA LAR VI/68)

- . NASA Deputy Administrator Dr. Robert C. Seamans, Jr., visited MSFC and MTF to discuss progress in AA and Saturn launch vehicle programs. He would visit MSC June 28. (MSFC Release 67-132; Marshall Star, 6/28/67, 1)

June 27: The wife of Soviet Cosmonaut Aleksey Leonov, first man to walk in space, gave birth to their second daughter, Soviet press reported. (UPI, W Post, 6/28/67, A18)

- . Survey by New York Times correspondents indicated that Western Europe had taken little action to close the "technology gap" with the U.S., Brendan Jones reported. Discussions and meetings had helped clarify the problems but had also caused discouragement about achieving any quick solutions. Survey, which covered 10 countries, also indicated that increases being made in research spending in Western Europe were still comparatively small. Plans for combining technical knowledge by Common Market countries, or increasing exchange of technology with U.S. through NATO were in only the proposal stages. (Jones, NYT, 6/27/67, 51)
- . France exploded a nuclear device of "low yield" near Mururoa Atoll in the Pacific. (AP, NYT, 6/28/67, 3)

June 28: House and Senate both passed NASA FY 1968 authorization bills which were less than the \$5.1 billion originally requested by NASA. Senate bill (S. 1296) authorized \$4.851 billion: \$4.136 billion for R&D; \$648 million for administrative operations; and \$67 million for construction of facilities. House bill (H.R. 10340) authorized \$4.791 billion: \$4.076 billion for R&D; \$648 million for administrative operations; and \$67 million for construction of facilities.

Senate defeated two amendments by Sen. William Proxmire (D-Wis.) to reduce NASA authorization--one by \$317 million; one by \$98 million. An amendment by Sen. Charles Percy (R-Ill.) which would require NASA to keep Senate Committee on Aeronautical and Space Sciences "fully and currently informed" was also defeated. Committee Chairman Sen. Clinton P. Anderson (D-N.Mex.) said the proposal had been considered by the Committee and rejected as unnecessary: "It's not needed. What is needed is enforcement and compliance with existing legislation."

House bill authorized \$200.7 million less than Committee on Science and Astronautics had recommended [see May 16]. An amendment by Rep. Richard L. Roudebush (R-Ind.) to an amendment by Rep. James G. Fulton (R-Pa.) cut \$65 million from \$455 million proposed by Committee for AA program. Fulton's original amendment had recommended cutting the program by \$250 million. Remaining reductions, totaling \$135.7 million, were contained in surprise recommittal motion offered by Representative Fulton at the end of the day. They included: (1) \$6.2 million from advanced missions (funding eliminated); (2) \$21.5 million from Voyager; (3) \$20 million from nuclear rockets; (4) \$78 million from launch vehicle procurement; and (5) \$10 million

1 9 6 7

June 28 (continued)

from sustaining university program. Amendment also contained provision to establish an independent safety review board within NASA. Establishment of the board had been urged by Rep. Donald Rumsfeld (R-Ill.) as one means of avoiding another accident like the Jan. 27 Apollo fire. Differences between Senate and House authorization bills would be resolved by joint House/Senate Conference Committee. (CR, 6/28/67, S9078-94, H8150-200; UPI, NYT, 6/29/67, 11; Reistrup, W Post, 6/29/67, A6)

- . AFCRL successfully launched 65-lb payload by Trailblazer II booster from Wallops Station in experiment to study reentry communications problems by carefully measuring plasma sheath properties and their effects. Booster's 3rd and 4th stage engines fired at 187-mi altitude to propel nosecone downward; at 60-mi altitude rocket achieved a velocity of 18,000 fps creating an envelope of plasma identical to the envelopes which block radio and microwave communications with reentering spacecraft. Since a pure plasma was essential to the success of the experiment, reentry vehicle had no ablative coating and burned up completely in the atmosphere. AFCRL would use results of measurements to develop techniques for predicting exact behavior of a radiating system during reentry. (OAR Release 67-9)
- . FRC awarded RCA a \$2.59 million, fixed-price contract to design, fabricate, and install an instrumentation radar system at NASA's Ely, Nev., tracking site. Scheduled for completion by Dec. 30, 1968, system would be used to provide highly accurate position and velocity data on such high-performance aircraft as the X-15 and the XB-70. (NASA Release 67-172)
- . NAE announced establishment of an Aeronautics and Space Engineering Board to advise NASA and other Federal agencies. Board would operate under contract with NASA that estimated expenditures of \$186,500 during first year of operation. Chairman was Dr. H. Guyford Stever, President of Carnegie Institute of Technology. Col. Robert J. Burger, Executive Secretary of Scientific Advisory Board, USAF Hq., would become Executive Director Aug. 1, following his retirement from USAF. Board's first meeting would be held in Washington, D.C., in mid-July. (NAE Release)

June 29: Maj. William J. Knight (USAF) made successful emergency landing of X-15 No. 1 at Edwards AFB 59 sec after takeoff because of an electrical power failure. (X-15 Proj Off)

June 29: NASA awarded Philco-Ford Corp.'s Western Development Laboratories a \$45,757,000, multiple-incentive contract modification for continued engineering and operational support at MSC's Mission Control Center (MCC). (NASA Release 67-173)

- . Eight Apollo astronauts flew from New York to Iceland for eight-day expedition to gather geological data from an area believed to be similar to the lunar surface. Fifteen more astronauts were expected to join the expedition June 30. (NYT, 6/30/67, 13)
- . NASA released "Opportunities for Participation in Space Flight Investigation" (NHB 8030.1A) describing opportunities available to scientists and technical groups for including their experiments and equipment on NASA missions. Handbook, which superseded earlier edition published in July 1965, described each of NASA's present flight programs and noted opportunities available in automated and manned flights and in flight-related programs so that scientists would have an up-to-date review of missions currently being sponsored by NASA and could develop compatible experiments. (NASA Release 67-169)

June 30: MSFC awarded two contracts: (1) a \$2.4-million, two-month contract extension to Chrysler Corp. for procurement of long-lead time items for additional Uprated Saturn I 1st stages. Extension would enable Chrysler to continue procurements necessary to maintain capability to assemble four Uprated Saturn I boosters annually. (2) a \$14,811,540 fixed-price-incentive-fee contract to NAA for 60 additional H-1 rocket engines for use on 1st stages of Uprated Saturn I boosters. Order increased total number of engines purchased to 322. Delivery would continue through September 1968. (MSFC Releases 67-136, 67-138)

- . USAF named four USAF pilots to train for DOD's Manned Orbiting Laboratory (MOL) program: Maj. James A. Abrahamson; L/Col. Robert T. Herres; Maj. Donald H. Peterson; and Maj. Robert H. Lawrence, Jr., the first Negro selected for a mission in the Nation's space program. All were completing training course at Edwards AFB Aerospace Research Pilot School. They would join 12 previously selected pilots in September to begin project training. (USAF PIO; NYT, 7/1/67, 1, 8)
- . French Army and Foreign Legion evacuated Hammaguir Range in accordance with treaty granting Algerian independence. Sahara Missile Proving Grounds had been evacuated March 31. (NYT, 2/11/67; Av Wk, 3/27/67, 50)

June 30: Patent for a large circular vehicle which could roll across the rugged lunar terrain while its crew remained upright was granted to Martin Marietta Corp. executive Dr. Arthur A. Ezra. Open-sphere, 60-ft-dia vehicle had frame of circular metal rims and a closed cabin in the center which was suspended from gimbals and weighted so that floor would always remain level. Crew would steer vehicle with jet engines attached to cabin. (Jones, NYT, 7/1/67, 26)

During June: NASA had failed to locate Surveyor III's transmitting frequency after repeated attempts to reactivate spacecraft since May 23. Efforts to reestablish contact would be resumed on a limited basis after end of third lunar night which would begin July 1. (NASA Proj Off; SBD, 6/5/67, 194)

- . Computer system which furnished selected scientists with biweekly listings of the new technical developments in their fields was put into operation at Ft. Monmouth, N.J., Hq. of USA Electronics Command. Designated Selective Dissemination of Information (SDI), system utilized abstracts of scientific and engineering reports prepared at Defense Documentation Center, Cameron, Va. Abstracts were classified into 7,144 subjects, inserted into computers, and then registered on reels of magnetic tape bearing document profiles which described specific subject or subjects covered by the documents. Tapes were then sent to Ft. Monmouth where document profiles were matched with "interest" profiles of subscribers. Ft. Monmouth Commander M/G William B. Latta said the goal of the system was "to increase the productivity of our technical personnel by making sure that each scientist is kept abreast of the latest work in his specialty.

"Our researchers will thus be able to make maximum use of the scientific advances of their co-workers throughout the country and avoid costly duplication." (Lyons, NYT, 6/2/67, 22)

- . Col. Maynard E. White (USAF, Ret.), former Deputy Chief of Staff for Personnel, USAF Hq. in Europe, was appointed Director of Manned Space Flight Program Control, OMSF. (NASA Ann)

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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

JULY 1967

A CHRONOLOGY ON SCIENCE, TECHNOLOGY, AND POLICY

(HHR-23)

Text Drafted by Science and Technology Division
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NASA Historical Staff (EH)
Office of Policy
National Aeronautics and Space Administration
Washington, D.C. 20546

(For Insertion in Your Folder)

(PLEASE RETURN COMMENTS AND SURPLUS COPIES TO EH)

JULY 1967

July 1: USAF Titan III-C booster launched from FTR successfully inserted six satellites--three Initial Defense Communications Satellite Program (IDCSP) comsats; one Lincoln Experimental Satellite (LES-5); one DOD Gravity Experiment (DODGE) satellite; and one Despun Antenna Test Satellite (DATS)--into circular, near-synchronous orbits.

Powered flight of Titan III-C was close to planned parameters. Transtage and payload were inserted into parking orbit with 103-mi (166-km) apogee and 89-mi (143-km) perigee. First transtage burn made necessary course corrections; second transtage burn moved stage and payload into transfer orbit with 20,920-mi (33,666-km) apogee and 111-mi (179-km) perigee. Third burn put satellite dispenser frame and six satellites into final orbit with 20,809-mi (33,488-km) apogee and 20,453-mi (32,915-km) perigee. Between 3:21 and 3:23 pm EST satellites were ejected separately into slightly different orbital paths.

Three IDCSP comsats, combined with 15 others launched June 16, 1966 and Jan. 18, 1967, completed Pacific link of DOD's IDCSP system designed to provide reliable, full-time radio communications between Washington, D.C., and U.S. troops in Vietnam and other distant outposts. LES-5, first all solid-state UHF band comsat, would transmit radio signals and test communications to front-line troops. DODGE satellite would extend 10 metal booms to test satellite's stability, determine whether it could maintain position that would keep one side always facing earth, and transmit first color TV pictures of earth taken from orbit with a 22° camera. DATS, an advanced version of IDCSP comsats, carried new antenna designed to transmit 75% of radio signal strength --compared with current 15%--back to earth. USAF officials reported all satellites were functioning properly. (DOD Proj Off; UPI, NYT, 7/2/67, 20; W Post, 7/2/67, A4; Av Wk, 7/10/67, 39; Aero Tech, 7/17/67, 20)

- . AFSC's Ballistic Systems Div. (BSD) and Space Systems Div. (SSD) were combined to form new Space and Missile Systems Organization (SAMSO) with headquarters in Los Angeles. New organization--result of an extensive study "to determine most effective management posture" for USAF's space and missile program--would be commanded by M/G John W. O'Neill, former Commander of Electronic Systems Div. M/G John L. McCoy, former BSD Commander, was named Deputy Commander for Missiles; M/G Paul T. Cooper, former SSD Commander, was appointed Deputy Commander for Space. (AFSC Release 101.67; SSD Release 67-207)
- . Agreement between NASA and USAF to increase economy and efficiency in purchases of propellants and pressurants became effective. Under agreement, USAF would purchase most of the materials used in static tests at MSFC and MTF--liquid oxygen, liquid nitrogen, gaseous helium, and RP-1 --and thus reduce overlapping supply and distribution patterns caused by simultaneous NASA and USAF supply contracts with same commercial sources. (MSFC Release 67-107)

July 1: MSFC awarded McDonnell-Douglas Corp. a \$496,024 contract to study advanced versions of Saturn S-IVB orbital workshop. Study would explore concepts for a follow-on workshop for the Up-rated Saturn I and several more sophisticated versions for the Saturn V with initial emphasis on uses of the stage in Apollo Applications (AA) program. (MSFC Release 67-145)

- . Princeton Univ. astronomers were studying photos of ultraviolet spectra of Venus and Jupiter taken by a rocket-borne telescope launched from WSMR June 8 in an effort to provide additional data on Venutian atmosphere, the New York Times reported. Photos, taken at 118-mi altitude, provided "50 times more detail than ever obtained before," Dr. Donald C. Morton, director of Princeton's rocket astronomy program, explained. Princeton astronomers would continue analyzing spectrograms to determine composition of planets' gaseous atmospheres, he said, and would compare their findings with data transmitted by U.S.'s Mariner V and U.S.S.R.'s Venus IV spacecraft--both expected to reach Venus by late October. (NYT, 7/2/67, 21)
- . M/G Vincent G. Huston, former Commander of Air Force Eastern Test Range (AFETR) and recipient of NASA Leadership Medal, became Commander of AFSC's National Range Div. He succeeded L/G Leighton I. Davis who became Commandant of the Industrial College of the Armed Forces in Washington, D.C. (AFSC Release 103.67)

July 2: France exploded nuclear device from a balloon over Mururoa Atoll in the Pacific. Test--originally scheduled for July 14--was last in summer 1967 series of three designed to perfect a trigger for hydrogen bomb France planned to explode in 1968. (UPI, W Star, 7/3/67, B4)

- . SSTs would solve sonic boom problem by flying at subsonic speeds where necessary over densely populated areas, Secretary of Transportation Alan S. Boyd said on ABC TV's "Issues and Answers." Since development of SST was "very worthwhile" to national prestige, balance of payments, U.S. leadership in aviation industry, and advances in related technology, it should be continued despite rising costs of Vietnam war, he said. Citing urban congestion as U.S.'s major transportation problem, Boyd said DOT was trying to develop a balanced system of transporting people to and through cities. Even with expanded airport facilities, possible relief of congestion by means of aviation would be limited by ground congestion, he said. "I am even afraid to think about how much money it is going to cost if we are to be able to move people to and through airports with a reasonable sense of convenience." (Smith, W Post, 7/3/67, A17)

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July 2: NASA personnel changes: (1) John S. Brown, Division Director in the Office of Legislative Affairs, NASA Hq., became Deputy Assistant Administrator for Legislative Affairs; (2) John P. Jewett, Assistant Chief for Administration, Nevada Extension of AEC/NASA Space Nuclear Propulsion Office (SNPO-N), became Chief of SNPO-N. (NASA Ann, 7/2/67, 7/25/67)

July 3: Minor fire broke out during an unmanned vacuum chamber test of Lunar Module (LM) descent stage mockup at WSMR. NASA officials said vehicle was under a vacuum soak condition when fuel escaped into the vacuum chamber; fire apparently developed from spontaneous combustion. It was extinguished immediately by the water deluge system, and damage was believed to be minor. (WSMR Release)

- . "Unless U.S. space program moves much faster than now seems likely, U.S. consumption of helium this year...may be down as much as...25%," Chemical and Engineering News reported. Since Jan. 27 Apollo fire and resulting "slowdown" in space program, use of helium to pressurize rocket fuels --which accounted for 45% of helium consumption--had dropped to about half of its former level. Despite the 1967 recession, however, helium industry was optimistic that trend would be reversed when manned space flights were resumed in 1968. (C&E News, 7/3/67, 18-9)
- . USN had selected six companies to compete for six-month study contract to design ship-based antimissile missile system which would support Nike-X, William Beecher reported in New York Times. Companies were: Hughes Aircraft Co., Martin Marietta Corp., Boeing Co., Aerojet General Corp., McDonnell-Douglas Co., and Raytheon Co. Code-named Seaborne Anti-Ballistic Missile Intercept System (SABMIS), it would be deployed on submarines and warships stationed in international waters off Communist China and U.S.S.R. to intercept long-range missiles launched from those countries. A USA Nike-X official commented: "The Navy system is both feasible and attractive. It could intercept enemy ICBM's before they can deploy most of their penetration aids; it would reduce the number of missiles Nike-X would have to contend with; and it would tremendously increase the enemy's technology problems by forcing him to become very sophisticated indeed if he wants to stand any chance of getting his ICBM's past both the mid-course and terminal phase defenses." (Beecher, NYT, 7/4/67, 1, 2)
- . ERC Director James C. Elms announced appointment of Dr. Francis C. Schwarz as head of ERC's Power Conditioning and Distribution Laboratory. (ERC Release 67-22)
- . Col. Robert A. Merchant (USMC, Ret.), former Assistant Chief of Staff, USMC Hq., became Director of the new International Technology Affairs Div., Office of International Affairs, NASA Hq. He would be responsible

July 3 (continued)

for coordinating dissemination of NASA scientific and technical information abroad, developing recommendations for the disposition of export control cases, and exploring broader use of space technology overseas. (NASA Ann, 7/3/67)

- . Harold W. Yates, former chief engineer of Barnes Engineering Co.'s Field Research and Systems Dept., became Director of the National Environmental Satellite Center's Satellite Experiment Laboratory. (ESSA Release 67-17)
- . Applied science, which received more than \$3.5-billion in Federal funds in 1966, was being neglected, NAS report charged. A 20-man committee, headed by Dr. Harvey Brooks of Harvard Univ., said that the caliber of scientist being drawn into applied research was not commensurate with the dollars expended--perhaps because basic science was "more prestigious." Physical sciences had become the primary focus of Government and industrial research and had pushed biomedical and social sciences "into the shadows," report noted. (SciServ, NYT, 7/3/67, 17)

July 4: U.S.S.R. launched Cosmos CLXVIII into orbit with 268-km (167-mi) apogee; 199-km (124-mi) perigee; 89-min period; and 52° inclination. All equipment was functioning normally. (SBD, 7/6/67, 12)

July 5: George H. Hage, former Engineering Manager of Boeing Co.'s Lunar Orbiter Program, became NASA Deputy Associate Administrator for Space Science and Applications (Engineering). His appointment had been announced May 18. (NASA Ann, 7/6/67)

July 6: NRL Aerobee sounding rocket launched May 17 had detected x rays from quasar 3C-273--believed to be 1.5-billion light years from earth --and Virgo A, a galaxy believed to be 30-million light years from earth, Dr. Herbert Friedman, Superintendent of Naval Research Laboratory's Atmospheric and Astrophysics Div., announced at news conference in Washington, D.C. Rocket experiment, he said: (1) provided first evidence that x rays were produced as far away as the "rim" of the universe; (2) detected quasars, previously detectable only by their radio waves or by visible light seen through high-power telescopes; (3) lent support to theory that universe is saturated with background radiation from explosion of universe 10 billion yrs ago; and (4) detected three new x-ray sources, apparently outside our galaxy and not traceable to any known object. These findings, Dr. Friedman said, indicated that x-ray astronomy had "come of age" as a tool to explore the universe, just as radio astronomy had when it was first used to detect quasars and radio galaxies. To explore x-ray sources further, he suggested installing x-ray

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July 6 (continued)

detection equipment on proposed satellites such as NASA's orbital workshop and launching larger equipment for longer periods of time to map the whole sky for x-ray sources. (Text; Reistrup, W Post, 7/7/67)

- . USAF successfully launched an Advanced Ballistic Re-Entry System (ABRES) vehicle from Vandenberg AFB by Atlas D booster. (Aero Tech, 7/17/67, 13)
- . NASA's Lunar Orbiter Incentive Evaluation Board awarded Boeing Co. a \$1,053,405 bonus for the Lunar Orbiter III mission. Board said pictures produced were "of high quality, properly exposed and with good positioning," although of unsatisfactory quantity, and noted that secondary site photography "had considerable value scientifically." Spacecraft, launched from ETR Feb. 4, had transmitted 154 of 211 photos and was currently gathering data on meteoroids, radiation, and lunar gravitational field. (NASA Release 67-177)

July 7: NASA Aerobee 150 sounding rocket launched from WSMR carried MIT x-ray experiment to 88-mi (142-km) altitude to search for undiscovered x-ray sources and to obtain data on celestial locations and energy spectra of "discrete celestial X-ray sources" in three regions. Rocket and instruments performed satisfactorily. (NASA Rpt SRL)

- . NASA Associate Administrator for Space Science and Applications Dr. Homer E. Newell and OSSA Director of Space Applications Programs Leonard Jaffe discussed impact of space research on science and technology in Science. As a result of space research, they said, science and technology could contribute to the arts by furnishing new media for human expression; enrich the humanities by furnishing man with a broader basis for understanding himself and his place in nature; provide the historian with a better approach to history because of scientific methodology; and enable archeologists to more accurately date materials and identify their sources.

