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F E B R U A R Y 1 9 6 9

February 2: Laser tracking techniques which permitted accurate tracking of orbiting spacecraft on 24-hr basis had been developed and perfected by NASA scientists and engineers, NASA announced. New technique-- particularly important in geodetic studies, which required precise angle and distance measurements between satellite and ground stations-- offered greater measuring accuracy than RF methods, required only light-weight reflectors on satellite, and was less affected by transmission-impeding environmental disturbances. First operational daylight tracking with laser had been accomplished by GSFC team Oct. 21, 1968. (NASA Release 69-18; A&A 68)

NASA's Apollo 8 mission and USN navigation satellite system developed by Johns Hopkins Univ. Applied Physics Laboratory had been named two of top four engineering achievements of 1968 by National Society of Professional Engineers. Others listed were Meramec Power Plant, south St. Louis County, Mo., for its air pollution control system and Palacio del Rio Hotel, San Antonio, Tex., for unique crane-hoisted module construction. (W Star, 2/2/69, B2)

In New York Times Magazine, Dr. Ralph E. Lapp, physicist, wrote: "...I would urge that we alter the U.S. space program as follows: First, make a firm decision to terminate the manned space program soon after the initial lunar landing.... I would reserve the remaining Apollo craft for future unmanned missions to the planets and I would mothball the single-purpose manned space flight facilities. At the same time, I would continue a N.A.S.A. program of long-range space development aimed at advanced modes of propulsion, compact energy sources and improved long-distance communication. High priority would be assigned to the development of nuclear energy both for propulsion and for on-board power.

"Second, greatly expand N.A.S.A.'s present program for exploiting applications of space science and technology. The potential of satellites for communications is far from being realized and needs to be enhanced by the development of new techniques. It should not be too difficult to develop orbital systems for the control of intercontinental air traffic. Perhaps the greatest benefits from satellites are to be expected in the survey and evaluation of earth resources, such as underground water, mineral deposits and plant-forest cover....

"Third, establish a high priority within N.A.S.A. for fundamental research using unmanned space vehicles. This program should be 10 to 20 years in duration and should be aimed at finding out more about our

February 2 (continued)

planet, the sun and the rest of the solar system. The most expensive-- and probably the most dramatic--of these projects would be the planetary probes designed to fly by, orbit or land on the nearby planets." (NYT, 2/2/69, 32-40; CR, 2/7/69, E989-90)

- Apollo 8 Astronaut Frank Borman and family departed aboard USAF jet for 18-day presidential goodwill mission to England, France, Belgium, the Netherlands, West Germany, Italy, Spain, and Portugal. Itinerary: London, Feb. 2-5; Paris, Feb. 5-7; Brussels, Feb. 7-10; The Hague, Feb. 10-11; Bonn, Feb. 11-12; West Berlin, Feb. 12-13; Rome, Feb. 13-17; Madrid, Feb. 17-19; and Lisbon, Feb. 19-21. (NASA Off of Int Affairs; W Star, 2/2/69, A3)

February 3: NASA announced it had extended \$69,692,000 contract with Bellcomm, Inc., to provide systems analysis, study, planning, and technical support of manned space flight. Value of one-year cost-plus-fixed-fee contract extension was \$11,483,000. (NASA Release 69-25)

February 3-5: London accorded Apollo 8 Astronaut Frank Borman and family full celebrity status, including frontpage newspaper coverage, taped TV interviews, and cheers from schoolchildren. He lectured before Royal Society of Scientists Feb. 3 and on Feb. 4 was presented to Queen Elizabeth II at Buckingham Palace and visited Prime Minister Harold Wilson and House of Commons. Borman at U.S. Embassy presented NASA's Manned Spaceflight Group Achievement Award to Station Manager James McDowell of NASA Communications Switching Station in London and Public Service Group Achievement Award to C. James Gill, director of U.K.'s postoffice telecommunications system. (Lee, NYT, 2/4/69, 4; W Post, 2/5/69, A18; C Trib, 2/5/69; NASA Off of Int'l Affairs)

February 4: Aerobee 150 MI sounding rocket launched by NASA from Churchill Research Range carried Univ. of Minnesota Institute of Technology payload to 115.6-mi (186-km) altitude to study neutral composition of polar atmosphere with neutral mass spectrometers. Rocket and instruments performed satisfactorily and experimental data showed "some extremely interesting results." (NASA Rpt SRL)