As the entire world "absorbs the increased understanding of man and nature that science generates, and reflects that understanding in its literature, its social, political, and economic institutions, and its application to human daily living...it may be hoped that this common bond will...give increased motivation to solve peaceably the problems that beset the world...[and] provide increased means for doing so.... To use properly and effectively these powerful tools of our times is an inescapable challenge to men and governments the world over." (Newell, Jaffe, Science, 7/7/67, 29-39)

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July 7: ComSatCorp filed notice with FCC of three proposed contract awards totaling more than \$13 million for antenna subsystems and related equipment to be installed at West Virginia, California, Puerto Rico, and Hawaii, earth stations. Fixed-price contracts proposed included: \$7,600,000 to Philco-Ford Corp. for four antenna subsystems; \$4,500,000 to Raytheon Co. for four ground communications equipment subsystems; and \$1,015,000 to Cutler-Hammer, Inc., for four low-noise receiver subsystems. Construction on three new earth stations and expansion of facilities at Hawaii station were expected to begin in late 1967. (ComSatCorp Release 67-36)

- . H. Frank Hann became Director of the Financial Management Div., Office of Administration, NASA Hq. He had been Acting Director since April 3. (NASA Ann, 7/12/67)

July 8-9: 1967 Soviet air show--first in six years--was held at Domodedovo Airport near Moscow. Program included aerial displays and ground exhibits of seven new types of supersonic jet fighters, including one VTOL and two variable-sweep-wing aircraft similar to U.S. F-111; Proton and Vostok spacecraft; World War II fighters; and four-engine IL-62 commercial aircraft. U.S.S.R. claimed that its new variable-sweep-wing models--a fighter and a missile launcher--were first and lightest in the world and were capable of flying at mach 1 at sea level and mach 2 at higher altitudes. New VTOL aircraft was reportedly capable of rising vertically 130-160 ft before beginning forward flight. Western sources speculated that absence of any large new bombers suggested that U.S.S.R., like U.S., was concentrating on versatile missile-launching aircraft which had long-range striking power. (Reuters, NYT, 7/9/67, 17; W Post, 7/10/67, A10; Av Wk, 7/24/67, 38-44)

July 9: USN decision to study a ship-based antimissile missile system [see July 3] was praised by Hanson Baldwin in the New York Times. "Strategically and tactically the role of the Navy has been transformed by the nuclear age; the depths of the sea, the space above the atmosphere and every part of every land mass on earth are now accessible to modern naval power." Proposed SABMIS system would be especially effective because: (1) nuclear submarines' ability to remain completely submerged indefinitely gave them unequalled defense invulnerability; (2) submarine-launched ballistic missile would draw enemy attack toward seas rather than toward populated land as land-based missiles do; (3) sea-based system would be more effective against enemy missile containing several warheads, each capable of maneuvering along different trajectory; and (4) system would be able to intercept enemy missiles in midcourse, rather than terminal phase. (Baldwin, NYT, 7/9/67)

July 9: Effect of sonic boom on SST flight routes and sales prospects was discussed by Secretary of Transportation Alan S. Boyd, FAA Administrator William F. McKee, and Director of SST Development B/G J. C. Maxwell (USAF, Ret.) in May and June testimony released by House Committee on Appropriations' Subcommittee on the Dept. of Transportation. Conditions under which supersonic flight would be permitted over populated land areas had still not been determined, General Maxwell explained: "The available sonic boom data indicates that the present SST design may possibly be restricted from supersonic operations over populated land areas...[and we] have based our SST program decisions on the conservative assumption that this design will be operated primarily on water."

DOT did not have to force the American public to tolerate sonic booms to make SST program an economic success, Secretary Boyd assured the Committee. "We are satisfied that we can have a...highly successful program, assuming the sonic boom is intolerable over populated areas.... The only thing that is involved here is whether we sell more aircraft, not whether the program is a success...." Even if SST were limited to subsonic flight over inhabited areas at least 300 aircraft could be sold initially, he said, and market studies indicated "that there is a possibility of going up to 1,200 aircraft by 1990." (Transcript, 41, 294, 942)

- . NATO had begun to modernize its communications network by using comsats, Clyde H. Farnsworth reported in the New York Times. Initial \$900,000 test phase of project had been inaugurated by Supreme Allied Commander in Europe Gen. Lyman L. Lemnitzer in a transmission from his headquarters in Casteau, Belgium, to Naples, Italy, via one of DOD's 15 Initial Defense Communications Satellite Project (IDCSP) satellites. U.S., which had proposed the NATO project, was permitting NATO to use the IDCSP satellites temporarily. Following approval of the second phase of the project, \$45 million--of which U.S. would pay 25%--would be spent to link 12 alliance countries via two 100-lb comsats owned by NATO and launched by USAF into synchronous orbits over the Atlantic. Two ground stations would be located in U.S. and one in each NATO country except France, who had not been invited to participate in the project, Luxembourg, and Iceland. (Farnsworth, NYT, 7/9/67, 17)

July 10: Chicago Daily News urged House/Senate Conference Committee on NASA FY 1968 authorization bill to accept Rep. Donald Rumsfeld's (R-Ill.) proposals to establish an independent safety review board and to require NASA to keep Congress fully informed on its operations [see June 28]:

"There is ample justification for these requirements.

"Part of it can be found in the scandalous record of fumbling, bumbling and pure carelessness unearthed in the investigation of the blazing death of three [Apollo] astronauts...[and part from] the perils of an

July 10 (continued)

alliance between big government and the big industries that serve it and profit by its contracts.

"Congress...has a unique obligation to exert discipline over the executive department's workings. In exotic fields like those of the Central Intelligence Agency and NASA there is an understandable tendency to resent such surveillance. But those same agencies, for all the high average caliber of their work, have demonstrated that when supervision is lacking both arrogance and carelessness flourish." (C Daily News, 7/10/67)

- . Capt. H. L. Anderton (USN, Ret.) became Chief of Communications and Tracking, Electronics and Control Div., OART. Prior to his retirement from USN July 1, he had been Deputy Director, Aeronautics Div., Office of the Deputy Chief of Naval Operations (Development). (NASA Ann, 7/18/67)

During week of July 10: Yugoslavia would build an earth station for use with communications satellites, the official press agency Tanyug announced. In addition, the Government had given its approval for "incorporating Yugoslavia into the world system of telecommunications via manmade satellites." U.S. experts speculated that statement indicated Yugoslavia was seeking to become the first Communist country to join INTELSAT consortium managed by ComSatCorp. Speculation was based in part on Yugoslavia's failure to attend April 3-15 Moscow meeting of European Communist-bloc nations which resulted in April 16 announcement by U.S.S.R. of plans to create a separate comsat network. (NYT, 7/21/67, 3)

July 10-13: Accelerated space effort by DOD was discussed in four-part Long Island Newsday series by AP writer Howard Benedict. U.S., he said, was quietly developing a strong military space capability because: (1) U.S.S.R. "is vigorously pushing for a military space capability"; (2) Titan II and Minuteman missiles "are threatened by new warhead guidance system 10 times more accurate than any previous system"; (3) Polaris missiles deployed at sea "are threatened by new satellite reconnaissance devices" that may soon be able to locate submerged submarines; (4) U.S. missiles designed to penetrate Soviet defenses were threatened by potential Soviet capability to neutralize and destroy them before they reached enemy territory; and (5) "world strategic situation has been changed sharply by Red Chinese achievements in nuclear explosives and by steadily decreasing costs which will permit other nations to deploy missile forces."

July 10-13 (continued)

DOD was developing "fantastic" weapons and military equipment, Benedict noted: "...reconnaissance satellites that will spot a soldier hiding in underbrush or a missile buried underground; satellites to locate submerged submarines; communications satellites that will enable infantrymen...to converge on strategy; rockets to knock down enemy satellites; laser and radiation beams to pulverize space or ground targets; rocket-borne nuclear bombs to destroy missile warhead rockets with great power and versatility; and manned spaceships that will take off and land like conventional airplanes." USAF's Manned Orbiting Laboratory (MOL) program, he said, would determine whether man is more effective at performing tasks currently done by unmanned satellites and whether space itself could become a battlefield. (Benedict, LI Newsday, 7/10-13/67)

July 11: MSC engineer Caldwell C. Johnson was granted patent for a cocoon-like escape device for orbiting astronauts. Device, which would be stored in an external compartment on the spacecraft, consisted of an insulated zippered nylon bag with a retrorocket. Astronaut would don his pressure suit with oxygen supply, seal himself in the bag, and fire retrorocket to thrust toward a landmark on earth. He would then inflate a bladder to shape the bag into a sphere for stability during reentry. Sphere would deflate during reentry, notifying astronaut when it was time to deploy parachute for safe landing. (U.S. Patent Off; MSC Roundup, 7/7/67, 8; Jones, NYT, 7/15/67, 29)

- . 1st and 2nd stages of second Saturn V booster were mechanically mated at KSC in preparation for AS-502 unmanned mission to test Apollo spacecraft's reentry heat shield. 3rd stage was added July 13; instrument unit, July 14. (KSC Proj Off; Marshall Star, 7/12/67, 1)
- . NASA contract awards: (1) Brown and Root-Northrop Corp. were selected for negotiations of a one-year, \$10-million, cost-plus-award-fee contract to jointly provide operational support services to MSC's laboratory and test facilities; (2) Graham Engineering Corp. and LTV Range Systems Div. were selected for competitive negotiations of a one-year, \$10-million, cost-plus award fee contract for facility support services at MSC. (NASA Releases 67-180, 67-181)
- . First aerial drop in test series to develop and qualify Earth Landing System (ELS) for heavier Block II Apollo spacecraft was conducted by Northrop Ventura at El Centro, Calif. Tests were studying the use of a two-stage reefing system for three main ELS chutes, and larger

July 11 (continued)

diameter drogue parachutes for the ELS. Block I Apollo spacecraft used only a single-stage reefing. (NAA Skywriter, 7/21/67, 1, 2)

- . X-24A (formerly SV-5P), Nation's newest manned lifting-body vehicle, was publicly displayed and officially turned over to USAF in ceremonies at Martin Marietta Corp.'s Baltimore plant. The 5,000-lb wingless vehicle, constructed by Martin Marietta Corp. under AFSC contract, would be air-launched from B-52 aircraft at AFFTC and would be driven by Thiokol rocket engines to higher altitudes and supersonic speeds before gliding to controlled landing. Flight tests would be conducted by five USAF and NASA pilots in late 1967 under joint NASA/USAF lifting-body program. (AFSC Release 59.67; Clark, NYT, 7/12/67, 1)
- . First regular data reports of activity on sun's "invisible hemisphere" --side visible from earth only once every 13.5 days--were being made to ESSA's Solar Disturbance Forecast Center in Boulder, Colo., by NASA's Pioneer VI and VII satellites, in orbit around sun. Satellites' observations on physical characteristics of solar storms would allow continuous scientific study of solar surface and provide Apollo astronauts with additional warning time to avoid solar radiation hazards. (NASA Release 67-174)

July 12: F-1 engines for Saturn V boosters were no longer being transported from NAA's Canoga Park, Calif., plant to Michoud Assembly Facility by specially-adapted aircraft, MSFC announced. Since engine supply at Michoud was sufficient to meet current manufacturing requirements, air shipments were being replaced by slower, more economical ground shipments by truck. (MSFC Release 67-146)

- . Soviet space officials hinted that they were conducting an advanced lunar exploration program and said that series of spacecraft from Luna IX through Luna XIII would not be used again, Space Business Daily reported. Officials did not elaborate on the "new material" that would be used, but indicated that new plans would include unmanned mobility on lunar surface. (SBD, 7/12/67, 42)
- . American Security Council (ASC) released results of study prepared for House Armed Services Committee which concluded that U.S.S.R. would achieve a marked nuclear superiority over U.S. by 1971 unless steps were taken immediately to improve American strategic capabilities. Study, conducted by ASC's National Strategy Committee under chairmanship of former AFSC Commander Gen. Bernard A. Schriever (USAF, Ret.), found that U.S. had "exchanged its goal of a war-winning strategic superiority for a strategy of mutual deterrence" while U.S.S.R.

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July 12 (continued)

"is driving hard toward a goal of overwhelming superiority...." Report predicted that by 1971 U.S.S.R. would have a 30,000- to 50,000-mt nuclear delivery capability, compared with 6,000- to 15,000-mt for U.S., and recommended a rapid arms buildup or development of an antiballistic missile system. It warned that "by placing our sole reliance for deterrence on ICBMs, POLARIS and POSEIDON missiles, and the remaining manned bomber force...[U.S.] places itself in the dangerous position of having only one option left if it is faced with a Soviet ultimatum to surrender. It must either fire its offensive nuclear weapons or give up its sovereignty. An ABM [Antiballistic Missile System] would at least strengthen the hand of the President if he is confronted with such a fateful decision, and it might stay the hand of an enemy at a critical moment...." (Text; ASC News)

July 12-19: "Cold flow" test series of Phoebus 2 nuclear reactor was successfully conducted at NRDS as part of NASA-AEC Project Rover program to develop a nuclear-propelled rocket. Purpose of tests was to check reactor design under gas-flow conditions and at liquid-hydrogen temperatures; measure variations in pressures, temperatures, and flow rates during simulated "start-up" operations; and obtain initial experience on the hook-up and test operations of Phoebus 2 reactors in test facility. Assembly used for experiments in "cold flow" tests was identical to that used in "hot" tests, except that it contained no fissionable material and did not produce a nuclear reaction. (NASA Proj Off; UPI, NYT, 7/22/67, 11)

July 13: Short circuit of electrical connector in Atlas-Centaur's upper stage caused 24-hr postponement of Surveyor IV launch. (UPI, W Star, 7/13/67, B11)

- Admiral David L. McDonald, Chief of Naval Operations, and General John P. McConnell, Chief of Staff of the Air Force, presented Distinguished Flying Crosses to the military astronauts who had made space flights in special Pentagon ceremony. Included were posthumous awards to L/Col. Virgil I. Grissom (USAF) and L/Col. Edward H. White II (USAF), who died in Jan. 27 Apollo fire. Capt. Alan B. Shepard, Jr., speaking on behalf of his fellow astronauts, said they were "proud members of the military, but also...representatives of a great and significant national effort," who had grown "to enjoy the [space program's] successes and live with its failures." (DOD Release 642-67; AP, B Sun, 7/14/67, 6; SBD, 7/17/67, 68)

July 13: House Appropriations Committee reported \$1.53-billion DOT authorization bill (H.R. 11456) which included \$142.3 million for development of two SST prototypes. Bill was approved by House July 18. (AP, NYT, 7/14/67, 5)

- . Senate passed \$2.6-billion AEC FY 1968 authorization bill (H.R. 10918) which included \$7.3 million for a new proton accelerator in Weston, Ill. Amendment by Sen. John O. Pastore (D-R.I.) to delay approval of the Weston site until the community or the state passed open-housing laws which would enable Negro employees to find suitable housing near the plant was defeated. (CR, 7/13/67, S9484-521)

The New York Times later commented: "...credit goes to Senators...who exposed the real issues at stake, and who won a moral victory when the vote margin in Weston's favor proved much narrower than had been expected....

"But there is an even more basic objection to any commitments or expenditures for this expensive research tool at this time. That objection is simply the irrelevance of a 200 billion electron volt accelerator to any real present national problem.... The budget cutters are now in full cry demanding reductions in already inadequate expenditures for human needs. It is a distortion of the national priorities to commit many millions now to this interesting but unnecessary scientific luxury." (NYT, 7/16/67, 12)

- . NASA awarded Pratt & Whitney Div., United Aircraft Corp., a \$458,000 contract to "study desirable characteristics of components for a quiet turbofan engine and define a development program." Contract was first awarded in NASA's Quiet Engine program to combine all known noise-control techniques to produce a 20,000-lb-thrust engine which would be 15-20 db quieter than present subsonic jet engines and could be used in current aircraft models. Program was being conducted by NASA as part of national noise abatement program. (NASA Release 67-184; Clark, NYT, 7/14/67, 27)
- . NASA was studying feasibility of launching two navigation satellites to keep SST under constant surveillance and be alert to slightest malfunction, Mohammed Rauf, Jr., reported in the News American. NASA Chief of Navigation and Traffic Control Eugene Ehrlich, who conceived the plan, told Rauf in an interview that the system would provide maximum safety against accidents: "The program calls for the building of two tracking stations on each side of the Atlantic. The wings of the plane and all its other important parts will be fitted with small transponders, which will continually relay information about the plane's condition to the satellites...[which would] relay the signals to the tracking stations, where giant computers will process them within minutes for appropriate action." Eventually, Ehrlich predicted, all aircraft and ships would be equipped with transponders "because the [proposed] navigation satellites...will be capable of handling the increasing amount of air and sea traffic predicted for this century.

July 13 (continued)

"Four satellites can have the whole world under surveillance for air and sea traffic control, and will cut down both the cost of such control as exercised by conventional methods, and also the time required for it." (Rauf, News American, 7/13/67)

- . Rep. Donald Rumsfeld (R-Ill.), speaking on the floor of the House, urged House to support Rep. Charles Mathias' (R-Md.) bill (H.R. 69) to establish a commission to review organization of Executive Branch: "Congressional review has often been piecemeal and after the fact. For example, the recent congressional hearing concerning the tragic Apollo spacecraft fire unearthed a shocking amount of information about NASA's operations which should have been reported to Congress long ago.... Legislation has been proposed to correct this, and hopefully, the provisions in the House version of the NASA authorization bill...will be accepted and thereby require NASA to keep Congress 'fully and currently informed'.... I am convinced such language is needed with respect to NASA. I am equally convinced that, if the operations of the executive branch are studied and reviewed for organizational deficiencies and economy of operation, there would be far less need to wage battles on the floor on a piecemeal, hit-or-miss basis." (NASA LAR VI/75)

July 14: Second anniversary of Mars flyby by NASA's Mariner IV during which spacecraft flew within 6,118 mi of Mars, took 22 close-up photos of the planet, and transmitted scientific data on Martian atmosphere. Launched from ETR Nov. 28, 1964, Mariner IV had traveled 1.3 billion mi during its 959 days of flight and had operated continuously for more than 23,000 hrs--exceeding its 6,000-hr design lifetime by more than 400%. NASA announced that satellite, which was expected to continue operating satisfactorily until early 1968, had been assigned a new mission. It would be used in an experiment to conduct simultaneous comparison of solar radiation during August 1967 "solar system line-up" involving Mariner IV, Mariner V (launched June 14), the earth, and the sun. (NASA Release 67-182)

- . U.S.S.R.'s Venus IV unmanned Venus probe, launched June 12, was about 5 million mi from earth and was performing satisfactorily, U.S.S.R. announced. Spacecraft was expected to reach Venus in mid-October. (AP, W Star, 7/15/67, 1)
- . Bistatic radar detection--experimental technique for mapping celestial bodies by bouncing signals off them from an orbiting spacecraft--had been used successfully to map a portion of the lunar surface, Stanford Univ. Center for Radar Astronomy scientists Dr. G. L. Tyler, V. R. Eshleman, G. Fjeldbo, H. T. Howard, and A. M. Peterson reported in

July 14 (continued)

Science. Radar waves emitted Oct. 12, 1966, from an antenna on NASA's Lunar Orbiter I spacecraft had reached earth as two signals: one directly, and one after being reflected by the moon. Both underwent different shifts in frequency. From a measurement made on the ground scientists were able to tell the direction from the spacecraft to the site on the moon. Other measurements related to the same site enabled them to triangulate the position. (Science, 7/14/67, 193-5)

- . U.S. space program was a sound investment which would pay "handsome dividends" to all Americans and to humanity in general, UCLA professor of chemistry Dr. Willard F. Libby told AAS meeting in Denver. Winner of the 1960 Nobel Prize in chemistry and discoverer of radio-carbon dating, Dr. Libby suggested that space program opponents "quit grumbling about going-to-the-moon extravagance with taxpayers' money" and realize that large expenditures were necessary to maintain U.S. world leadership in space.

"And we can't stop at the moon.... Once we've ventured that far, we should establish a base there for manned takeoffs to Mars and Venus.

"Now Congress is debating the merits of authorizing space exploration beyond the moon in the early '70s. They have duty to debate such a venture, costing more than \$2 billion. But what...would Congress do with that money if it weren't spent on future space research?" Space research had already made great contributions to medicine, microelectronics, worldwide communications, and many other fields, he said, and could continue to achieve much more "for the good of humanity and the expansion of frontiers of human knowledge." (Lindbergh, Denver Post, 7/16/67)

- . Harry N. Atwood, an associate of the Wright Brothers, died at age 83. On July 1, 1911, during 17-hr 12-min flight from Boston to Washington, D.C., Atwood became first man to fly over New York City. The following month he successfully flew his biplane, the "Baby Wright," 1,265 mi from St. Louis to New York City in 28 hrs 58 min, setting a new air distance record and winning a \$10,000 prize. In 1927 Atwood announced the development of a motor that would "develop power without the use of a propeller, by exhausting exploding gasses into the atmosphere or water, thus driving itself forward much as a rocket does." In 1935 he developed strong, lightweight plywood for aircraft bodies. (AP, NYT, 7/16/67, 65)
- . U.S. tourist vacationing on beach at Harbour Island in the Bahamas had found a 10-ft-long piece of metal bearing words "United" and "destruct mechanism here," San Diego Union reported. Assuming metal to be part of a rocket, the tourist had notified KSC officials who retrieved the part and determined that it was an insulation panel from the upper stage of an Atlas-Centaur used Oct. 26, 1966, to launch a Surveyor model on a test flight. (AP, SD Union, 7/14/67)

July 14-16: NASA's Surveyor IV (Surveyor D) was successfully launched from ETR by Atlas-Centaur booster (AC-11) on an excellent 65-hr lunar-intercept trajectory, but mission ended prematurely when communications with spacecraft were lost seconds before it was scheduled to softland on the moon. NASA officials could not determine whether spacecraft had landed safely or crashed out of control.

Launched by the last direct-ascent (single-burn) Centaur vehicle in Surveyor program, 2,290-lb Surveyor IV performed all required sequences on schedule, including a midcourse maneuver which narrowed estimated target miss from 124 mi to 2.4 mi. Landing sequence began as planned when spacecraft shifted its normal cruising attitude to position main retrorocket downward toward moon. Radio contact was lost two seconds before retrorocket ended its planned 42-sec burn to slow spacecraft's speed from 5,900 mph to 350 mph. JPL Surveyor Project Manager Howard Haglund commented: "All we know is that we have lost contact with Surveyor IV.... There are many possibilities [about the cause] but one of those uppermost in my mind is that there may have been an explosion in the rocket just before burnout." Repeated attempts to reestablish radio contact with spacecraft failed.

Surveyor IV carried photographic equipment, a surface sampler, and a magnetic device on one of its footpads to test for magnetic materials in the lunar soil. Primary mission objectives: (1) to softland on the moon in the Sinus Medii; and (2) obtain TV photos of the lunar surface. Secondary objectives: (1) conduct a vernier-engine experiment; (2) manipulate lunar surface with surface sampler in view of TV camera; (3) obtain touchdown dynamics data; and (4) obtain thermal and radar reflectivity data on lunar surface. Target zone in the Sinus Medii was almost in the exact center of moon's visible hemisphere and was rougher than the Ocean of Storms where Surveyor I and Surveyor III had landed. Benjamin Milwitsky, NASA Surveyor Program Manager, said the site was so rugged that spacecraft had only a 50-50 chance of landing intact. "But this region is extremely important to Apollo and that's why we're going in."

Surveyor IV was fourth in series of seven spacecraft in NASA's Surveyor program: Surveyor I (launched May 30, 1966) and Surveyor III (launched April 17, 1967) both softlanded successfully and transmitted photos to earth; Surveyor II (launched Sept. 20, 1966) did not softland because of ignition failure in one of its three vernier engines. Program was directed by OSSA Lunar and Planetary Programs Div.; program management was assigned to JPL. (NASA Release 67-172; NASA Proj Off; UPI, NYT, 7/15/67, 22; AP, NYT, 7/17/67, 16; Reistrup, W Post, 7/15/67, B4; 7/16/67, A5; 7/17/67, 1; UPI, W Star, 7/14/67, A1; 7/15/67, A2; 7/16/67, B5; 7/17/67, A1)

July 15: Dr. Athelstan F. Spilhaus, Univ. of Minnesota geophysicist, announced that he was resigning to become president of the Franklin Institute in Philadelphia, succeeding Wynn L. LePage who would become board chairman. (UPI, NYT, 7/16/67, 33)

July 16: Lunar Orbiter II, Lunar Orbiter III, and Lunar Orbiter IV, all of which were circling the moon, were being used by NASA's Manned Space Flight Network personnel and stations for practice tracking exercises. Satellites served as "stand-ins" for the manned Apollo spacecraft which would eventually orbit the moon. (NASA Release 67-183)

- . Jerald Kubat, formerly Special Assistant to the Apollo Program Director, OMSF, had been appointed Director, Apollo Program Control. He would have overall responsibility for program planning, configuration management, logistics, resources control, and procurement operations to ensure the attainment of Apollo goals. (NASA Ann, 7/17/67)
- . A U-2 photographic aircraft was flown at Edwards AFB to test missile system that would intercept and then incapacitate enemy satellites, George Wilson reported in Washington Post. "The idea is to equip the United States with a missile or spacecraft that could blind reconnaissance satellites in time of war or national emergency.
 "There is no intention now of ending the gentlemen's agreement under which both the U.S. and the Soviet Union spy on each other by satellite.
 "But there may come a day, Air Force leaders say, when the U.S. will want to hide the movements of its bombers and missiles...."
 (Wilson, W Post, 7/27/67, 17)

July 17: Cosmos CLXIX was launched by U.S.S.R. into orbit with 208-km (129-mi) apogee; 144-km (89-mi) perigee; 88-min period; and 50° inclination. It decayed later in the day. (Aero Tech, 7/31/67, 18)

- . Congressional reaction to the FY 1968 space budget pointed up the need for the Johnson Administration to "take a fresh, hard look at shaping a truly national space program" in the 1970's, Michael Getler suggested in Aerospace Technology. "What we have now, on one hand, is the already big and expensive civilian space program which, though enormously successful and of great importance to national technological strength, is unfortunately vulnerable to on-again/off-again Congressional support and to the continuing challenge of finding dramatic new undertakings which can attract the necessary backing.

July 17 (continued)

"On the other hand, we now have a rapidly growing military space program which appears to be on its firmest footing and which has demonstrated an ability to request and get new funds even when dollars are very tight...."

There were many areas where the two programs should remain separate, Getler said, but there were also many areas where cooperation would be advantageous: "Rather than representing a loss of funding, we believe that joint development [in some areas] will lend stability to programs that might otherwise run into trouble as single agency undertakings, will lend more logic to the national commitment to space, and end some of the sniping about parallelism that has hurt in the past...." (Getler, Aero Tech, 7/17/67, 70)

- . Six airlines reserved delivery positions for 16 SSTs at a cost of \$750,-000 each [see June 5], bringing to 129 the total number of delivery positions reserved. (AP, NYT, 7/18/67)
- . Rep. William F. Ryan (D-N.Y.), speaking on the House floor, repeated his request that Congress reopen its investigation of NASA [see June 12]: "The Apollo hearings should be reconvened--not for the purpose of continuing further a technical discussion of possible technical causes for the Apollo fire--but to undertake a serious and far-ranging management review of the sort that would force NASA to take stock and develop sound management practices for the protection of the public's investment in the space program. This is not to mention the safety of our astronauts...." (CR, 7/17/67, H8750)
- . RCA announced it had received \$38-million NASA contract [see June 2] to maintain and operate portions of the Space Tracking and Data Acquisition Network (STADAN). (WSJ, 7/17/67, 3)
- . Many valid conclusions could be drawn from the displays and exhibits at the Soviet Air Show [see July 8-9], Robert Hotz suggested in Aviation Week. Program indicated that U.S.S.R. had: (1) replaced "peaceful" Soviet aerial image projected at Paris International Air and Space Show with "a mighty brandishing of military might"; (2) begun to devote an increasingly large effort toward hardware and tactics for modern, non-nuclear war; and (3) exhausted her "creative design capability in the current generation of aerospace technology" and was relying more heavily on Western design concepts. (Hotz, Av Wk, 7/17/67, 21)
- . Legal Subcommittee of U.N. Committee on the Peaceful Uses of Outer Space meeting in Geneva reached provisional agreements on aiding and returning astronauts who landed in foreign countries and on payment of damages

July 17 (continued)

caused by space launches. Agreements would be submitted to full U.N. Committee for approval and then placed before U.N. General Assembly for final action. (UPI, P EB, 7/18/67; UPI, W Post, 7/18/67, A3)

July 17-20: NASA personnel changes: (1) Albert P. Little, former Chief, Program Plans, OMSF Plans and Analysis Directorate, had been appointed Assistant to the Assistant Administrator for Administration effective July 17; (2) R/Adm. Roderick O. Middleton (USN), former Deputy Director of OMSF Missions Operations Directorate, had been appointed Apollo Program Manager at KSC, replacing M/G John G. Shinkle (USA, Ret.), who resigned May 18. Edward R. Mathews had been acting manager since May 29; (3) Stanley de Jongh Osborne, a general partner of Lazard Freres & Co. investment banking firm in New York, had been sworn in as consultant to NASA Administrator James E. Webb on Government-industry relations and on the impact of space technology on the national economy; and (4) Erskine E. Harton, Jr., former Assistant Safety Director, had been appointed Acting Safety Director, replacing George D. McCauley who recently retired from Government service. (NASA Ann 7/20/67; NASA Releases 67-189, 67-190)

July 18: JPL scientists abandoned attempts to contact Surveyor IV spacecraft resting on the moon [see July 14-16]. A JPL spokesman said both Canberra and Goldstone tracking stations had sent signals to the spacecraft July 17, but had received no response. A committee was attempting to determine whether Surveyor IV had softlanded on the moon as planned or crashed out of control. (AP, W Star, 7/18/67, A3; AP, NYT, 7/20/67, 11)

- . A minimum of four manned space flights would precede the first U.S. attempt to land men on the moon, Astronauts Joe H. Engle and Alfred M. Worden, recently returned from a geology survey in Iceland, told NASA Hq. press conference. Three of the four missions would involve rendezvous with another spacecraft in earth orbit. Astronauts also said that they and their colleagues had even more confidence in the Apollo program now than they had before the Jan. 27 fire. (B Sun, 7/19/67; W Post, 7/19/67)
- . House passed \$1.53-billion DOT FY 1968 authorization bill (H.R. 11456) which included \$142.3 million for SST prototype development. Amendment by Rep. Clark MacGregor (R-Minn.) to delete SST funds was defeated. (CR, 7/18/67, H8813-58)
- . Christopher C. Kraft, Jr., Director of Flight Operations at MSC, received the Spirit of St. Louis medal from the American Society of Mechanical Engineers (ASME) meeting in Cocoa Beach, Fla. He was cited for his "meritorious service in the advancement of aeronautics." (NYT, 7/19/67, 32)

July 18: LRC awarded four contracts totaling over \$5 million for major systems of the SERT II (Space Electric Rocket Test) spacecraft: (1) \$2,462,678 to Fairchild Hiller Corp. for system definition selection and qualification of components for spacecraft support unit; (2) \$1,308,065 to Hughes Aircraft Co.; (3) \$1,055,757 to Westinghouse Electric Corp., to develop, respectively, prime and backup power conditioning and control systems for ion thrusters; and (4) \$290,987 to Cutler-Hammer Corp. to develop a radio frequency interference experiment to measure interference with radio communications generated by the ion engines. SERT II was an orbital mission scheduled for late 1968 to advance the development of ion engines as propulsion units for future long-duration space missions. (NASA Release 67-188)

- . Astronauts on long-duration space flights might have to accept greater radiation exposure than the amount considered safe for industrial workers and, in some cases, this additional exposure could heighten the risk of cancer and shorten the life expectancy, NRC's Space Science Board concluded in report entitled Radiobiological Factors in Manned Space Flight. Board recommended that criteria different from those used in industry be set up to gauge radiation risks in space flight and to decide what was acceptable. "Manned space flights are high risk endeavors. They take place in a hostile environment that cannot be permitted to encroach beyond the limits of human endurance if the missions are to succeed." Report noted, however, that radiation was "only one of many recognized and accepted potential risks" to space flight and shielding against it added weight to the spacecraft. Consequently, protection against radiation had to be balanced against other needs vital to the success of the mission. (NRC Release; Schmeck, NYT, 7/18/67, 38M; Reistrup, W Post, 7/18/67, A3; AP, W Star, 7/18/67, A3)
- . AFSC had presented its ninth Craftsmanship Award--highest of three honors that could be won by a defense contractor under USAF's Industrial Zero Defects Program--to RCA's Aerospace Systems Div. To qualify for the award, a firm had to show performance records for at least 18 mos clearly reflecting achievements against predetermined goals. USAF personnel then validated performance data and determined adequacy and realism of the goals. (AFSC Release 71.67)
- . A monument had been erected on the spot where Cosmonaut Vladimir M. Komarov was killed when his Soyuz I spacecraft crash-landed April 24, Pravda reported. It was located on the Orenburg Steppe, 1,207 km (750 mi) southeast of Moscow. (Reuters, NYT, 7/19/67; W Post, 7/19/67, C7)

July 19: First experimental tactical communications by satellite among USN, USAF, and USA units had been successful, DOD announced. Messages had been exchanged among airborne aircraft, a submarine, a ship, and fixed and mobile terminals via Lincoln Experimental Satellite (LES-5), one of six satellites launched by USAF July 1. (DOD Release 661-67; AP, NYT, 7/21/67, 6)

. USAF announced that first unit to be equipped with F-111 variable-sweep -wing aircraft would be activated at Nellis AFB, Nev., in summer 1967. (DOD Release 664-67)

. Rep. John J. Rhodes (R-Ariz.), speaking in the House on behalf of the Republican Policy Committee, urged that House/Senate Conference Committee on NASA FY 1968 authorization bill accept key Republican amendments adopted by the House. Amendments would reduce NASA's FY 1968 budget request by \$201.4 million; establish an independent safety panel in NASA; and require NASA to keep Congress fully and currently informed of problem areas in the space effort. (CR, 7/19/67, H9045)

. President Johnson, in letter to Congress transmitting NSF's FY 1966 report on Federal activities in the area of weather modification, wrote: "This report provides clear evidence that progress is being made toward our goal of developing the capacity to modify the weather for the benefit of all mankind.

"In the period covered by this Report, we found that: (1) Precipitation from some types of clouds may be increased by as much as ten per cent by seeding; (2) Seeding of thunderstorm clouds may reduce significantly the number of lightning strikes; (3) The incidence of hail may be reduced by heavy seeding; (4) Large bodies of cold ground fog may be dissipated through the use of dry ice or silver iodide; and (5) Mathematical models will be increasingly useful for experimentation with techniques for controlling hurricanes and tornadoes...." (PD, 7/24/67, 1035)

July 19-22: NASA successfully launched Explorer XXXV Interplanetary Monitoring Platform (IMP-E) from ETR by three-stage Thrust-Augmented Delta booster on direct-ascent lunar-transfer trajectory. On July 21 retromotor burned 23 sec, decreasing spacecraft's velocity and permitting lunar capture; retromotor separated as planned two hours later and spacecraft entered elliptical orbit with 4,780-mi (7,692-km) apolune; 497-mi (800-km) perilune; 11.5-hr period; and 147° inclination.

Sixth of 10 Interplanetary Explorers planned by NASA and second designed to collect data at lunar distances, Explorer XXXV carried eight experiments, seven scientific and one engineering--a solar cell

July 19-22 (continued)

damage study. Preliminary data indicated that all experiments were performing satisfactorily. Primary mission objective was "to place the spacecraft into either a captured lunar orbit or a geocentric orbit with apogee near or beyond the lunar distance, to investigate out to and at lunar distances and to obtain scientific data on the characteristics of the interplanetary plasma and the interplanetary magnetic field" using the scientific experiments. Secondary objectives, possible only if spacecraft achieved lunar orbit, were the collection of data on dust distribution around the moon, the lunar gravitational field, the weak lunar ionosphere, and the radiation environment. IMP series was managed by GSFC under OSSA direction; two of the five previously orbited satellites--Explorer XXXIII (launched July 1, 1966) and Explorer XXXIV (launched May 24, 1967)--were still providing data. (NASA Releases 67-178, 67-193; NASA Proj Off; NYT, 7/20/67, 14; 7/22/67, 3; 7/23/67, 63; AP, W Star, 7/19/67, 1; 7/20/67, A9; 7/21/67, 1; W Post, 7/25/67, A8)

July 20: NASA test pilot William H. Dana flew X-15 No. 3 to 84,000-ft altitude and 3,682 mph (mach 5.51) at Edwards AFB. Purposes of test flight: (1) cold-wall heat transfer; (2) wavy panel heat transfer; (3) boost guidance checkout; (4) PCM checkout; (5) horizontal tail loads; (6) nose gear loads; and (7) tip-pod accelerometer. (NASA Proj Off)

- . NASA's Mariner V Venus probe, launched June 14 from ETR, had traveled 55,327,194 mi of its 216-million-mi flight to Venus and was continuing to operate normally, JPL project officials announced. On July 23 central computer and sequencer would change amount of data transmitted from 33 bits per second (bps) to 8 1/3 bps to meet slower transmission requirements of rapidly increasing communications distance. New transmission rate would remain in effect for duration of flight. (NASA Release 67-194)
- . ComSatCorp announced NASA would launch fourth satellite in the INTELSAT II series Sept. 20. Plans called for satellite to be launched from ETR into synchronous orbit over the Pacific to increase communications capability and serve as a backup against interruption of satellite communications service. (ComSatCorp Release)
- . Recent cuts in NASA's FY 1968 budget were due in part to lack of Congressional understanding of the U.S. space program, NASC Executive Secretary Dr. Edward C. Welsh told AIAA's Joint Propulsion Conference in Washington, D.C. "...many members of the Congress understand" certain areas of the space program, but "not enough of our legislators seem to have sufficient comprehension of the vast benefits flowing from space activities. And

July 20 (continued)

if many members of Congress and very many of their constituents don't know about these benefits, then they may well feel justified in cutting back on the amount of money to be spent...." To help increase understanding, Dr. Welsh recommended that the space industry avoid "confining their advertising to superlatives" about individual products and strive to communicate the overall benefits of the space program. (Text)

A. O. Tischler, director of QART's Chemical Propulsion Div., received AIAA's 1967 Wyld Propulsion Award for leadership and management of rocket programs. He was cited for his "outstanding contributions to the research and development of Liquid Rocket Propulsion Systems and overall management of the NASA Liquid Rocket Propulsion Program." (NASA Release 67-186)

- . Rep. William F. Ryan (D-N.Y.), speaking on the House floor, suggested that SST program was progressing too rapidly. "...it is not clear why the United States is so anxious to rush into a costly program of SST development involving many unsolved problems and great economic risk on the strength of a nebulous national prestige. It may well be that our prestige will lose a great deal more if we show ourselves to be a nation whose commitments and investments are based largely on a hysteria about our 'image'--largely and simply because the British and French are building the Concorde--unable to wait and learn from their experience--and unable to take the advice of a multitude of technical and economic experts within our own country as to the inadvisability of this effort...." (CR, 7/20/-67, H9128)
- . European leaders had realized in recent months that only they could close the "technology gap" between their countries and the U.S., Dr. Donald F. Hornig, Special Assistant to the President for Science and Technology, told New York Times reporter Evert Clark. Dr. Hornig reached this conclusion after a 16-day tour of six European capitals. The belief that U.S. had created the gap and should therefore assume the burden of closing it "has entirely disappeared," he said. "What we found [on the tour] was a realistic approach, a realization that most of these things are basic problems, ones they have to tackle themselves." This realization was "a most important advance" that represented an "enormous closing of the understanding gap" and meant that discussion of the many problems making up the larger technological gap "has now come down to earth." (Clark, NYT, 7/21/67, 15)
- . Barry Goldwater, 1964 Republican presidential candidate, told National Retail Hardware Assn. in San Francisco, that he believed U.S.S.R. had orbited military weapons: "We have every reason to believe that the Russians have a weapon in orbit that can be called down at any time against any target." Goldwater said he could not prove his statement,

July 20 (continued)

but that information from Soviet technical journals indicated it was accurate. (AP, B Sun, 7/21/67)

July 21: A new star just bright enough to be visible to the naked eye had been discovered in the constellation Delphinus by G. E. D. Alcock of Peterborough, U.K. Discovery was confirmed by M. P. Candy, British Astronomical Society, who estimated star's brightness as magnitude five, which is near the limit of visual observation. (SciServ, NYT, 7/21/67)

- . Dr. Thomas L. Altshuler, formerly with GCA Corp., had been appointed Senior Scientist in ERC's Qualifications and Standards Laboratory. (ERC Release 67-26)
- . Wind tunnel tests at USAF's Arnold Engineering Development Center (AEDC) in Tullahoma, Tenn., indicated "NASA has miscalculated the control spacemen would have over the Apollo spacecraft at the critical point it reenters the Earth's atmosphere," the Nashville Tennessean wrote in a copyrighted story. Loss of control "means that the Moon spacecraft's maneuvering ability would be cut, perhaps to a dangerous degree." Results of tests, which had been forwarded to MSC, "will cause NASA to alter its computer projections of the Apollo's reentry path." (AP, H Chron, 7/21/67)
- . July 14 promotion of career administrator Herman Pollack from Acting Director to Director of State Dept.'s Office of International Scientific and Technological Affairs was accepted reluctantly by the scientific community, Science reported. "The role and potential of the office...[is a] fuzzily defined relationship between science, technology, and foreign policy," and the scientific community had tended to think of the office as its own. "...many elder statesmen of science...are not altogether pleased to find...[the directorship] in the hands of a nonscientist," but have admitted grudgingly "that Pollack has done an outstanding job [as Acting Director] and that the office is likely to improve still further now that he is free of the uncertainties of an acting appointment." (Science, 7/21/67, 292)
- . Center for European Research (CERN), West Germany, and France signed an agreement in Geneva to share the estimated \$19.5-million cost of constructing a bubble chamber in which particles of smashed atoms could be tracked photographically to provide further information on the properties of matter. Scheduled to be built at CERN Hq. near

July 21 (continued)

Geneva, the structure would be cylindrical, about 11.5 ft in dia and 10 ft high--the largest bubble chamber in existence. (NYT, 7/22/67, 11)

July 22: NASA successfully launched first of five Nike-Apache sounding rockets from NASA Wallops Station but canceled remaining four in the dusk-to-dawn series of launches because of unfavorable weather. Rocket ejected a trimethylaluminum (TMA) vapor trail of bluish color between 50- and 125-mi altitudes in experiment to measure wind velocities and directions at various altitudes in the upper atmosphere. Data on these conditions were obtained by photographing continuously the motion of the trails from several ground-based camera sites within a 100-mi radius of Wallops. Launchings were conducted for GCA Corp., under contract to GSFC. OSSA had overall program responsibility. (NASA Release 67-179; WS Release 67-25; W Post, 7/23/67, A3)

- . NAA's incentive fees for the Apollo Command Module (CM) destroyed in Jan. 27 fire would be reduced by NASA to \$41 million, Sen. Clinton P. Anderson (D-N. Mex.), Chairman of Senate Aeronautical and Space Sciences Committee, told the press. He said information provided him showed "that amount is \$15 million less than what North American's estimated potential incentive earnings would have been if the accident had not occurred." Senator Anderson said he believed the settlement was realistic and fair: "A stricter penalty would have served no purpose and could have adverse effects on the relationship between [NASA and NAA]." (Text)
- . Twelve science experts met in Washington, D.C., to discuss implementing the April 13 promise made by 20 Latin American presidents at Punta del Este, Uruguay, to "harness science and technology for the service of our [440 million] peoples." MIT Chancellor Dr. James R. Killian, U.S. representative, told the New York Times that "it would be of enormous value and importance if we were able to devise a quick transfer of what is already available, both within the other Latin countries and between the United States and the others." Strengthening of existing "centers of excellence" in science and engineering, and the creation of multinational centers that would overcome the problems of national boundaries could rapidly increase the diffusion of skills among Latin American industries and society, he said. (Clark, NYT, 7/23/67, 52)
- . John Cobb Cooper, former president of International Institute of Space Law and founder of McGill Univ.'s Institute of International Air Law, died in Princeton, N.J. Cooper devised a legal code for outer space in 1961 when he was legal adviser to the International Air Transport

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July 22 (continued)

Assn. Code included recommendations that: (1) the lower boundary of outer space be fixed at the point above the earth's surface where it is possible to launch a satellite into orbit at least once around the earth; (2) outer space have the same status as the high seas, and that no one be permitted to assert sovereignty over outer space or any celestial body in it; (3) satellites and other spacecraft have the nationality of the country that launched them unless otherwise agreed; and (4) a nation have the right to take action in outer space for its self-protection and self-defense. (NYT, 7/24/67, 27)

July 23: Dr. Roger W. Heyns, Chancellor of the Univ. of California at Berkeley, was named chairman of NASA's Ad Hoc Science Advisory Committee, replacing Dr. Norman F. Ramsey of Harvard Univ., who resigned to devote more time to his new duties as President of the Universities' Research Assn. Established in March 1966, the Committee advised NASA on the conduct of future space programs, including manned programs. (NASA Release 67-191)

- . NASA had awarded 12 inventors a total of \$9,100 for the advancement of space technology: (1) Warren E. Armstrong, Donald S. La France, Carroll Z. Morgan, Lloyd B. Ryland, and Hervey H. Voge of Shell Development Corp., \$3,000 for their contribution relating to a catalyst for monopropellant decomposition of hydrazine used in liquid propulsion technology; (2) Erwin Baker of Hughes Aircraft Co., \$1,400 for a constant lift device used to simulate lunar landing conditions for spacecraft; (3) Joseph A. Goodrich and Kenneth T. Ingham, NAA, \$1,200 for a turbine blade-locking device to retain rotor blades on rotor wheels for turbines employed in the J-2 engine program; (4) Richard G. Turner, RCA, \$1,000 for a thermocouple assembly used in thermo-vacuum tests for TV systems in Ranger, Tiros, Lunar Orbiter, and other similar programs; (5) Richard A. McKay, JPL, \$1,000 for temperature control system for circulating fluids used in mixing units for propellant development systems; and (6) John B. Schutt, GSFC, and Charles M. Shai, Electro Mechanical Research Corp., \$1,500 for an alkali-metal silicate protective coating used for thermal control on spacecraft and for fire-resistant paint in both Government and commercial applications. (NASA Release 67-185)

July 24: Soviet launch rate for recoverable Cosmos reconnaissance satellites had levelled after six-year increase, Aviation Week reported. Number launched as of mid-July 1967 was same as number launched during same period in 1966, and annual 1967 total was expected to be similar to annual 1966 total of 21. "The Russians now are launching recoverable reconnaissance satellites on the average of one every 16-17 days, each

July 24 (continued)

of which remains in orbit for approximately eight days. When the program began in 1962, the launch rate averaged one every 73 days and the following year the pace accelerated to an average of one every 46 days. In 1964 the figure was every 28 days, in 1965 the frequency had increased to an average of one every 19 days and last year it began to taper to one every 17 days...." (Av Wk, 7/24/67, 26)

- . France had taken two steps to strengthen the Franco-German Symphonie communications satellite program, Donald E. Fink reported in Aviation Week: (1) she had reorganized the industrial teams to ensure that French and German companies received equal shares of work; and (2) she had reassured representatives at the European Ministerial Space Conference (EMSC) in Rome that she was still interested in participating in planned European comsat system. "The moves demonstrate France's determination to develop a national regional comsat system--with financial and technical assistance from Germany--to strengthen its position in the International Communications Satellite (Intelsat) system. This drive is a direct challenge to U.S. domination of Intelsat...." Fink said French officials at the EMSC had justified development of the Symphonie system by saying it would be based on state-of-the-art technology: "This would permit the European effort...to be directed toward developing a second-generation advanced system." (Fink, Av Wk, 7/24/67, 27)
- . Soviet aircraft designer Alexander Yakovlev had criticized U.S. exhibit at the Paris International Air and Space Show [see May 26-31], Aviation Week reported. U.S. space pavilion was too complicated for the general public, he said, whereas Soviet exhibit showed "simplicity and clarity." Although U.S. showed several of its commercial aircraft, it alienated visitors, as it had in 1965, by exhibiting military weapons. "The United States couldn't restrain itself, for example, from again showing the Phantom bomber, which is sadly known for its piratical attacks in Vietnam. But everything shown in the Soviet Union's salon had peaceful significance." (Av. Wk., 7/24/67, 44)
- . LaRC was developing a new airfoil that could improve performance of advanced variable-sweep-wing fighter aircraft, increase efficiency of subsonic jet transports, reduce helicopter blade tip stalling, and virtually eliminate local shock wave formation, B. K. Thomas, Jr., reported in Aviation Week. Airfoil, which was actually a "transonic wing," delayed boundary layer separation at high subsonic speeds, thereby delaying the rapid rise in aerodynamic drag in the transonic region. It was currently undergoing wind tunnel tests at LaRC, but no aircraft flight testing was planned before FY 1970. (Thomas, Av Wk, 7/24/67, 25)

July 24: MSFC had awarded Astro Space Labs, Inc., a \$93,136 contract for further development and testing of a remotely controlled device to handle tools, equipment, and men in space. Called a serpentuator, device was invented by Hans Wuenschel of MSFC's Manufacturing Engineering Laboratory. It consisted of links connected by powered hinges, which could be remotely controlled from either end of the device; one end would be connected to the spacecraft; one would be free. Small versions of the device could be powered by a hand pump or batteries; larger versions, by electric motors. (MSFC Release 67-151)

During week of July 24: West German Cabinet approved \$456-million five-year plan which would substantially expand national space program. Commenting on the approval, Dr. Gerhard Stoltenberg, Minister for Scientific Research, told the press that enlarged national program was necessary to create a basis for improved cooperation with other technologically-advanced nations. Plan would emphasize projects that provided a "rapid spin-off" of technical knowledge for industry and the economy, he said. Among the areas of special interest would be new materials, energy sources, electronic components, and new methods of planning and managing. (NYT, 7/30/67, 13)

July 25: NASA personnel changes: (1) Dr. Joseph F. Shea, Deputy Associate Administrator for Manned Space Flight, resigned effective Aug. 1 to become a vice president of Polaroid Corp; (2) B/G Carroll H. Bolender (USAF), OMSF, was named manager for the Lunar Module (LM) at MSC's Apollo Spacecraft Program Office, replacing Dr. William A. Lee, who resigned for personal reasons. Bolender would be responsible for management of the LM program including design, development, and fabrication of the vehicle by Grumman Aircraft Engineering Corp., LM prime contractor; (3) Col. Maynard E. White (USAF, Ret.), former Deputy Chief of Staff for Personnel, USAF Hq. in Europe, became Director of Program Control, OMSF, replacing William E. Lilly, who was appointed Assistant Administrator for Administration March 8. White would be responsible for the total financial, administrative, and business management support services for OMSF and the administration and direction of approved facility projects in support of the manned flight program. (NASA Releases 67-196, 67-198; O'Toole, W Post, 7/26/67, A10; AP, W Star, 7/26/67)

- . U.K., France, and West Germany would develop a short-to-medium-distance aircraft designed to reduce cost of air travel by the early 1970's, John Stonehouse of the British Ministry of Technology told a London news conference. Known as the European Airbus Project, plan called for a 300-passenger twin-engine aircraft with a 1,931-km (1,200-mi) to 2,253-km (1,400-mi) range to begin commercial service by 1973. Expected

July 25 (continued)

to cost \$532 million, Airbus would be designed jointly by Sud-Aviation of France, Hawker Siddeley of U.K., and Arbeitsgemeinschaft Airbus of West Germany. (NYT, 7/26/67, 61M)

- . France and U.K. did not believe Concorde supersonic aircraft, scheduled to enter commercial service in 1971, would be forced out of the world market by U.S. SST in 1974, Sir George Edwards, chairman of an Anglo-French management organization for the Concorde, told the Washington, D.C., Aero Club. One distinct selling advantage for the Concorde was its price--about \$16,000,000, compared to an estimated \$40,000,000 for SST. He predicted 150 Concorde would be sold by 1975 and about 40-50 per year after that date. (Sehlstedt, B Sun, 7/26/67)
- . AFSC announced it would purchase eight production models of Titan III-C Standard Space Launch Vehicle. New boosters, along with four of the 17 original R&D vehicles which had not yet been flown, were expected to "support mission requirements through the 1969-1971 period." (AFSC Release 126.67)

July 26: NASA awarded Boeing Co. a \$2.275-million cost-plus-fixed-fee contract for procurement of long-lead-time materials for two additional Saturn V launch vehicles. Contract, which expired Jan. 1, 1968, was first Saturn V procurement in support of Apollo Applications (AA) program. (NASA Release 67-200)

- . NASA selected Martin Marietta Corp. to negotiate 27-mo, \$25-million, cost-plus-incentive-award-fee contract for payload integration of experiments and experiment support equipment on Apollo Applications (AA) spacecraft. Tasks would be performed at NASA's three manned spaceflight centers: (1) MSFC work would involve the orbital workshop and Apollo Telescope Mount (ATM); (2) MSC work, the meteorological and earth resources payloads; and (3) KSC work, the test integration planning and support for launch operations. Selection of contractor followed competitive definition phase in which Martin Marietta Corp. and Lockheed Missiles and Space Co. conducted studies of AA payload integration under parallel, \$2-million, fixed-price contracts. (NASA Release 67-199)
- . NASA Administrator James E. Webb testified on NASA FY 1968 authorization bill before Senate Committee on Appropriations' Subcommittee on Independent Offices. Asked by Sen. Spessard Holland (D-Fla.) to make a choice between a substantial cut in funding for the Apollo Applications (AA) program and the Voyager program, Webb replied that both were vital to the U.S. space effort. "The Apollo application is a small investment

July 26 (continued)

to expend on something you have already spent \$15 billion to get and it seems to me that this is important.

"On the other hand, the United States, if it retires from the exploration of the planetary field, in my view, this has the most serious consequences because the Russians are going to be moving out there and our knowledge of the forces that exist in the Solar System can affect the Earth and can be used for many purposes to serve mankind or for military power...." Criticized by Senator Holland for refusing to make a choice, Webb said he did not want "to give aid and comfort to anyone to cut out a program. I think it is essential that we do them both." (Transcript, 2382-3)

July 27: Sen. Joseph S. Clark (D-Pa.), speaking on the Senate floor, urged President Johnson to appoint a commission to study the need for construction and deployment of an antiballistic missile (ABM) system. "...the ABM question is of such a magnitude that it is essential to have a careful and objective evaluation of the course the United States should follow. I do not believe...that the military-industrial complex is objective enough to advise the United States Congress or the President on how we should proceed. This being the case, I strongly suggest that a temporary blue ribbon commission drawn from all sectors of national life is the best way to bring a thorough inquiry into the issues.

"Our very national survival may be at issue in the ABM controversy. It is time we put the best minds in the country to work." (CR, 7/27/67, S10364-6)

- . NASA's Apollo program was "back on the track" six months after the Jan. 27 fire at KSC, Washington Evening Star columnist William Hines concluded after a tour of NASA centers. "Half a year after that unforgettable night of Jan. 27 the process of trauma, shock, and recuperation has run its course. Much remains to be done, of course--and it will be another nine or 10 months before astronauts fly again--but things are moving once more.

"At Downey...where Apollo spacecraft are built, at Houston, where flights will be controlled, and at Cape Kennedy, where they will begin, there is a noticeable air of confidence (but not over-confidence) mingled with caution (but not over-caution).

"A sadder but wiser Apollo team has emerged from the disaster at pad 34 with the realization that 'pretty good' simply is not good enough...." (Hines, W Star, 7/27/67, A1)

July 27: DOD officials were concerned about serious mechanical problems that had "undermined the readiness" of the Minuteman II ICBM, William Beecher reported in the New York Times. "As recently as this spring, reliable sources say, nearly 100 missiles--about 40 per cent of all the advanced Minuteman 2 missiles and 10 per cent of the entire 1,000 -missile Minuteman force--were out of action because of trouble with the weapon's guidance and control system." Although DOD's "more or less official view" was that the problem was "worrisome but well in hand," many officials "while observing that mechanical problems will always group up in any complex electronics system and can be corrected, cite the Minuteman 2 trouble in questioning the wisdom of the near total reliance that Mr. McNamara places on intercontinental ballistic missiles in the strategic field." Secretary of the Air Force Dr. Harold Brown released a statement on the Minuteman II July 28. (Beecher, NYT, 7/28/-67, 1, 2)

- . LaRC would negotiate with Ling-Temco-Vought, Inc. (LTV), for 24-mo, \$10-million, firm-fixed-price contract to provide 15 Scout launch vehicles. Deliveries would begin about the 10th month at a rate of one vehicle a month. Scout was a multistage booster which could launch a 320-lb satellite into 300-mi orbit or a 50-lb satellite into an 11,000-mi orbit. (NASA Release 67-201)
- . NASA and Centre National Des Études Spatiales (CNES) were conducting series of laser tests with five orbiting satellites--three U.S. and two French--to make precise geodetic measurements. In experiments, a laser beam was fired at a satellite equipped with a reflector designed to return beam to the transmitting station. Time elapsed from transmission to reception is a measure of the distance between station and satellite. If satellite's position is known by independent means or if several stations fire lasers simultaneously, it is then possible to use these measurements to determine distance between observing ground stations. NASA said initial tests, which began in April from stations in U.S., Europe, and North Africa, had been so successful that it might soon be possible to prove or disprove the theory of continental drift by determining the movements of continents relative to one another. (NASA Release 67-197)
- . Sixteen White House Fellows--young men selected to participate in high -level Government operations for one year--visited MSFC for briefings and an inspection tour of facilities. (MSFC Release 67-157)
- . A fir tree had been tested in the Royal Aircraft Establishment's wind tunnel at Farnborough, U.K., to study the effects of high storm winds on forests. (Can Press, NYT, 7/27/67, 3)

July 28: NASA's OGO IV (OGO D) Orbiting Geophysical Observatory was successfully launched from WTR into polar orbit with 564-mi (908-km) apogee; 256-mi (412-km) perigee; 97.9-min period; and 86° inclination. Primary mission objective was "to acquire data for studies of latitude-dependent atmospheric phenomena, from an attitude stabilized platform, during the period of perigee rotation from the Northern Hemisphere across the Arctic pole into the Southern Hemisphere." Secondary objective was to conduct "detailed correlative investigations in atmospheric physics, energetic particle physics and polar region physics with known spacecraft attitude for the greater part of one diurnal cycle." 1,240-lb satellite, which carried 20 experiments, was fourth of six spacecraft in NASA's Orbiting Geophysical Observatory (OGO) program: OGO I was launched Sept. 4, 1964; OGO II, Oct. 14, 1965; and OGO III, June 7, 1966. To date these missions had provided over 450,000 experiment hours of data on earth's environment and had resulted in over 100 scientific papers and published reports. OGO program was managed by GSFC under OSSA direction. (NASA Release 67-187; NASA Proj Off; AP, NYT, 7/29/67, 7)

- . NASA successfully conducted at WSMR second of five balloon-launched parachute tests to determine effectiveness of parachutes as decelerators in soft-landing unmanned instrumented capsules on Mars. On ground command 815-ft-long balloon released disc-shaped flight unit containing parachute, eight acceleration rockets, and 500-lb payload at 129,000-ft-altitude where earth atmosphere is as thin as that of Mars. Rockets then propelled unit to 140,000-ft altitude; parachute deployed and descended with payload into planned recovery area. Test was part of LaRC's Planetary Entry Parachute Program to investigate parachute landing systems for Voyager program. (NASA Release 67-170; Roswell Daily Record, 7/28/67; AP, NYT, 7/29/67, 7)
- . ComSatCorp informed FCC that it was prepared to finance, build, and operate a pilot program for domestic satellite services. In a letter replying to FCC's request for details on the program ComSatCorp proposed March 31, ComSatCorp Chairman James McCormack explained that pilot system would include two synchronous satellites serving 34 domestic ground stations. Estimated total cost was \$104.7 million: \$35.7 million for two satellites; \$22 million for 34 earth stations; and \$47 million for operating costs during two years. Charges for each type of service could not yet be established accurately, but ComSatCorp would provide, without fee, the capacity equivalent to two television channels for noncommercial TV service. McCormack concluded: "We believe that the pilot program offers the American people a beginning to their realization of the benefits of satellite communications, a beginning to their dividend from space technology in which the Federal Government and American industry have played such an important role...." (ComSatCorp Release 67-38)

July 28: Secretary of the Air Force Dr. Harold Brown released a statement on the Minuteman II IBCM: "The effectiveness of a missile depends not only on its alert rate but on the reliability and accuracy with which it will fly to its destination and place its payload on a predetermined target. The overall performance of Minuteman II when fired from alert status has been outstanding by any standard...."

"Therefore, while the Minuteman II guidance and control system is proving to require more maintenance than predicted earlier, the alert Minuteman II missile force is indeed reliable...." (DOD Release 696-67)

- . Increased appropriations for riot-torn cities should take precedence over NASA's request for funds to finance unmanned exploration of the planets, Washington Daily News suggested in an editorial. "James E. Webb...is concerned over cuts in the agency's \$5 billion budget including reduction in money for unmanned exploration of Venus and Mars. Russia, he says, is about to send up the biggest...rocket you ever saw. In the present state of domestic affairs, we'd say let 'em!

"From all appearances our scientists already have more and more exact information about conditions on Venus and Mars than our police and war-on-poverty experts have on Los Angeles and Cleveland...." (W News, 7/28/67, 16)

July 29: Seventh attempt to launch ELDO's Europa I rocket from Woomera, Australia, failed when mechanical fault developed in release system of the French Coralie 2nd stage. (Reuters, C Trib, 7/31/67)

- . President Johnson had approved a recommendation by USN that Navy Navigation Satellite System be released for use by U.S. civilian ships and for commercial manufacture of shipboard receivers, Vice President Hubert H. Humphrey told a group of marine scientists at Bowdoin College, Brunswick, Me. "Our all-weather satellite system has been in use since 1964 by the Navy and has enabled fleet units to pinpoint their positions anywhere on the earth. The same degree of navigational accuracy will now be available to our non-military ships." Humphrey noted that close allies would probably request permission to purchase U.S. receivers and said "policy and procedures for responding to these requests are currently under consideration." The Vice President, who served as Chairman of the National Council on Marine Resources and Engineering Development, was on a five-day tour of New England oceanographic centers. (Text; Wilford, NYT, 7/30/67, 1, 28)

- . Supersonic aircraft fares should be 25% higher than subsonic fares, ATA president Stuart G. Tipton, who was touring facilities where Anglo-French Concorde supersonic aircraft was being built, told a Paris press conference. He predicted that \$18-million price of the Concorde would

July 29 (continued)

make it necessary for airlines to impose a premium fare at first. Tipton praised the quality of work being done on the Concorde and said he believed French prototype would be flown on schedule in February 1968. (NYT, 7/29/67, 38)

July 30: NASA's Nimbus II meteorological satellite had made the first well-substantiated observation from space of a volcanic eruption when it recorded the eruption of Iceland's Surtsey volcano in 1966, U.S. Geological Survey reported. "During August 1966, the Nimbus II satellite was in a near-polar orbit and passed over the island the day after the eruption began with its infrared sensing devices working.

"The Surtsey eruption in its entirety was recorded as a minute black spot on infrared images during more than eight orbital sweeps of the Nimbus II satellite - first on August 20 and definitely identified as late as October 3." Nimbus II was participating in a three-dimensional study of Surtsey by scientists from U.S. Geological Survey and AFCRL using infrared survey techniques. Experiment marked first time volcanic heat had been monitored almost simultaneously from ground, aircraft, and space. Scientists believed the ability to measure heat radiation could be applied to studies of volcanoes on the earth, moon, and planets by means of infrared devices installed in spacecraft. (USGS Release, 7/30/67; Clark, NYT, 7/30/67, 41)

July 31: U.S.S.R. launched Cosmos CLXX into orbit with 208-km (129-mi) apogee; 145-km (90-mi) perigee; and 50° inclination. All equipment was functioning normally, but satellite decayed later in the day. (SBD, 8/10/67, 202)

- . ComSatCorp reported net income of \$2,088,146 for first six months of 1967: a net operating loss of \$755,603 was offset by a net interest gain of \$2,843,749. ComSatCorp entered full commercial operations May 1. (ComSatCorp Release 67-39)
- . Latest Harris poll indicated American people, by 54%-to-34% margin, did not believe U.S. space program was worth an annual \$4-billion expenditure. By 60%-to-30%, public would oppose continuing program at present rate of expenditure if U.S.S.R. were not active in space. People were divided sharply by income and age: (1) low-income people opposed Apollo manned lunar landing program by almost three-to-one, while upper-income people favored it by nearly two-to-one; (2) 62% of persons over 50 opposed program, while 58% of persons under 35 favored it. Results of 1967 poll differed from those of 1965 poll which showed public supporting space program by 45%-to-42% margin. (W Post, 7/31/67, A2)

July 31: The aerospace industry had a special responsibility to try to respond to the critical challenges posed by the Vietnam war and the urban riots, Robert Hotz suggested in Aviation Week. "Perhaps the aerospace industry has been so much absorbed in its traditional task of providing defense against external enemies that it has never given much thought to the contributions it can make to strengthen this nation internally. We submit that the events of this summer should stimulate the industry to take a long hard look in re-evaluating its role on the American scene and to make a bolder and more imaginative bid to offer its services to meet the new challenges of our times....

"We do not mean to suggest that the aerospace industry can provide a panacea for all the problems that face this nation now. But these are new problems in a new environment, and they require fresh thought and new approaches....

"What we do mean to suggest is that the aerospace industry, with its modern technology and systems management, can become a stronger ally of modern government in searching for and implementing effective solutions...." (Hotz, Av Wk, 7/31/67, 11)

- . House/Senate Conference Committee agreed on \$4.86-billion NASA authorization bill--\$234.2 million less than NASA had requested for FY 1968. It included \$42 million for Voyager program; \$347.7 million for AA program; \$73 million for nuclear rocket program; and \$157.7 million for launch vehicle procurement. Bill, which required Senate and House approval, was passed by the Senate Aug. 2. (NASA LAR VI/83; Committee Release; Clark, NYT, 8/1/67, 13)
- . NASA investigative board concluded that immediate cause of the M2-F2 lifting body vehicle crash at Edwards AFB May 10 was "an unusually low landing flare maneuver and premature ground contact" resulting from an unusual set of circumstances "that individually would not have ended in an accident." These circumstances were: (1) "Pilot was overburdened in his normally exacting task by a combination of events that disoriented and distracted him and denied him normal height information; (2) The large amplitude roll oscillation during final approach...caused a temporary loss of lateral control...and changed the landing heading"; (3) Presence of rescue helicopter near path of landing heading represented a collision potential; (4) Lack of visual height cues in landing area; and (5) Unavoidable absence of radioed attitude callouts from chase aircraft. Board recommended: (1) easing pilot workloads in landing lifting-body vehicles; (2) maintaining an enlarged cleared area where inadvertent landings might occur; and (3) improving the information flow on flight planning, briefing, and monitoring procedures. (FRC Release 20-67; NASA Release 67-205)

July 31: NASA would negotiate with Bendix Corp. for one-year, \$25-million contract extension to provide KSC launch support services. (NASA Release 67-204)

- . A Polaris A-3 missile fired from nuclear submarine U.S.S. Will Rogers, submerged off the coast of Cape Kennedy, traveled 1,500 mi down Atlantic Missile Range (AMR) and impacted close to target area near Antigua Island. Scheduled to begin her first patrol in September, U.S.S. Will Rogers was 41st and last ballistic weapon submarine in U.S. fleet. (Baldwin, NYT, 8/1/67, 13)
- . William C. Schneider, formerly Mission Director for NASA's Apollo Applications (AA) program, was named Apollo Mission Director and Apollo Program Deputy Director for Missions, OMSF. Schneider would be responsible for management, direction, and coordination of mission and flight plans, schedules, and associated activities. (NASA Release 67-206)

During July: Editorial comment on proposed NASA FY 1968 authorization bills [see June 28].

Science: "The political atmosphere surrounding the U.S. space program is today murkier and less hospitable than at any time since 1961 when President Kennedy decided to send men to the moon. This does not necessarily mean that NASA is in any danger of falling off its \$5-billion-a-year budgetary plateau...[but] it is clear that, where Congress is concerned, the agency has lost much of its innocence and therefore its plans are to be reviewed with caution and skepticism.

"Some members of Congress are remarkably frank in indicating that their principal interest in the space program lies in the economic benefits it brings their districts.... Indeed, one might be justified in predicting that the major budgetary struggles of the future will be less concerned with how much money NASA gets than with how NASA spends the money it does get." (Carter, Science, 7/14/67, 170-3)

Washington Evening Star: "If continuity and momentum are to be maintained in the space program...the [Congressional] conferees must act with special wisdom this year.

"Two...items in the House bill should be embodied in one final version.... One would establish an independent safety panel in NASA, and the other would require...[NASA] to keep Congress 'fully and currently informed' of problem areas in the space effort.

"Both proposals were strongly opposed by administration spokesmen on grounds that seem shallow and legalistic. It would be well to embody both in the final 1968 authorization bill, if only to put NASA on firm notice that it is time to shape up." (W Star, 7/7/67, A16)

During July (continued)

New York Times: "To read the record of the Congressional debate on NASA's budget is a melancholy experience.... Behind the rhetoric it was easy to see the pressure of the many corporations and communities now sharing in NASA's largeness and fearful of the impact of any major cut in this flow of golden manna....

"A rational 1968 space budget would have been substantially lower than either the House or Senate version, and would have cut particularly severely at the Apollo project.... It would have changed the present emphasis...to lay greater stress on the exploration of the cosmos with relatively cheap, unmanned rockets. Instead, the enormously expensive manned lunar landing effort is left virtually intact, while the highly promising program for sending unmanned Voyagers to Mars and other planets could be entirely eliminated.

"The lobbyists can rejoice, but the nation's real interests have been dealt a severe setback." (NYT, 7/3/67, 10)

- . AIAA President Harold T. Luskin, in Astronautics and Aeronautics editorial, proposed a joint Soviet-American safety program to reduce hazards of manned space flight. He urged that representatives of U.S. and U.S.S.R. meet to exchange technical data on spacecraft safety features, such as crew hatches and parachutes, to set up a common communications network for use in emergencies, and to plan joint rescue operations. "Cooperation for safety could be a step forward in promoting the greatest possible success of manned space exploration. The world would regard it as a meritorious indication that nations can find ways to compete and cooperate at one and the same time....

"Let both countries work toward the day when a flight crew is saved through cooperative action. That event would be the finest space spectacular, the best space first!" (ASA, 7/67, 33-4)

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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

AUGUST 1967

A CHRONOLOGY ON SCIENCE, TECHNOLOGY, AND POLICY

(HHR-23)

Text Drafted by Science and Technology Division
Library of Congress

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AUGUST 1967

August 1: NASA's Lunar Orbiter V (Lunar Orbiter E) unmanned spacecraft was successfully launched by Atlas-Agena D booster from ETR on mission to photograph the lunar surface [see Aug. 5-27].

Agenda 2nd stage fired to boost 860-lb spacecraft into 100-mi (161-km) -altitude parking orbit, reignited after 30-min coast period, injecting spacecraft on 89-hr translunar trajectory, and separated. On schedule, Lunar Orbiter V deployed its four solar panels and two antennas and locked its five sensors on the sun. Star tracker encountered slight difficulty in locating Canopus because of "glint" from the sun and "earthshine," but obtained a fix prior to midcourse maneuver. At 31:27 GET midcourse maneuver with 26-sec engine burn was successfully conducted to slow spacecraft's speed and alter its aiming point slightly.

Primary objectives of NASA's Lunar Orbiter V mission were: (1) to place three-axis-stabilized spacecraft into high-inclination lunar orbit; and (2) to obtain photography of selected scientifically interesting areas on lunar surface and supplemental photography of candidate Apollo lunar landing sites. Photos would cover five Apollo sites, 36 scientific sites, and areas of the moon's hidden side previously unphotographed. Spacecraft would also provide precision trajectory information to refine definition of lunar gravitational field, monitor micrometeoroids and radiation intensity in lunar environment, and serve as a target for tracking operations by Manned Space Flight Network stations.

Last in series of five spacecraft designed to improve knowledge of the moon, Lunar Orbiter V differed from four earlier missions because it would concentrate on targets of primary interest to science. Lunar Orbiter I (launched Aug. 10, 1966), Lunar Orbiter II (launched Nov. 6, 1966), and Lunar Orbiter III (launched Feb. 4, 1967) were in direct support of Apollo and Surveyor programs, identifying at least eight areas suitable for manned landings. Lunar Orbiter IV (launched May 4, 1967) completed broad photographic survey of 99% of moon's front face with 10 times finer resolution than best existing telescopic views. Lunar Orbiter program was managed by LaRC under OSSA direction. Tracking and communications were the responsibility of JPL-operated Deep Space Network. (NASA Proj Off; NASA Release 67-192)

- . NASA announced that Mariner V Venus probe had detected two solar flares of medium intensity. Data transmitted to JPL from spacecraft via Goldstone, Calif., tracking station showed large increases in measurements of solar radiation at 1:30 p.m. and 8:47 p.m. EDT. Occurrence of flares was confirmed by visual observations at Solar Geomagnetic Monitoring Service, Ft. Belvoir, Va. (NASA Release 67-209)
- . KSC held dedication ceremonies for its \$1.1-million Visitor Information Center. One hour later a visitor purchased the 500,000th ticket for the center's guided tour. (LaMont, Cocoa Trib, 8/1/67)

August 1: B/G Harold C. Teubner (USAF), formerly with Hq. USAF comptroller's office, became AFSC Deputy Chief of Staff for Comptroller, succeeding M/G Wendell E. Carter, who was being reassigned to the Pentagon as Deputy Assistant Secretary of Defense (Comptroller/Information). (AFSC Release 152.67)

- . Miami's Opa Locka Airport was the Nation's busiest airport in FY 1967 with a record 596,949 takeoff and landing operations, FAA reported. Chicago's O'Hare International was second with 588,527 operations. (FAA Release 67-61)
- . Scientists at Royal Aircraft Establishment, near Farnborough, U.K., were firing bullets at raindrops because they believed damage inflicted on a bullet impacting with a raindrop was same as damage that would be inflicted on an aircraft flying at high speed through a squall. Scientists were concerned that raindrops, which were a relatively minor problem to subsonic aircraft, might cause serious fuselage and wing erosion to the Concorde SST. (Reuters, NYT, 8/1/67, 29)
- . Cost estimates for developing Anglo-French Concorde supersonic transport had risen to \$1.47 billion, House of Commons Committee of Public Accounts revealed in a report. Additional \$75.4 million would probably be incurred by Ministry of Technology in R&D costs directly connected with the aircraft. Estimates for development costs were \$476 million in November 1962 when Concorde project began. They were subsequently raised to \$1.3 billion and, in June 1966, increased to \$1.4 billion. (NYT, 8/3/67, 44)

August 2: Senate passed, by routine voice vote, and sent to the House the \$4.86-billion NASA FY 1968 authorization bill (S. 1296). House/Senate Conference Committee had agreed on a \$4.86 billion bill July 31. (CR, 8/2/67, S10578-80)

- . Five of the 11 scientist-astronauts selected for NASA's Apollo program were announced in the Nation's press: Dr. Philip K. Chapman, 32, a naturalized citizen born in Australia, and presently a staff physicist at MIT's Experimental Astronomy Laboratory; Dr. Karl G. Henize, 40, astronomy professor at Northwestern Univ., and an experimenter in the Gemini program; Dr. Donald L. Holmquest, 28, who would report for duty in one year after completing his medical internship at Baylor College of Medicine; Dr. John A. Llewellyn, 34, a naturalized citizen born in Wales, presently an associate professor in chemistry at Florida State Univ.; and Dr. William E. Thornton, 38, who recently completed two-year tour of duty with Brooks AFB Aerospace Medical Div. NASA confirmed only that five men named were "in the final running." Complete and official list was released Aug. 4. (AP, NYT, 8/3/67, 8; UPI, W Post, 8/3/67, A1)

August 2: MSC selected NAA's Rocketdyne Div. to negotiate \$5-million, cost-plus-fixed-fee contract for design, development, and qualification of a backup injector for Apollo Lunar Module (LM) ascent engine. Contract would provide initially for design feasibility and development testing with provision for delivery of four production injectors if required. Two of the injectors would be used in ground testing at WSMR and remaining two would be held for possible use in flight engines. NASA said present injector, which was being built by Bell Aerospace Corp., was causing unstable combustion in engine chamber and excessive erosion of ablative thrust chamber. Bell was attempting to correct the deficiencies, but "it was decided to develop an injector of a different design in the event the problems cannot be corrected." (NASA Release 67-207)

- . The number of scientists, engineers, and physicians immigrating to the U.S. had increased 77% between 1956 and 1966, according to report released by House Committee on Government Operations' Research and Technical Programs Subcommittee. Report said this influx from poor nations was an "involuntary gift of valuable resources.

"Such a loss by the developing countries is of direct concern to the United States. To the extent that it undermines development, it also defeats a major United States foreign policy objective for the sake of which this country is currently spending about \$3.7 billion per year...." Reduction of this influx would probably have to be the joint responsibility of the U.S. and the nations that were losing their skilled professionals, report said. "The loss of even a few exceptional individuals in a poor country can mean an important development venture not undertaken, the denial of high-quality instruction and training for the future leaders of development and the diminution of the energy, drive and vision without which there is no development...." (Text; Science, 8/18/67, 783; NYT, 8/3/67, 13)

- . Office of Science and Technology released an interim report on test flights conducted by USAF at Edwards AFB to study the effects of the sonic boom. Flown between June 3-23, 1966, and Oct. 31, 1966-Jan. 17, 1967, tests involved 11 types of aircraft which made 367 supersonic and 261 subsonic flights. Report concluded that flights caused little or no physical harm to test structures, 393 test subjects, or 220,570 test animals, but it dealt with the problem of annoyance only comparatively by noting the relative annoyance of booms of differing intensity and of booms compared to jet aircraft engine noise. Statistics in report, however, indicated that between 33% and 98% of the test subjects objected to booms in the 2.0- to 3.5-lb psf overpressure range that SSTs were expected to produce under the worst possible conditions. Other preliminary conclusions: (1) sonic booms sounded louder outside than inside; (2) walls of houses were more effective in blocking out jet engine noise than

August 2 (continued)

sonic booms; and (3) annoyance increased faster with increasingly bigger booms than with increasingly louder engine noise. (Text; Clark, NYT, 8/3/67, 1, 24)

- . Report released by Joint Committee on Atomic Energy concluded that Communist China would be capable of launching a missile attack on U.S. by the early 1970's. China's progress in developing thermonuclear weapons had been "more rapid and surprisingly more effective than had been expected or indeed predicted," report said. Conclusions differed from those of Secretary of Defense Robert S. McNamara who predicted that Communist China would not deploy a significant number of ICBMs before the mid-1970's and, even then, missiles would not have great reliability, speed of response, or substantial protection against attack. Five-page report was based on closed testimony by officials from State Dept., DOD, AEC, CIA, and atomic weapons laboratories. (Text; Finney, NYT, 8/3/67, 11)
- . A farmhouse in the village of Mauron, France, collapsed seconds after a loud bang was heard, killing three workmen and seriously injuring a fourth. French military and civil officials immediately began an investigation to determine whether a sonic boom had been responsible for the accident. The New York Times later commented: "The latest discoveries about sonic boom...provide scant comfort for enthusiasts of supersonic commercial air transports.

"Further research will undoubtedly turn up additional useful information, but by now the results of several years' investigation of this phenomenon are beginning to fall into a pattern. In a world where everyone was healthy and vigorous, where all buildings were relatively new and well constructed, sonic booms would be just one more source of annoyance and frayed nerves among the many such 'blessings' modern civilization and technology have produced. But in the real world--where any large community has many sick and infirm people and many old and poorly constructed buildings--sonic booms, especially if repeated frequently, pose appreciable hazards to the more fragile human beings and structures...." (Hess, NYT, 8/3/67, 24; NYT, 8/3/67, 30)

August 3: NASA Aerobee 150 sounding rocket launched from WSMR reached 93-mi (130-km) altitude in flight to measure the radiation from celestial objects in the spectral regions 2800-1200 Å, 40-50 Å, and 2-8 Å using photometers and gas-filled, mechanically collimated proportional counters. Experiments performed satisfactorily, but parachute did not deploy and payload crashed. Cause of failure had not yet been determined, but recovery was not required to obtain scientific data. (NASA Rpt SRL)

August 3: Astronaut-Aquanaut M. Scott Carpenter (Cdr., USN) was detached from NASA at USN's request for assignment in Navy's Deep Submergence Systems Project (DSSP). One of the Nation's seven original astronauts, Carpenter became the second American to orbit the earth when he piloted Aurora 7 spacecraft on three-orbit mission May 24, 1962. Active in USN's Man-in-the-Sea program since 1965, he set a world record in underwater work during Aug. 28-Oct. 10, 1965, Sealab II experiment when he lived 205 ft down in the Pacific for 30 consecutive days. Under assignment to DSSP he was tentatively assigned as an aquanaut in Sealab III, a 60-day experiment 600 ft down in the Pacific scheduled to take place in 1968. As USN's senior aquanaut, Carpenter's duties would include responsibility for Sealab III ocean floor operations, experiments, and equipment; and coordination of aquanaut team training.

NASA Administrator James E. Webb commented on Carpenter's departure. "...we are grateful to him and the United States Navy for his services over the past eight years. During the past two years, he has demonstrated that many of the technologies, techniques, and psycho-physiological factors related to space flight have direct applications to the Man-in-the-Sea program. Thus, Cdr. Carpenter becomes the first astronaut to return to his parent service in order to apply the skills, knowledge, and experience acquired during his assignment to NASA...." (NASA Release 67-208)

- . MSFC had successfully completed 11-mo. dynamic test program of Saturn V booster and Apollo spacecraft, which qualified the Saturn V configuration as dynamically and structurally sound. Conducted by Boeing Co., program included dynamic tests of Saturn V's 1st, 2nd, and 3rd stages, Instrument Unit (IU), and Apollo spacecraft. (MSFC Release 67-161)
- . Dr. Smith J. De France, Director Emeritus of ARC, was presented the National Aeronautic Assn.'s (NAA) Elder Statesmen of Aviation Award at ARC. Established in 1954 by NAA's Board of Directors, the award honored outstanding Americans for contributions to aeronautics. Dr. De France was cited "in recognition of his significant and enduring contributions over the years to the progress of aeronautics, and his demonstrated qualities of patriotism, integrity, and moral courage worthy of emulation." (ARC Astrogram, 8/17/67, 2)
- . ComSatCorp had issued three separate RFPs for construction of buildings and facilities at three new earth stations, to be built at Cayey, Puerto Rico; Green Valley, W. Va.; and Jamesburg, Calif. Construction was scheduled to begin in 1967 and end in late 1968. Also issued was an RFP for production, delivery, and installation of multiplex subsystems at the three new stations and at existing stations in Andover, Me., and Paumalu, Hawaii. All RFPs were filed with FCC. (ComSatCorp Release 67-40)

August 3: France's first hydrogen bomb test, scheduled for 1968, would be in the 500-kiloton range, Defense Minister Pierre Messmer announced in an armed forces communiqué. He said acquisition of a hydrogen device was the last and crucial stage in the French nuclear defense system as initiated by President Charles de Gaulle. (AP, NYT, 8/5/67, 3)

August 4: ELDO's Europa I rocket, launched from Woomera Rocket Range after 10 postponements, crash-landed when French Coralie 2nd stage failed to ignite. Malfunction was traced to equipment associated with the release system designed to separate the Coralie from U.K.'s Blue Streak 1st stage. Rocket, which should have flown 4,828 km (3,000 mi) into the Pacific, landed 965 km (600 mi) north of Woomera in the Simpson desert. (Reuters, NYT, 8/5/67, 7)

- . NASA announced selection of 11 civilian scientist-astronauts: Dr. Joseph P. Allen, 30, a physicist research associate at the Univ. of Washington; Dr. Philip K. Chapman, 32, a naturalized citizen born in Australia, and presently a staff physicist at MIT's Experimental Astronomy Laboratory; Dr. Anthony W. England, 25, a graduate fellow in geophysics at MIT and the youngest man ever to be named an astronaut; Dr. Karl G. Henize, 40, an astronomy professor at Northwestern Univ., and an experimenter in the Gemini program; Dr. Donald L. Holmquest, 28, who would report for duty in one year after completing his medical internship at Baylor College of Medicine; Dr. William B. Lenoir, 28, an assistant professor of electrical engineering at MIT; Dr. John A. Llewellyn, 34, a naturalized citizen born in Wales, and presently an associate professor in chemistry at Florida State Univ.; Dr. Franklin S. Musgrave, 31, a post-doctoral fellow at Univ. of Kentucky with a doctorate in medicine from Columbia Univ., a Ph.D. in physiology from Univ. of Kentucky, and four other college degrees; Dr. Brian T. O'Leary, 27, a Ph.D. in astronomy presently in the NASA trainee program at Univ. of California Dept. of Astronomy's Space Sciences Laboratory; Dr. Robert A. Parker, 30, assistant professor of astronomy at Univ. of Wisconsin; and Dr. William E. Thornton, 38, who recently completed two-year tour of duty with Brooks AFB Aerospace Medical Div.

The new astronauts, with the exception of Dr. Holmquest, would report for duty at MSC Sept. 18. After two weeks of general orientation activities, they would begin program of academic or "ground school" training, which would include orbital mechanics, astronomy, computers, spacecraft orientation, general mathematics and physics refresher courses, and field trips for contractor facility orientation. In March they would start Air Force flight training to become qualified jet pilots. The new group, which increased number of NASA astronauts to 56, was sixth class to be selected and second to be chosen specifically for scientific

August 4 (continued)

education. They were selected from a group of 69 nominees submitted to NASA in March by NAS after evaluating a total of 923 applications. (NASA Release 67-211)

- . President Johnson appointed Paul R. Ignatius, Assistant Secretary of Defense (Installations and Logistics) as Secretary of the Navy, succeeding Paul H. Nitze, who became Deputy Secretary of Defense July 1. John T. McNaughton, who had been nominated and confirmed as Nitze's successor in June, was killed in an aircraft crash July 19. In a related action, the President approved reassignment of Thomas D. Morris, Assistant Secretary of Defense (Manpower), to replace Ignatius. (PD, 8/7/67, 1100)
- . Conclusion in March 24 Science article by Bruce C. Murray of Cal Tech and his associates about probable contamination of Mars and Venus by U.S.S.R.'s Zond II and Venus III was challenged by Dr. Richard W. Porter, a member of International Relations Committee of NRC's Space Science Board. Tracking data from Jodrell Bank Experimental Station had indicated that Zond II, launched Nov. 30, 1964, was on a collision course with Mars terminating Aug. 6, 1965; however, Soviet space scientist Prof. Mstislav Keldysh had said the probe would pass within 900 mi. of the planet. Venus III, launched Nov. 12, 1965, may have crashlanded on Venus' surface Mar. 1, 1966. Radio communications had been maintained with the probe throughout the flight but were lost as it approached the planet; no telemetric data were received in final moments before impact. In a letter to the editor of Science, Dr. Porter wrote: "Their conclusion with respect to Venus is based largely on what was not said by the Soviets about sterilization of the flyby bus and on the authors' assumption that the capsule separation and bus deflection maneuvers were not made automatically, even after loss of radio contact." Dr. Porter said authors' conclusion about Mars was also based on insufficient evidence and noted that in discussions with "highly placed" Soviet scientists during Spring 1965, he had received impression that Zond II's miss distance was likely to be much greater than 900 mi. (Science, 8/4/67, 487)

August 5: NASA's selection of two foreign-born astronauts [see Aug. 4] was praised by Erwin D. Canham in the Christian Science Monitor: "The Australian, Dr. Philip K. Chapman...and the Welshman, Dr. John A. Llewellyn...are both naturalized Americans. They are, one may assume, part of the brain drain which has brought so many able persons to the United States in the last quarter of a century. Nothing like this flow of talent has been seen on such a scale in history before.

"The outreach of science also has become profoundly international. It is a deeper bond than we have yet recognized it to be. Someday, perhaps, it will transcend politics. That is the challenge: to bring

August 5 (continued)

political institutions into line with the basic unities which are evidenced in men's constantly changing relationship to the physical universe...." (Canham, CSM, 8/5/67)

August 5-27: NASA's Lunar Orbiter V became fifth U.S. spacecraft to circle the moon. It entered lunar orbit following successful deboost maneuver which reduced its speed by 1,440 mph and permitted lunar capture. Initial orbital parameters: apolune, 3,734 mi (6,023 km); perilune, 121 mi (194 km); period, 8 hrs 30 min; and inclination, 85°. Launched from ETR Aug. 1, spacecraft performed 513 attitude changes, responded to 4,524 commands, and recorded one micrometeoroid hit. Spacecraft systems were functioning normally. Photographs taken beginning Aug. 6 included 23 previously unphotographed areas of the moon's far side; first picture showing the "full earth"; 36 sites of primary interest to science, and five additional candidate Apollo landing sites. 212 medium- and 212 high-resolution photos were transmitted. Final readout was completed Aug. 27. Mission substantially filled in blanks in previous LO photography so that entire lunar surface, front and back, had now been photographed at resolutions about ten times better than obtainable from earth-based observations.

Harold Masursky, U.S. Geological Survey, told news conference at JPL that several of the pictures indicated there might be frozen liquid on the floor of perpetually shaded craters near the lunar poles. The nature of the "fluidal materials" was open to speculation, he said, but "meandering rills appeared to have been caused by some form of material flowing from a volcanic eruption--similar to terrestrial strains found in desert areas on earth." (NASA Proj Off; AP, W Post, 8/9/67, A3; UPI, C Trib, 8/15/67; NYT, 8/15/67, 1)

August 6: New York State Univ. had acquired two of 12 Atlas F ICBM sites near Plattsburgh, N.Y., for use as earth and space research laboratories. Sites had been turned over to GSA for disposal by USAF after deactivating and removing Atlas ICBMs. (NYT, 8/6/67, 2)

August 7: NASA issued three modifications totaling \$30.9 million to NAA's Saturn V 2nd stage contract: first, valued at \$5.5 million, provided for equitable adjustment of 2nd-stage changes previously ordered; second, valued at \$5.8 million, covered seven changes involving KSC ground support equipment; and third, valued at \$19.4 million, was for 12 changes covering alterations of selector switches and insulation of the entire 2nd stage. (NASA Release 67-212)

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August 7: Sen. William Proxmire (D-Wis.), in statement released by his office and submitted to Senate Appropriations Committee's Independent Offices Subcommittee in July, urged that \$427 million be cut from NASA's FY 1968 authorization bill (S. 1296). "We have to establish our priorities, and when it comes to parceling out money the space program stands far below defense, education and many other vital programs." Specifically, Proxmire recommended: (1) temporarily delaying initiation of programs that would commit U.S. to a manned Mars mission and other deep-space probes; (2) cutting AA funds; and (3) cutting advanced missions funds. (Text)

- . Congressional cuts in NASA's FY 1968 authorization bill (S. 1296) indicated that a new era was beginning for NASA and the U.S. space program, Robert Hotz suggested in Aviation Week editorial. "We do not think it was the intent of this Congress to either repudiate or emasculate the U.S. national space program. We think it was the aim of these legislators to mark the end of the era when NASA got everything it wanted simply because it asked for it in a strident and persistent voice. We think it was also the goal of Congress to put the national space program in a better perspective in relation to such other high-priority problems as the Southeast Asia war and the urban riots...." Hotz predicted that the future of the space program as a valid, continuing national goal "will depend in the long run on the successful development of its new hardware and the successful operation of this equipment on missions of increasing complexity and greater value. The most significant contribution that NASA and its industrial contractor complex can make to the future of the space program now is to bend their every effort to assure that the Apollo hardware will function flawlessly, not only for its missions to the moon but also for long-duration earth-orbital operations...." (Hotz, Av Wk, 8/7/67, 17)
- . U.S. and Soviet delegates attending COSPAR's International Years of the Quiet Sun (IQSY) symposium in London [July 17-22] had recommended that cooperative solar studies begun during IQSY be extended into the period of maximum solar activity, Herbert J. Coleman reported in Aviation Week. NRL scientist Dr. Herbert Friedman, President of the Inter-Union Commission on Solar Terrestrial Physics (IUCSTP) which initiated the proposal, said the application of new technologies, including space techniques, "had opened up new fields of investigation such as the relationship between the solar wind and the magnetosphere. A period of increased solar activity could provide valuable data." Soviet physicist R. V. Pushkov pledged full Soviet cooperation in extending the program. (Coleman, Av Wk, 8/7/67, 67)

August 7: ComSatCorp's plans to launch a satellite by 1970 for relaying VHF communications from transoceanic airliners might be delayed by high costs, Electronics reported. "As far as the FAA is concerned, the only issue is cost. The agency is still reeling from a Comsat proposal earlier this year pricing such communications services at \$5 million per channel per year; the FAA told Comsat it was not interested at that price. To make matters worse, one FAA official says current estimates from hardware makers are even higher." (Electronics, 8/7/67)

- Second phase of NATO's proposed comsat project (NATO/Satcom) [see July 9] was being delayed by dispute over which countries would develop satellite systems, Aviation Week reported. Several member countries reportedly opposed plan to use U.S.-supplied, Philco-Ford Co. Skynet satellites because it would eliminate participation by European avionics industry and give U.S. dominant role in the Satcom project. Satcom officials were considering several alternate plans in the event that agreement on original Phase II proposal could not be reached. They included: (1) delaying satellite development until Phase III to allow sufficient time to reach agreement on the work-sharing formula; and (2) dropping satellite development from Phase II and constructing a ground station network compatible to DOD's IDCSF satellites which were being used temporarily during initial test phase. (Av Wk, 8/7/67, 28)

August 8: NASA Aerobee 150 sounding rocket launched from WSMR achieved 180-mi (289-km) altitude in flight to measure: (1) vertical profiles of neutral and ion composition and electron densities; and (2) dissociation of molecular oxygen and atomic nitrogen density using mass spectrometers designed for the POGO satellite. Preliminary data indicated all experiments performed satisfactorily. (NASA Rpt SRL)

- U.S.S.R. launched Cosmos CLXXI into orbit with 220-km (137-mi) apogee; 145-km (90-mi) perigee; and 50° inclination. All equipment was functioning normally. Spacecraft reentered the same day it was launched. (SSR; Aero Tech, 8/14/67, 13)
- House passed \$4.86-billion NASA FY 1968 authorization bill (S. 1296); this completed congressional action on the authorization. (CR, 8/8/67, H10054-60)
- NASA had modified TRW Systems' \$34.7-million contract for Orbiting Geophysical Observatory (OGO) satellites to a \$53.7-million fixed-price incentive contract. Revised agreement provided for assembly, test, and launch of OGOS D, E, and F, in addition to incorporating previously authorized work--fabrication, integration, and observatory test of OGO-D and experiment integration and observatory testing of OGO-E. (NASA Release 67-213)

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August 8: Report by House of Commons Estimates Committee urged U.K. to appoint a space minister and initiate a five-year national space program at a cost of \$84-\$98 million annually. Program should be directed toward the 1971 launch of a comsat which could be used for both commercial and military operations. Report criticized U.K.'s current space effort for lack of purpose and organization, noting that money "had been poured into international projects without a properly conceived national program." (W Post, 8/9/67, A16; SBD, 8/10/67, 205)

- . Eastern Airlines named A. Scott Crossfield, former NACA test pilot, Systems Director of Research and Development for Flight to help prepare airline for its first Concorde and Boeing 2707 supersonic aircraft. A NACA test pilot from 1953-1961, Crossfield became the first man to fly at twice the speed of sound when in 1953 he piloted the rocket-propelled D-558-II aircraft. He was also the first pilot to fly the X-15 to mach 2.97 (Nov. 15, 1960). In 1961, he became division director of test and quality assurance for NAA's Hounddog Missile, Apollo, Saturn, and Paraglider projects. For his contributions to aviation he was awarded the Harmon International Aviator's Trophy in 1961 and the Robert J. Collier Trophy in 1962. (NYT, 8/9/67, 61)

August 8-9: NASA successfully launched five Nike-Apache sounding rockets with chemical cloud experiments and one Arcas sounding rocket with a small live animal payload from NASA Wallops Station between 10:43 p.m. and 7:27 a.m. Five Nike-Apaches ejected vapor trails between 50- and 125-mi altitudes to measure wind velocities and directions at various altitudes in the upper atmosphere. Nike-Apache launched at dawn was sodium experiment which created reddish-orange trail; remaining four were trimethylaluminum (TMA) experiments which created bluish-green trails. Data were obtained by photographing continuously the motion of the trails from five ground-based camera sites within 100-mi radius of Wallops. Arcas sounding rocket carried payload with small live white rat to 25-mi altitude; payload descended by parachute and was recovered from the Atlantic by helicopter. Subsequent examination by Wallops scientists indicated rat was in excellent condition.

Nike-Apache launches were conducted for GCA Corp., under contract to GSFC. Arcas launch was part of Wallops Station's Bio-Space Technology Training Program to assist biological experimenters in evaluating the engineering and operational aspects of spaceflight research. (WS Release 67-27)

August 9: U.S.S.R. launched Cosmos CLXXII into orbit with 301-km (187-mi) apogee; 202-km (125-mi) perigee; 89-min period; and 52° inclination. All equipment was functioning normally. (Aero Tech, 8/14/67, 13)

- . A balloon carrying 9,000-lb instrumented payload for NASA was successfully launched from Chico, Calif., by Univ. of California Space Sciences Laboratory. Approximately 10 hrs later, however, parachutes failed to deploy after ground stations had commanded payload to separate and payload fell into the Pacific. Equipped with flotation gear, it landed within 20 mi of the recovery barge, but had not yet been located. Believed the heaviest ever carried by a balloon, payload contained instruments to: (1) measure cosmic radiation, nuclear interactions of primary particles, and interference background of secondary particles; and (2) gain information on mass and momentum of incoming particles. Scientists were uncertain whether instruments had survived the impact, but said they had obtained excellent telemetry data during 9½-hr flight. (NASA Release 67-218)
- . NASA had selected RCA Defense Electronics Products Div. for negotiation of a \$5-million, cost-plus-fixed-fee contract for 16 pairs of flight-qualified dual spacesuit communications (SSC) systems to be used by Apollo astronauts on the moon. SSC systems--each consisting of AM and FM transmitters and receivers, warning system, and related equipment--would: (1) permit two Apollo astronauts on lunar surface to maintain constant voice communications with each other and with flight controllers on earth; and (2) simultaneously transmit telemetry data from each astronaut back to the lunar module (LM) for relay to earth. Contract would be managed by MSC. Delivery of first two flight units was scheduled for October 1968. (NASA Release 67-214)
- . Rep. George P. Miller (D-Calif.), Chairman of the House Committee on Science and Astronautics, made a statement on the House floor praising NASA's Lunar Orbiter program: "In the short span of just under 1 year, all five Lunar Orbiters have been launched and have provided the world with more information about the moon than has been obtained in all previous history. Lunar Orbiter photography has certified four potential landing sites for our Apollo astronauts, and has provided detailed photographs for 99 percent of the front side of the moon and 60 percent of the back side.
"Successful completion of the present mission [Lunar Orbiter V] will provide supplementary data for the certification of five more Apollo landing sites, detailed photography of virtually the entire moon's surface, front and back, and very close view of 36 areas of great scientific interest on the front face of the moon.
"I wish to compliment the NASA team that has made the Lunar Orbiter

August 9 (continued)

program one of the most successful in the 9-year history of that agency...." (CR, 8/9/67, H10175)

- . Informed sources said U.S.S.R. had launched Cosmos CLXX (July 31) and Cosmos CLXXI (Aug. 8) to test new parachute system designed to avoid the malfunction blamed for the death of Cosmonaut Vladimir Komarov. U.S.S.R. attributed the April 24 crash-landing of Soyuz I to a tangled parachute that failed to decrease spacecraft's speed during reentry. Both satellites had gone into orbit but had re-entered the same day as launched. (AP, B Sun, 8/10/67; AP, C Sun-Times, 8/11/67)
- . French cabinet authorized France to sign U.N. space law treaty [see Dec. 8, 1966]. Signed by representatives of 62 nations Jan. 27, treaty now had about 80 signatories. (NYT, 8/10/67)

August 9-11: Officials from NASA Hq. and field centers and MSFC prime and local support contractors participated in MSFC conference on organizational communication. Purposes of conference were to: (1) review the state-of-the-art and current academic pursuits in organizational communication in government and industry; (2) exchange experiences and knowledge among NASA personnel; and (3) identify areas of common interest with MSFC contractors. Representatives from U.S. Civil Service Commission and selected universities attended as observers. (MSFC Release 67-154)

August 10: NASA's Mariner IV (launched Nov. 28, 1964) and Mariner V (launched June 14) satellites drew into a unique "solar system lineup" which would enable JPL scientists to obtain their first three-point measurements of solar plasma and space magnetism. Orbiting about 70 million mi apart on a direct line from the sun, with earth approximately in the middle, satellites were expected to remain in about the same position relative to each other until Oct. 10. This would enable JPL to compare the densities and velocities of solar rays simultaneously from three points in space--two satellites and earth. (JPL Release; Wilford, NYT, 8/13/67, 54)

- . NASA had converted \$13.5-million systems-integration portion of Chrysler Corp.'s Up-rated Saturn I contract to cost-plus-incentive-fee agreement and extended contract through April 1969. Under new arrangement, which raised total value of systems-integration portion to \$35.5 million, Chrysler's fee would be judged according to the performance, quality, and timeliness of the work, which would be performed at MSFC and Michoud Assembly Facility. (NASA Release 67-216; MSFC Release 67-168)

August 10: Military, congressional, and industrial sources agreed that F-111A variable-sweep-wing aircraft had developed new technical difficulties and that old problems had not yet been completely solved, Hanson Baldwin reported in the New York Times. Original plans had called for some F-111A's to reach Vietnam for combat tests in fall 1967; "now December or January appear to be the target dates if 'fixes' to the present difficulties are successful." Sources said that excessive vibration--a problem believed to have been completely solved--was recurring in tests. Aircraft was also experiencing difficulty with its speed brakes and the problem of partial engine stall during flight persisted. Col. Charles W. Reed, project officer for the F-111A at Nellis AFB, Nev., told Baldwin there were no "real serious problems" with the aircraft and said that accelerated testing and training project which began at Nellis in July was "ahead of schedule." He conceded, however, that aircraft at Nellis had not yet carried bomb loads. Flight and combat testing of the F-111A was continuing at Edwards AFB and Eglin AFB. (Baldwin, NYT, 8/11/67, 1, 2)

- . The universe was 70 billion yrs old--about seven times older than generally believed, Soviet astrophysicists Iosif Shklovsky and Dr. Nikolay Kardashov told a Moscow news conference. When it was formed it first expanded, then remained static for about 50 billion yrs, and now was expanding again. Scientists said they made their conclusions after analyzing the red light shift in spectrograms made of quasars--a method of measuring the distance and velocity of celestial objects. (AP, NYT, 8/13/67, 69)

August 11: OGO "handlers" were hoping that OGO IV (launched July 28) might be economical enough with its gas supply to permit it to continue for one year at the peak of its investigative capabilities. Achievement of one-year performance would enable satellite to gather data on earth, its upper atmosphere, and its near-space environment during period of peak solar activity, which occurs every 11 yrs. OGO IV's gas system, used to supply thrust to series of small attitude-stabilized jets, had been improved by installation of gas bottle filled with krypton instead of argon. This increased gas pressure from 3,000 psi to 4,000 psi and doubled available impulse from 900 to 1,800 pound-seconds. NASA reported that if present gas expenditure rate were maintained they were assured the minimum 50 days of three-axis stabilized operation that would permit mission success. (NASA Release 67-210)

- . Universities should not rely so heavily on NASA and DOD to advance and support basic science, Cal Tech president Lee A. DuBridge suggested in Science. A moderate fraction of these agencies' budgets was necessarily used to advance basic research, he said, and in the case of the space

August 11 (continued)

program "the resulting technologies are providing a valuable tool for carrying on scientific investigations which would otherwise be impossible.

"However, it must...be stressed that neither NASA nor any other agency charged with implementing a national-policy goal is intended to be a philanthropic agency authorized to provide benefactions to university science departments. They are agencies seeking to get a job done, and they turn to universities only when the universities can render a service...." DuBridge urged that Federal Government develop a more adequate and balanced program for strengthening basic science by charging "suitable agencies (principally the National Science Foundation) with this particular task" and providing adequate funds for carrying it out. (DuBridge, Science, 8/11/67, 648-50)

- . Commercial applications of a miniaturized TV aerial developed by USAF after four years of research were being explored by at least 100 electronic companies, Jack Gould reported in the New York Times. Firms believed device, originally developed for military communications, might be used to accommodate the public preference for small antennas without sacrificing picture quality. Inventor Edwin M. Turner, who was attached to the Air Force at Wright-Patterson AFB, told the press that the "heart" of the miniaturized antenna was the use of transistors which made possible a drastic reduction in size. He said USAF was expected to release further details on the aerial in September. (Gould, NYT, 8/12/67, 27)

August 12: GSFC scientists were predicting that NASA's Echo I comsat, launched Aug. 12, 1960, would decay from orbit during the next year, AP reported. Once a perfect sphere 100 ft in dia, balloon had deflated and its speed in orbit was steadily decreasing. It had been launched to demonstrate that large inflatable spheres could be used as passive communications reflectors in space. (AP, H Post, 8/13/67; Volker, M News, 8/12/67)

- . AIAA Board of Directors endorsed hobbyists who built model rockets from paper, plastic, and balsa wood, but warned against the hazards of amateurs mixing their own fuels and experimenting with homemade metal rockets. Action preceded the National Model Rocket Championship contest scheduled to open in Mankato, Minn., Aug. 15. AIAA, which had for many years withheld endorsement of any type of nonprofessional rocket experiments, recommended that model rocketry be conducted only with adult supervision. (Wilford, NYT, 8/14/67, 37)

August 12: U.S. and Australia were engaged in a joint program to build a highly technical installation in the Australian desert to intercept information transmitted by Soviet reconnaissance satellites, UPI reported. On Aug. 11, DOD issued a statement saying only that U.S. was "cooperating with the Australian government in a space defense research project." U.S. officials admitted privately, however, that project was a "ferret" installation to detect radar, electromagnetic radiation, and other electronic impulses emanating from Soviet satellites. (UPI, W Star, 8/12/67)

August 14: President Johnson, in a message to Congress on communications policy, announced that he was appointing a 15-man task force headed by Under Secretary of State for Political Affairs Eugene V. Rostow to formulate "a national communications policy." Included among the questions the group would examine were: (1) How soon would a domestic satellite system be economically feasible? (2) Should a domestic system be general purpose or specialized? and (3) Should there be more than one system? Task force's report was due in one year. The President also: (1) reaffirmed U.S. commitments made in 1962 and 1964 in support of the development of a global system of comsats "to make modern communications available to all nations"; (2) pledged U.S. support to the continuation of the Intelsat consortium: "We seek no domination of satellite communications to the exclusion of any other nation--or group of nations"; (3) stated that U.S. "should take no action in the establishment of a domestic [comsat] system which is incompatible with our support for a global system"; and (4) urged U.S.S.R. and the nations of Eastern Europe to join Intelsat. "Here is a rare opportunity to join in an activity to bring benefits to all nations and loss to none." He suggested there might be an eventual linkage between Soviet Molniya system and Intelsat system.

The President concluded: "Historians may write that the human race survived or faltered because of how well it mastered the technology of this age.

"Communications satellites now permit man's greatest gifts--sight, expression, human thoughts and ideas--to travel unfettered to any portion of our globe. The opportunity is within our grasp. We must be prepared to act." (PD, 8/21/67, 1146-54; WSJ, 8/15/67)

- . William S. Aiken, Jr., former Chief of Operations Research Branch, OART, was appointed Deputy Director, Aeronautical Vehicles Div., OART. (NASA Ann, 8/15/67)
- . NASA's Manned Space Flight Network would be tested for the first time with the unmanned Apollo 4 mission, tentatively scheduled for early October, Barry Kalb reported in the Washington Evening Star. Dr. Friedrich O. Von Bun, chief of GSFC's mission and trajectory analysis

August 14 (continued)

div., told Kalb in an interview that the "reliability of the system is 99.5 percent." Network included a new system, he said, which performed the combined functions of tracking, signaling, and voice communication. Previously a separate system was required for each. Only certain portions of the network would be used for the Apollo 4 mission, Von Bun said. The entire system consisted of 13 earth orbit tracking stations, three deep-space stations (each with a backup unit), five tracking ships, and eight specially fitted jet aircraft. Three deep-space stations, located in Goldstone, Calif., Madrid, Spain, and Canberra, Australia, were designed specifically for "communicating with vehicles at lunar distance." (Kalb, W Star, 8/14/67, A6)

- . NASC was accumulating data on various approaches to earth resources satellites with the goal of forcing competing agencies to agree on a single coordinated program for FY 1969, Aerospace Technology reported. A decision was expected by mid-September. The Depts. of Interior and Agriculture favored an operational program, but NASA believed current technology justified only an R&D approach at this time. (Aero Tech, 8/14/67, 3)
- . ERC was studying a navigation satellite system capable of providing location information to ships and aircraft accurate to within .1 mi, Aerospace Technology reported. System would be competitive with recently-declassified Navy Navigation Satellite System [see July 29], but would be aimed primarily at small users such as private aircraft and pleasure craft. User cost for receiving equipment would range from \$1,000 to \$5,000. Current phase of program involved three contractors: (1) Philco-Ford Corp., which had completed study on fan beam navigation satellites; (2) RCA, which was studying a hyperbolic L-band ranging system providing continuous radiation of the signal; and (3) TRW Systems which was designing a synchronous-orbit satellite system, also operating in the L-band. The next phase, pending NASA Hq. approval, was laboratory testing followed, possibly, by flight experiments in Applications Technology Satellite (ATS) or Apollo Applications (AA) program. (Aero Tech, 8/14/67, 10)
- . The time had come to "fix" the responsibility for the total results of U.S. technology, Michael Getler suggested in Aerospace Technology. There was no single group or agency to "link the broad spectrum of American technological development with social development. There was no single group with the expertise available to probe all forms of technology and its effects, to pump funds into a truly important new applied science not able to capture headlines, to speed the transfer of defense and space technology into other areas, and to put the special interest groups on the line for blockage of improvements within the state-of-the-art. There is no group directly responsible to the citizenry to develop and carry through legislation

August 14 (continued)

to try and save us from tomorrow's smog and urban clutter; for we have not, by a long shot, run out of self-inflicted ills...." Getler urged that the overall responsibility be given to Congress. "It is the Legislative branch of Government, properly augmented with a permanent staff of specialists, that is best equipped to serve as a responsive arbiter between the good life of our people, the promise of technology, and the pressure of the marketplace." (Getler, Aero Tech, 8/14/67, 62)

- . Soviet mathematician Dr. Alex M. Letov, visiting Huntsville for the Guidance, Control, and Flight Dynamics Conference sponsored by Alabama chapter of the AIAA, said he supported the exchange of technical information between U.S. and U.S.S.R. After delivering an important technical paper, Letov remarked: "I am hopeful that I may have initiated some steps in this area of exchange. I am completely satisfied with my presentation and the response of the American scientist. In my report I will reflect this." One of the world's leading authorities on spacecraft guidance and control, Letov outlined a complex theory for stabilizing a large manned spacecraft, which he considered a major problem. "You can't consider the other problems of engineering if your system is not stable. It must be stable." (KC Star, 8/15/67)

August 15: NASA Administrator James E. Webb, testifying at a closed hearing before House Committee on Appropriations' Subcommittee on Independent Offices and Department of Housing and Urban Development, said NASA hoped to keep an approximate \$5.5-billion annual budget following a manned lunar landing. "...we believe it would be wise to keep the budget approximately level, approximately at where it is now or even going up a half billion dollars a year, and use this capability for some further landings on the moon, for ability to move around, for synchronous orbital work with large stations using men for a multiplicity of other purposes related to the earth, and further studies in space...."

"This is very much what the Russians are doing. They are developing a very large number of options and maintaining the ability to select those that are most useful to them at a particular time and move rapidly with it and creating the image that they are out in front with respect to all these modern technologies." Webb said he believed four recent launchings of large unmanned spacecraft by U.S.S.R. were "preparations for manned flights shortly to come. I believe they are flights to work out the difficulties that resulted in the death of their cosmonaut." (Transcript, p. 8, 34)

August 15: Selection of NASA's sixth astronaut class [see Aug. 4] indicated that astronaut "glamour" grew with each new peril, Neal Stanford reported in Christian Science Monitor. "Scientists...compete more intensively for the few scientist-astronaut jobs open than do jet pilots in the military services for the pilot jobs available.

"The glamour has not entirely gone out of space flying. What has happened is that its perils have become more apparent, its scientific opportunities more exciting, and its financial rewards less considerable.

"There have been 6 selections of astronauts, 4 of flier astronauts, and 2 of science astronauts. In this sixth and latest selection 939 [sic] scientists applied for the 11 positions open. In the previous selection of pilot astronauts only 403 applied for 19 positions open...." (Stanford, CSM, 8/15/67)

- . Proposal to operate a 55-passenger STOL airliner in the greater New York area as a three-year demonstration project had been advanced to Federal, state, and city transportation officials, Robert L. Cummings, President of New York Airways, told New York Times. Developed jointly by New York Airways, McDonnell-Douglas Corp., and Cutler-Hammer, Inc., proposal called for four-engine turboprop that could cruise at speeds ranging from 50-250 mph and land on strips 1,200-1,400 ft long. Financing the estimated \$12-\$15-million demonstration project would probably require "some sort of contract operation, presumably with a Government agency," Cummings said. (NYT, 8/16/67, 66)

August 15-17: Divers Arthur Pachtette and Glen Taylor set records for longest and deepest underwater excursions outside a protective capsule in series of three saturation dives in Gulf of Mexico. Sponsored by Ocean Systems Inc., and Esso Production Research, tests studied new deep-diving system designed to enable men eventually to walk and work on the ocean floor at depths of 1,000 ft or more. During tests divers descended 636 ft in a steel hull sphere, donned rubberized "wetsuits" and, breathing a helium-oxygen gas mixture, worked on a dummy oil well outside the capsule for nearly seven hours. Ocean Systems spokesman said they experienced no decompression problems and were able to manipulate nuts and bolts, replace valves, and perform other simulated repair work. In underwater tests conducted by Westinghouse Electric Corp. in June, divers descended to 600 ft in similar operation, but did not remain at the depth long enough to achieve saturation--condition in which the body tissues become completely saturated with gases contained in breathing mixture. (Wilford, NYT, 8/25/67, 19; Aero Tech, 8/28/67, 22)

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August 16: Astronauts Walter M. Schirra, Donn F. Eisele, and Walter Cunningham toured McDonnell-Douglas Test Facility near Sacramento to inspect 3rd stage of the Saturn V booster which would be used to launch them on first manned Apollo mission in 1968. Schirra told newsmen that NASA would not be "pressed by the press" into flying the mission on a specific date. Asked if he believed pressure from the press was in any way responsible for the Jan. 27 fire, Schirra replied: "...I found that whenever we...get together with the members of the press that you're right away asking us, 'Well, now when are you going to fly?' That's almost the first question, and it's not a very unique question.... It seems you want that answer that may be hard news, but when we give you that answer then if we don't make that date, for some reason or another it appears that we're failing our goal. While the goal is to have a successful flight at a reasonable time rather than an early failure...." (Transcript)

- . NASA's Mariner V spacecraft had reached the halfway point in elapsed time in its 128-day, 216-million-mi flight to Venus. Scheduled to fly by the planet Oct. 19, spacecraft had traveled 98,667,000 mi in 64 days. It was scheduled to reach midway mark in distance Aug. 22. (NASA Release 67-223)
- . The Federal Government had involved itself in the SST program because failure to do so would have resulted in a loss of jobs and progress in U.S. aviation industry, M/G J.C. Maxwell (USAF), Director of FAA SST Development, told the National Space Club. "The aircraft industry had been challenged by a powerful consortium [Concorde] of two large aircraft companies fully subsidized by two major governments. Our aircraft companies did not have the resources to meet this challenge. The government acted." Federal participation had resulted in some major side effects, Maxwell said. "We were able to make available to all potential SST contractors a vast amount of technological information that the government had acquired in its own huge aircraft endeavors. The flight test experiences of the B-70, the SR-71, and the F-111 were and are being provided to our SST contractors.... We were able...to contribute some 49,000 hours of SST wind tunnel tests conducted by NASA. The military...has logged some 300,000 hours of supersonic experience.... The SST program is founded on the experience and know-how from other programs sponsored and paid for by the government--and that includes the space effort.

"Another benefit...[was] the fact that the resources of the whole aviation industry were brought into the project. Our search for the best design was, in every sense of the word, a competition. The best talent and genius of American aeronautical engineering was put to work." (Text)

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August 17: Photo of the earth in the near full phase transmitted by Lunar Orbiter V [see Aug. 5-27] was a "fraud, a fake, a piece of trickery or deceit," Samuel Shenton, Secretary of the International Flat Earth Research Society, told newsmen in London. "Look at the photograph the satellite supposedly took. Notice those lines across the bottom of the picture. They show it's a composite, a mock-up." Asked why U.S. should seek to perpetrate such a deception, Shenton replied: "It's all part of the great global earth conspiracy, and it's a shame." Members of the International Flat Earth Research Society believed that the earth is not only flat, but static in space. They also maintained that the theory of gravity was advanced only to support the belief that the earth spins. (AP, B Sun, 8/18/67)

- . St. Louis Univ. scientists Drs. F. C. Bates and Albert Pallman were studying structure and circulation of the lower Martian atmosphere to aid NASA in deciding whether to use a hard- or soft-landing spacecraft on first Mars mission. (UPI, NYT, 8/17/67, 24)
- . North American Air Defense Command (NORAD) announced officially that no flying saucers, no extraterrestrial spacecraft, and no "unfriendly objects" had ever been identified by air forces over U.S. or Canada: "There have been thousands of reports about official air force stands on UFOs from the widest variety of sources over the years--but so far as the command is aware, it never has been shown anything but natural atmospheric or astronomical phenomena or airborne objects--birds, insects, hardware--seen under unusual circumstances, or misinterpreted." (Thomis, C Trib, 8/18/67, 1)

August 18: House Committee on Appropriations reported \$4.6-billion NASA FY 1968 appropriation bill--\$516.6 million less than NASA had requested and \$282 million less than NASA FY 1968 authorization bill (S. 1296). Committee said the bill was "less than would be recommended under less stringent fiscal circumstances," but it would support "a viable space program, and one that is consistent with available resources."

"The reductions...should in no respect be interpreted as an expression of a lack of confidence in our space endeavors...." Cuts included: (1) \$50.5 million from Apollo program; (2) \$154.7 million from AA program; (3) \$27.5 million from Nuclear Rocket Program; (4) \$37.7 million from Tracking and Data Acquisition; and (5) \$71.5 million from Voyager (funding eliminated). (NASA LAR VI/91; WSJ, 8/21/67, 4; O'Toole, W Post, 8/19/67, A4)

- . First two Apollo spacesuits incorporating changes recommended by NASA's Apollo 204 Review Board were scheduled to arrive at MSC in early September for thermo-vacuum and compatibility testing. New suit,

August 18 (continued)

designated A-7L, was an improved version of the original A-6L suit. Changes, which primarily involved replacement of flammable materials with non-flammable or low-flammability materials, included substitution of: (1) Beta fabric, a non-flammable fiberglass cloth, for Nomex, a high-temperature nylon, in outside layer; (2) Nomex for a more flammable nylon inner layer; and (3) fire-resistant Kapton/Beta fiberglass insulation for aluminized mylar-dacron insulation. In addition to its greater fire-resistant properties, spacesuit, which was white rather than blue, was more comfortable and mobile than A-6L. It would be used in all manned Apollo missions during pre-launch and launch phases, and reentry. First production model of spacesuit, which was manufactured by International Latex Corp., Government and Industrial Div., under MSC contract, was scheduled for mid-October delivery. (NASA Release 67-222)

- . NASA had awarded NAA's Rocketdyne Div. a \$1.4-million contract for continued technological investigation of the advanced aerospike rocket engine. Studied by OART for $1\frac{1}{2}$ yrs, the engine utilizes a doughnut-shaped combustion chamber which discharges exhaust gases against the surface of a short center cone. In conventional rocket engines gases are expanded inside long bell-shaped nozzles. Current concept specified an engine eight feet in diameter and $4\frac{1}{2}$ ft high --about 50% shorter than conventional bell nozzle engines. A new "aerodynamically compensating nozzle" would permit use of the engine at sea level or high altitude, making it potentially suitable for both lower and upper stages of launch vehicles. Contract completion date was May 31, 1968. (NASA Release 67-221)
- . A completely fireproof version of the spacecraft fabric Velcro had been perfected and would be used on NASA's first manned Apollo mission in 1968, William Hines reported in the Washington Evening Star. In tests conducted at MSC early in August, the all-metallic fabric did not ignite, even in pure oxygen atmosphere at 16.5 psia. Velcro Corp. vice president Jack Mates told Hines in an interview that NASA had not yet placed an order for the improved Velcro, but that his company was beginning production of a substantial quantity. "We know they are going to use Velcro and we know this is safer than the old kind." In the Jan. 27 Apollo fire, flames in the spacecraft had quickly spread along the surface of ordinary nylon Velcro adhesive pads which were used to hold frequently-used equipment. (Hines, W Star, 8/18/67)
- . Inexpensive and easily-acquired property was not necessarily the best site for a new airport, according to airport site selection guide published by FAA. Other factors such as accessibility to users,

August 18 (continued)

construction costs, future expansion possibilities, obstructions, anticipated community response to aircraft noise, and proximity to other airports could be even more important factors. Airport site selection was a local responsibility, guide noted, but all sponsors of civil airport projects were required to notify FAA of proposed construction so agency could review project's effect on surrounding airspace. (FAA Release 67-62)

August 19: Negotiations were being conducted in Washington, D.C., to move Canada's High Altitude Research Project (HARP) from McGill Univ. to Univ. of Vermont, Jay Walz reported in the New York Times. Move was a result of Canada's decision to cut off funding because it believed program should be self-supporting. HARP, which maintained a launch site in Highwater, Quebec, near the Vermont border, used 16-in naval guns to inexpensively launch spacecraft into the ionosphere for various scientific and meteorological experiments. Project, which received about \$1.2 million annually from U.S. Army, employed 50 persons at McGill Univ., 70 at Highwater, and 60 at a launch site in Barbados, West Indies. McGill Univ. commented that the loss of the project "is a very great disappointment [but] the university is very glad indeed that the work may be continued in a sister university in a neighboring state." (Walz, NYT, 8/20/67, 20)

- . An unusual sequence of Soviet launches had led some U.S. officials to conclude that U.S.S.R. was testing techniques for reentering warheads from space, Evert Clark reported in the New York Times. "This could mean that the Russians are developing weapons to be stationed in orbit. Weapon re-entry techniques can be tested with or without the use of weapons, and the same re-entry techniques can be used for either nuclear or conventional weapons." Clark said all of the flights (1) were very short; (2) had been launched from Tyuratam range; (3) had entered orbits with 49° inclination; and (4) had been given a Cosmos number. A resolution adopted by the U.N. General Assembly in 1963 asked all nations to refrain from orbiting weapons of mass destruction. The question of whether resolution prohibited the development of such weapons had never been clarified, Clark said. (Clark, NYT, 8/20/67, 17)
- . Hugo Gernsback, an inventor, author, editor, and publisher who was often called the father of modern science fiction, died in New York at age 83. Gernsback described radar in 1911--35 yrs before communications experts bounced a radar signal off the moon. In 1927 he began publishing Amazing Stories, one of the earliest magazines devoted entirely to science fiction; and in 1928 he sponsored New York's first television

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August 19 (continued)

broadcasts: images only slightly larger than postage stamps were received on crude scanners owned by 2,000 amateurs. (NYT, 8/21/67, 29)

August 20: NASA published the first extensive chart of the far side of the moon. Compiled by USAF Aeronautical Chart and Information Center using NASA-supplied photos, map covered more than 75% of the moon's hidden side. Approximately 85% of the photos used were provided by NASA Lunar Orbiters I, II, III, and IV; remaining 15% were provided by Soviet Zond III. Map was released to assist astronomers at the International Astronomical Union, convening Aug. 22 in Prague, in naming features on moon's far side. (NASA Release 67-220)

- . USN successfully conducted first underwater launch of the Poseidon missile off the coast of San Clemente, Calif. Missile was expected to be operational by 1970 aboard 30 of the 41 Polaris submarines. (W Post, 8/21/67)

August 21: Two-stage Nike-Cajun sounding rocket launched from Natal, Brazil, failed when rocket strayed from planned trajectory. Failure was first in Brazil's space program which opened Dec. 15, 1965, with the launch of a Nike-Apache sounding rocket. (Reuters, W Post, 8/23/67)

- . President Johnson signed \$4.86-billion NASA FY 1968 authorization bill (S. 1296) into law. Noting that on Aug. 18 House Committee on Appropriations reported \$4.6-billion NASA FY 1968 appropriation bill, \$516.6 million less than NASA had requested, the President said: "Under other circumstances I would have opposed such a cut. However, conditions have greatly changed since I submitted my January budget request....

"I recognize--as also must the Congress--that the reduction in funds recommended by the House Appropriations Committee will require the deferral and reduction of some desirable space projects. Yet, in the face of present circumstances, I join with the Congress and accept this reduction." (PD, 8/28/67, 1192-3)

- . Charles W. McGuire, formerly an aerospace engineer in the test directorate of NASA's Gemini program, became Director of Safety for the Apollo Program. He would be on the staff of and report directly to the Apollo Program Director while being administratively assigned to the Safety Office, OMSF. (NASA Ann, 8/7/67)
- . Maj. William J. Knight (USAF) flew X-15 No. 2 to 3,409 mph (mach 5.10) and 90,000-ft altitude in first flight with a new ablative coating and sealer designed to permit aircraft to fly at mach 7.4 without basic

August 21 (continued)

- airframe modification. Flight also tested: (1) stability and control with dummy ramjet and ablative; (2) Hycom phase-II camera (KA-51A); (3) ramjet local flow; (4) ramjet separation characteristics; and (5) wing tip accelerometer. (NASA Proj Off; Av Wk, 8/28/67, 33)
- . Special NSF panel to screen radio astronomy proposals advised NSF Director Leland J. Haworth to accept immediately only two of the six recommendations presented to the panel during July hearings: (1) Cornell Univ.'s proposal to improve accuracy of the surface of 300-m antenna at Arecibo, Puerto Rico; and (2) Cal Tech's proposal to add seven dish antennas to one already in existence at Owens Valley Observatory. Panel rejected or deferred: (1) National Radio Astronomy Observatory's (NRAO) proposal for a Very Large Array (VLA) consisting of 36 25-m dish antennas distributed along three arms of a Y; (2) Northeast Radio Observatory Corp.'s (NEROC) proposal for 135-m fully steerable dish antenna under plastic steel-ribbed radome; (3) Associates for Radio Astronomy's (ARA) proposal for 100-m fully steerable dish antenna without radome; and (4) Committee on Institutional Cooperation's proposal for a device to study upper atmosphere and ionosphere. Eight-member panel was chaired by Princeton Univ. physicist Dr. Robert H. Dicke. (McElheny, Science, 8/18/67, 782-4; 8/25/67, 907-10)
 - . Rep. William L. Hungate (D-Mo), speaking on the House floor, expressed concern about NASA's FY 1968 budget request "at a time when the Nation's economy is threatened by inflation and when we are spending \$24 billion annually on the war in Vietnam....
 "As an example of untimely NASA spending, \$21,100,000 of the funds requested are to be devoted to research directly applicable to the supersonic transport project.... Before more millions are poured into supersonic transport, some consideration should be given to solving the problems created thus far by this costly innovation...." (CR, 8/21/67, H10888)
 - . ComSatCorp would issue RFP's in 1968 to build a 10,000-channel satellite--Intelsat IV, Electronics reported. Procurement of four or more of the satellites would have to be approved by Intelsat, but "chances of a go-ahead look good." ComSatCorp's plan was based on design studies recently completed by Hughes Aircraft Co. and Lockheed Aircraft Corp. for a high-capacity, multipurpose satellite [see March 23]. (Electronics, 8/21/67)
 - . A SPACE rescue blanket for campers and sportsmen was being manufactured by National Research Corp. using a superinsulation material it had developed to store cryogenic materials in spacecraft, Douglas W. Cray reported in the New York Times. Made of a plastic base one half of

August 21 (continued)

one thousandth of one inch thick with an aluminum coating one millionth inch thick, blanket weighed two ounces, measured 56 by 84 in, and could be folded into a cigarette-pack size. It was waterproof and windproof; remained flexible at temperatures as low as -60°F ; and could reflect 80% of user's natural body heat. (Cray, NYT, 8/21/67, 45, 48)

- . LRC's Quiet Engine Program should produce a significant reduction in jet-engine noise and reverse the rising noise levels which had created serious problems at major airports, Michael L. Yaffee reported in Aviation Week. Expected to cost \$50 million, program was seeking to develop a new turbofan demonstrator engine that would show a reduction of 15 PNdb (perceived noise in decibels) on takeoff and 20 PNdb on landing, compared to current transport engines. Definition phase of Quiet Engine Program began under \$458,000 contract LRC awarded United Aircraft Corp.'s Pratt & Whitney Div., July 13. Remaining \$750,000 allotted to program for FY 1967 was being used to purchase supporting services and hardware. (Yaffee, Av Wk, 8/21/67, 38-9)

August 22: House voted 312-92 in favor of \$4.6-billion NASA FY 1968 appropriation bill (H.R. 12474)--NASA's lowest in five years. This was the sum recommended by the House Appropriations Committee [see Aug. 18]. Two amendments by Rep. William F. Ryan (D-N.Y.)--one to reduce R&D funds by \$100 million; one to reduce administrative operations' funds by \$37 million--were defeated by voice vote. (NASA IAR VI/93; CR, 8/22/67, H10909-30)

- . Leonard Rawicz, former patent counsel for GSFC, had been appointed NASA Assistant General Counsel for Patent Matters, succeeding Robert F. Allnutt, who was named NASA Assistant Administrator for Legislative Affairs June 15. (NASA Release 67-226)
- . Tass announced that U.S.S.R. would build more than 20 relay stations during 1967 so that Moscow telecasts could be transmitted via Molniya comsats to Siberia, the Soviet Far East, and the "extreme north." (Reuters, W Post, 8/24/67; Clark, NYT, 8/25/67)
- . USAF announced it was sending teletype messages between two aircraft flying 10,000 mi apart via a satellite in 20,000-mi-altitude earth orbit. Scheduled over six-month period, communications tests were being conducted over Pacific and Atlantic oceans, North and South America, the polar regions, and Europe. (AFSC Release 144.67)

August 22: A college which would train 2,000 pilots and technicians annually for the expanding aviation industry was proposed in report by a study group sponsored by the Economic Development Administration. Report recommended that various segments of the aviation industry join to form a nonprofit organization to operate flight training portion of the college. Academic side would be handled by Arizona State Univ. Report estimated college would cost \$13-million and could be opened by 1969. (UPI, NYT, 8/23/67, 73)

August 23: The New York Times commented on the task force appointed by President Johnson to formulate a national communications policy [see Aug. 19]: "The...task force...has an unprecedented opportunity to break internal governmental deadlocks that stand in the way of a domestic satellite system and other needed forward steps in communications. It can do much to advance public television and to give all TV, both commercial and noncommercial, a firmer root in public service. Perhaps most important of all, it can point a path for the interconnection of international satellites so that all countries can be encouraged to see and speak to one another across the heavens..."

"The major challenge is to clear channels through which revolutionary new developments in communications can be used with maximum effectiveness for total human service and enlightenment. The last thing that should happen is for Congress to postpone action on President Johnson's proposal for a Corporation of Public Broadcasting. Such a planning body should be in existence to move speedily on any sound recommendations the task force makes." (NYT, 8/23/67, 40M)

August 23-31: International Astronomical Union (IAU) met in Prague.

Dr. Robert B. Leighton of Cal Tech reported that there were about three times as many craters on Mars as preliminary photos transmitted in 1965 by Mariner IV spacecraft indicated. Citing data from two-year study of photos using new computer-enhancement technique, Dr. Leighton said pictures showed 300 clearly defined craters and more than 300 additional possible craters. Original estimate from unprocessed pictures was less than 100. Mars appeared to be about as densely pitted as the moon but its craters were smoother because of more effective erosion processes. Several photos showed a number of linear features similar to lines formed by rifts and faults on the moon. These features were not the "much-discussed" canals of Mars because they were too narrow to be visible from earth, Dr. Leighton said, but they might be related to some of the markings identified earlier as canals. (NASA Release 67-225)

Dr. and Mrs. Pierre Connes of Haute Provence Observatory and Meudon Observatory, France, respectively, reported evidence that might indicate Venutian clouds are not formed by water. Using an observation technique

August 23-31 (continued)

which greatly increases precision with which planets' spectra could be analyzed, they discovered spectral lines of hydrogen chloride and hydrogen fluoride in the light reflected from Venus. When hydrogen fluoride combines with water it creates hydrochloric acid which absorbs radar waves; yet radar waves are known to penetrate Venutian clouds, returning echoes to the surface of the earth. (Sullivan, NYT, 8/24/67)

The "mysterium phenomenon"--peculiar radio emissions from the Milky Way which display almost all the characteristics of artificial interstellar communication--was the subject of a report by Dr. T. K. Menon, National Astronomy Observatory, Green Bank, W. Va., and a later panel discussion. Dr. Menon said most recent observations of the emissions in the nearby part of the galaxy had been made simultaneously from California, Massachusetts, and U.K., using almost the entire width of earth as a baseline for measurement. They had identified sources of emissions which were smaller than the smallest star as seen by the human eye and discovered some of these emissions were fluctuating on time scales measured in hours or even less. Panel raised the possibility that emissions might be from stars in the process of formation. They were being transmitted at four closely spaced wavelengths associated with hydroxyl, a molecule formed of a single oxygen and hydrogen atom, and were being given off when such molecules shed energy. Emissions also appeared to have various properties associated with a maser--man-made device in which a radio or light wave is beamed through certain atoms whose energy has been raised. This results in enormous amplification of original wave and, if wave is confined to a single axis, produces a beam of extreme intensity. (Sullivan, NYT, 8/26/67, 1, 10; 8/28/67, 22)

Lunar Committee postponed naming of surface features on moon's far side pending the results of Lunar Orbiter V mission. A list of 228 names for approximately 500 major features had been submitted by Soviet scientists, but U. S. delegates cited errors in their designations and asked that features be assigned numbers until a more definitive map could be prepared using Lunar Orbiter V photos. (Sullivan, NYT, 8/25/67, 13)

IAU president Dr. Pol Swings of Belgium confirmed an observation made by two obscure Irish astronomers in 1882 that had been questioned because it ran counter to accepted theory and because techniques used were amateurish. He said astronomers Lohse and Copeland had observed a comet during the day, apparently with a hand-held spectroscope, and reported that it glowed strongly with spectral lines of iron as it passed the sun. All earlier observations of light emitted from comets as they neared the sun indicated they were composed of very light materials and the idea that they were rich in iron was viewed skeptically.

August 23-31 (continued)

However photos and electric recordings taken of the comet Ikeya-Seki as it passed the sun in 1966 showed unmistakable spectral lines of iron, Dr. Swings said. (Sullivan, NYT, 8/27/67, 51)

Dr. Gordon H. Pettengill, MIT's Lincoln Laboratory, said that results from an experiment which studied Martian terrain by bouncing radar signals off the planet indicated: (1) Mars was roughly as mountainous as earth; (2) there were no large bodies of water on Mars; and (3) there was no clear correlation between height of land and presence of dark areas on Mars. (Sullivan, NYT, 8/30/67, 15)

Dr. Bradford A. Smith, New Mexico State Univ., confirmed report by French astronomer Pierre Guerin that atmosphere of Venus was moving around the planet in a clockwise direction at a remarkable rate of speed. Conclusion was based on photos of Venutian atmosphere taken successively both at night and during the day which recorded changes in wavelengths of ultraviolet light. (Sullivan, NYT, 8/30/67, 15)

August 24: Cosmos CLXXIII was launched by U.S.S.R. into orbit with 528-km (328-mi) apogee; 280-km (174-mi) perigee; 92-min period; and 71° inclination. All equipment was functioning normally. (UPI, NYT, 8/25/67, 5)

- . U.S. and U.S.S.R. submitted to disarmament conference in Geneva separate but identical texts of a draft treaty to prevent the further spread of nuclear weapons. Treaty would bar the five nuclear powers from transferring nuclear weapons or nuclear explosive devices to nations that did not have them or from assisting them in the production of nuclear weapons. After draft was agreed to by 17-nation disarmament conference, it would be submitted to U.N. General Assembly for discussion.

President Johnson commented: "If we now go forward to completion of a worldwide agreement, we will pass on a great gift to those who follow us.

"We shall demonstrate that--despite all his problems, quarrels, and distractions--man still retains a capacity to design his fate, rather than be engulfed by it.

"Failure to complete our work will be interpreted by our children and grandchildren as a betrayal of conscience, in a world that needs all of its resources and talents to serve life, not death...." (PD, 8/28/67, 1204-5; Hamilton, NYT, 8/25/67, 1)

- . NASA test pilots Fitzhugh Fulton and Donald Mallick flew XB-70 No. 1 to mach 2.27 and 58,000-ft altitude in flight at Edwards AFB to check out: (1) three pacer airspeed calibration points; (2) photos

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August 24 (continued)

- of the tufted right upper canard; (3) boundary layer noise data; (4) stability, control, and handling qualities; (5) bypass close unstart of left inlet; (6) nose ramp flutter data; and (7) radar airspeed calibration. (NASA Proj Off)
- . Ten cosmonauts were practicing parachute jumps over the water, indicating that future Soviet space missions might attempt American-style splashdowns, Krasnaya Zvezda reported. All previous Soviet manned space missions had come down on dry land. (UPI, NYT, 8/25/67, 29)
 - . Soviet aircraft would drop bombs into two large areas of the Pacific from Sept. 2-10 in series of seismic tests which would aid Soviet study of world oceans and research into forecasting tidal waves and earthquakes. Tass asked foreign governments to warn their ships not to enter first area from 10:00 a.m. to 6:00 p.m. local time, Sept. 2-5; or second area during same hours Sept. 5-10. (Reuters, NYT, 8/25/67, 12)
 - . Republic Aviation Corp. offered \$10,000 each to 12 well-trained men willing to spend 270 consecutive days in 28-ft-long simulated space chamber. Applicants had to be qualified psychologists, microbiologists, or systems engineers. Tests, which would be conducted at Wright-Patterson AFB under \$646,434 USAF grant, would try to determine how men would react during a long space voyage. (AP, NYT, 8/25/67, 16)

August 25: Dr. Homer E. Newell, NASA Associate Administrator for Space Science and Applications, would become NASA Associate Administrator Oct. 1, NASA Administrator James E. Webb announced. He succeeded Dr. Robert C. Seamans, Jr., who became Deputy Director Dec. 21, 1965. In his new position, Dr. Newell would work closely with Webb and Dr. Seamans on the planning, development, and conduct of the space program. D. D. Wyatt, Assistant Administrator for Program Plans and Analysis, would report directly to Dr. Newell. (NASA Release 67-228)

- . Mariner V spacecraft had traveled more than 114 million mi of its 216-million-mi flight to Venus and was now closer to Venus than to earth, NASA announced. JPL officials said spacecraft's star tracker had been successfully updated for the first time Aug. 24 in a scheduled compensation for the changing relationship between spacecraft and Canopus. This electronic change would occur three more times during the flight. (NASA Release 67-229)

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August 25: Prof. Jacques-Emile Blamont of the University of Paris would receive the International Academy of Astronautics' (IAA) 1967 Daniel and Florence Guggenheim Award, IAA President Dr. C. Stark Draper announced. Given in recognition of an outstanding contribution to the progress of astronautics through work done during the last five years, award would be presented during International Astronautical Congress to be held in Belgrade Sept. 24-30. (IAA Press Release 32)

- . Maj. Michael J. Adams (USAF) flew X-15 No. 3 to 82,000-ft altitude and 3,136 mph (mach 4.71) at Edwards AFB. Purposes of test flight were to check: (1) phase II tail loads; (2) boost guidance checkout; (3) traversing probe; (4) tip pod accelerometer; and (4) boundary layer noise. (NASA Proj Off)

August 26: First Saturn V booster was moved to its launch pad on a crawler-transporter from KSC's Vehicle Assembly Building. Three and one half mile trip took about 10 hrs. 364-ft tall booster would undergo at least six weeks of additional testing at the pad before being used to launch unmanned Apollo 4 mission, tentatively scheduled for October. Apollo Program Director M/G Samuel C. Phillips (USAF) told newsmen at KSC that the movement of the Saturn V was an important milestone in the Apollo program. He predicted that, barring any major problems, U.S. could still achieve its goal of landing a man on the moon in 1969. He warned, however, that "it's a long way to the moon and we have a major job ahead. Dangers go with this business. We've done everything we can to improve the equipment. But, remember, we're treading on new ground and it's a risky business. We feel we can overcome the risk and make it work." (NASA Release 67-219; AP, W Star, 8/27/67, A3; NYT, 8/27/67, 1, 29; W Post, 8/27/67, 1)

- . FAA announced allocations of \$70.2 million in Federal matching funds to construct and improve 386 public civil airports under FY 1968 Federal -aid Airport Program (FAAP). Program provided \$64.1 million to improve 348 existing airports and \$6.1 million to construct 38 new public airports. (FAA Release 67-64)

August 28: Ralph W. Tyner, former Industrial Relations Officer at GSFC, became Deputy Director for Labor Relations at NASA Hq., replacing C. Stuart Broad, who transferred to DOD July 17. (NASA Ann, 8/25/67)

- . NASA Associate Administrator for Space Science and Applications Dr. Homer E. Newell wrote to the Editor of Aerospace Technology: "In 1973, NASA proposes to conduct the first of the Voyager series of missions to Mars, using the Saturn launch vehicle. We wish to

August 28 (continued)

call the attention of the scientific community to the opportunity of proposing experiments for this initial flight....

"...Regardless of the level of funding support obtained for Voyager this fiscal year, it is our plan to begin evaluating scientific proposals on Nov. 1, 1967, and to select scientists for participation in the planning and development steps by Feb. 1968...." (Aero Tech, 8/28/67, 8)

- . ARC was expected to award a one-year, \$100,000-\$150,000 study contract within a few months to define the characteristics of an economical general aviation aircraft engine for the 1985 time period, Aviation Week reported. Contract would be part of NASA's renewed emphasis on general aviation and would be designed to support in-house work that ARC had been conducting for the last year. Basic objective was to find areas where new technology could be applied to present or future propulsion systems that would lead to a more economical general aviation engine. NASA emphasized, Aviation Week said, that it would not be asking the contractor to design an engine; "rather, the agency is seeking a tool which it can use to implement tradeoffs during an in-house mission analysis." (Av Wk, 8/28/67, 113)
- . Report released by House Committee on Government Operations' Subcommittee on Military Operations said that DOD's Initial Defense Communications Satellite Program (IDCSP) had many inadequacies and urged that steps be taken "forthwith" to reinforce it by adding synchronous satellites. Report argued that undue reliance on present system would stretch it "skintight", impairing its capabilities if unexpected failures developed. The subcommittee expressed concern over DOD's apparent intent to use IDCSP "for a longer period than originally planned" and its tendency to lean "rather heavily on the future promise of technological breakthroughs and improvements in the state-of-the-art." It conceded it would be wrong to settle for a limited system when new technological advances could be made, but also felt it would be an error to inflate the possibilities of present system as an excuse to defer needed improvements. (Jones, M/S Daily, 8/29/67)
- . USAF had awarded letter contract to Lockheed Missiles and Space Co. to begin Program 612, a new reconnaissance satellite system, Aerospace Technology reported. It was estimated that program would cost \$350 million. (Aero Tech, 8/28/67, 3)
- . European aerospace industry assn. (Eurospace) was urging formation of an optional regional communications satellite system to provide TV and telephone coverage for Europe, Donald E. Fink reported in Aviation Week. An expanded version was also being studied to link

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the continent with the entire Mediterranean basin, the Middle East, and major portions of Africa. Designated Eurosat, system would consist of one 375-lb comsat launched into stationary orbit by an ELDO Europa II booster and at least 18 ground stations in Europe and North Africa. Fabrication of satellite and ground stations would be restricted to European aerospace companies. Initial cost estimate for satellite system was \$100 million. (Fink, Av Wk, 8/28/67, 29)

August 28-30: AIAA meeting on "Space Program Issues of the '70's" was held in Seattle.

Rep. Joseph E. Karth (D-Minn) said in a panel discussion that the civilian part of the Nation's space program "no longer has a very high priority," partly because of the Vietnam war and partly because NASA had not convinced the public and Congress of the economic and technological benefits of space research. As a result, spending on space exploration was not likely to be increased significantly for several years and accomplishments in the 1970's could be "severely limited." In view of these budgetary pressures, Karth recommended that NASA (1) abandon all ideas of a manned flight to Mars in the 1970's; (2) consider the increased use of smaller and unmanned probes; and (3) recognize that it could not keep its in-house team intact, even by curtailing outside contract work. He also urged that the current distinction between manned and unmanned missions be eliminated and that NASA reorganize along functional lines, such as earth orbital, lunar, solar, planetary, and deep space. (Text; Wilford, NYT, 8/30/67, 17)

NASC Executive Secretary Dr. Edward C. Welsh said he saw no need for a major post-Apollo goal. Conditions had changed since 1961 when President Kennedy announced Project Apollo, Dr. Welsh said, and "this country does not now need such a special source of impetus to keep it going in the right direction in space. Surely, we have learned enough about the benefits of the space program that we should not require a major project in order to maintain our competence or sense of purpose." Dr. Welsh predicted that U.S. would spend "substantially more dollars" on space projects in the 1970's than in the 1960's, "but they will have to meet the practical test of benefits and payoffs." (Text)

Dr. Albert J. Kelly, formerly Deputy Director of ERC and currently Dean of Boston College's Graduate School and School of Business Administration, argued that clearly-defined post-Apollo goals had to be formulated if full potential of the Nation's space program were to be realized. "If we set forward well-defined goals and plans we have a good possibility of continuing to maintain a strong national space

August 28-30 (continued)

program; if not, then we stand a chance of losing by default much of our gains to date, but even more important of not realizing our potential payoffs in the 70's." Dr. Kelly said specific goals were imperative to (1) enable the space program to "compete in the fiscal environment"; (2) permit industries to "see their own relationship to national plans"; and (3) maintain scientific interest. (SRD, 8/30/67, 312)

August 29: Sen. Margaret Chase Smith (R-Me.), speaking on the Senate floor, expressed concern that the Nation's space program suffered from a "serious lack of centralized leadership within the administration. Leadership is needed to weigh and decide on the merits of proposed space projects; to coordinate program requirements and development efforts of civil and defense agencies; and to establish long-range national space goals and to seek the resources necessary to achieve them.

"I believe that this failure to assert administrative responsibility has resulted in the costly and needless development of two families of launch vehicles--one for NASA and one for the Department of Defense. Currently, NASA and the Department of Defense are each separately undertaking manned space programs having similar, if not identical, basic objectives--to determine whether man can effectively operate in space...."

Criticizing President Johnson's support of NASA FY 1968 budget cuts recommended by House Appropriations Committee [see Aug. 21], Senator Smith said: "I am mindful that some significant budgetary decisions must be made because of our commitments in Vietnam and social strife at home. But is the Congress to supply the initial decisionmaking power for the executive branch? Is so little consideration and concern given to determining the required resource level for space technology programs that across-the-board reduction recommended by a legislative committee can be accepted so lightly?

"There are many of us who feel that science and technology may well be the key to our future existence--to the very survival of freedom in the world of tomorrow. In the past, I believe that the administration also held this to be true. However, the present lack of responsible action in regard to our space program leads me to wonder whether the administration plans and manages the future course for our country with any foresight or merely reacts to events with fear and trepidation." (CR, 8/29/67, S12399)

- . A 180-man crew working a 10-hr day six days a week had completed 14-week construction job of 15-building installation in the Australian desert which would be used to intercept information transmitted by Soviet reconnaissance satellites [see Aug. 12]. (AP, NYT, 8/29/67, 24)

August 30: NATO intelligence had learned that French President Charles de Gaulle would begin extensive cooperation with U.S.S.R. in the field of space exploration, including the orbiting of nuclear weapons, Henry J. Taylor reported in the Philadelphia Evening Bulletin. Taylor claimed U.S.S.R. was devoting a "substantial percentage" of its total military budget to the orbiting of nuclear weapons. (Taylor, PB, 8/30/67)

During August: In an article entitled "Jim Webb's Earthy Management of Space," Fortune magazine discussed NASA Administrator Webb's handling of the U.S. space program. "Webb...had developed a managerial doctrine as extraordinary as the space mission itself. Essentially it is a bold extension of the systems-management principle first applied in the Pentagon for weapon development. This approach means that the Pentagon tries to relate design and procurement plans to the weapon system's maximum potential, to other weapon systems, to cost effectiveness, to foreseeable strategic situations, and to other special considerations. In NASA's case, the 'system' is usually an exotic research objective, like landing a package of instruments on Mars. Such an undertaking, of course, requires management consideration of costs and engineering feasibility, but NASA also tries to relate it to the social, economic, and even political impact the new knowledge may have on some of the most basic mysteries of human life. In one sense, the system becomes an exercise in applied philosophy. To master such massively complex and extensive problems, the agency has mobilized some 20,000 individual firms, more than 400,000 workers, and 200 colleges and universities in a combine of the most advanced resources of American civilization." (Mecklin, Fortune, 8/67)

- . The Nation's press commented on photos transmitted by Lunar Orbiter V.
New York Times: "...Orbiter 5 is currently adding some enduring contributions to mankind's cultural heritage as photographic by-products of the space effort.

"Some of the close-up pictures of the moon have been among the wildest, most disordered and most surrealistic scenes ever viewed by human eyes. Yet its distant views of the far side of the moon convey a sense of desolate tranquility, of peace achieved after many storms.

"This new art form has been produced by machines hundreds of thousands and millions of miles away, in realms where men have never been. Yet many of these pictures have far more power to move than much of the output of contemporary artists...." (NYT, 8/13/67, 10E)

Washington Evening Star: "The pictures of the moon we have been getting back from our assorted orbiting cameras have been fine and fascinating, but the most interesting of all has turned out to be the picture of the earth from the distance of the moon.

1 9 6 7

During August (continued)

"This is natural enough: self-portraits are always the best portraits, especially from the point of view of the sitter.

"But the thing about this self-portrait is the inescapable conclusion that the earth is really a rather lovely place, when seen from 214,806 miles away...." (W Star, 8/18/67)

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