February 4: President Nixon accepted pro forma resignation of Dr. Edward C. Welsh, Executive Secretary of National Aeronautics and Space Council. Appointed by President Kennedy in 1961, Dr. Welsh had been Council's first and only executive secretary. (W Post, 2/5/69, A7; AP, W Star, 2/5/69, 1; B Sun, 2/5/69, A7; SBD, 2/6/69, 113)

. XB-70 supersonic research aircraft was flown from Edwards AFB, Calif., to Wright-Patterson AFB, Ohio, to be placed on exhibit at Air Force Museum. Flight had been delayed until turbulent air conditions prevailed so testing could continue until end of aircraft's service. During final flight, crew collected data on aircraft handling and structural response to air turbulence at subsonic flight. NASA had announced end of XB-70 flight research program Jan. 13. (NASA Proj Off; UPI, NYT, 2/5/69, 73; AP, W Star, 2/5/69, A19)

. In Look, science writer Arthur C. Clarke, Nobel Prize nuclear physicist Dr. I. I. Rabi, novelist C. P. Snow, and Catholic theologian Prof. Leslie Dewart, wrote personal reactions to Apollo 8 mission. Clarke said, "The Apollo 8 mission marks one of those rare turning points in human history after which nothing will ever be the same again. The immense technical achievement is already obvious to every one and has been universally praised; yet the psychological impact may be even more important and will take some time to make itself fully felt. We no longer live in the world which existed before Christmas 1968. It has passed away as irrevocably as the earth-centered universe of the Middle Ages."

Dr. Rabi said, "It would be misleading to talk of the events that led to the journey of Apollo 8 in terms of the vast sums of money that are involved, even though it cost several times as much as the development of the first atomic bomb. What is more important and more impressive is that Apollo 8 represents the cooperation of hundreds of thousands of people over a period of years in a gigantic effort with no clearly set practical goals, except perhaps the profound desire of mankind to prove to itself that it had the knowledge and the ability to overcome its earthbound limitations."

Prof. Dewart said, "Man has taken his first, halting steps into the cosmos beyond that earthly world in which he was born and within which he had always lived. The impact of Apollo 8 in other areas of human experience is obvious; in religion, it is much less immediately evident. And yet, in the end, it may be more significant for the development of man's religious consciousness." (Look, 2/4/69, 72-8)

February 4: In letter to Astronaut Frank Borman, Board of Education of Glendale Union High School District No. 205, Glendale, Ariz., said it had named planned high school "Apollo" in "honor and appreciation of the accomplishments of the participating astronauts. It invited Apollo 8 crew to participate in 1970 dedication ceremony. (NASA IAR, VIII/30; CR, 2/21/69, E1216)

- . USN announced award of \$40,000,000 contract to Grumman Aircraft Engineering Corp. for engineering development phase of F-14A supersonic fighter (formerly VFX), replacement for F-111B. Funding during four-year development was expected to total \$388,000,000. (DOD Release 92-69; W Star, 2/5/69, A7; WSJ, 2/5/69, 6)
- . In letter from Chairman L. Mendel Rivers (D-S.C.) to Secretary of Defense Melvin R. Laird, House Armed Services Committee informed DOD that because of uncertainty over ABM, Committee would take no action to approve Sentinel antiballistic missile sites until Nixon Administration positively expressed interest in project. (Sell, W Post, 2/6/69, A1)
- . In New York Times, Theodore Shabad said Moscow sources indicated Soviet investigators had ruled out possibility of political conspiracy in Jan. 22 shooting during Kremlin ceremonies for Soyuz cosmonauts because of amateurish behavior of gunman identified as "Lt. Ilyin" of Soviet Army. Sources denied earlier reports that gunman had taken poison after shooting and was dead. They said he was undergoing medical and psychological testing to determine his sanity and motives. (NYT, 2/5/69, 2)

February 5-7: Intelsat-III F-3 was successfully launched by NASA for ComSatCorp on behalf of International Communications Satellite Consortium. The 632-lb cylindrical satellite, launched from ETR by Long-Tank Thrust-Augmented Thor (LTTAT)-Delta booster, entered elliptical transfer orbit with 23,496.9-mi (37,814.6-km) altitude 174.6-mi (253.1-km) perigee, 671.9-min period, and 29.8° inclination. All systems were functioning normally. On Feb. 7 apogee motor was fired to kick satellite into planned near-synchronous orbit over Pacific at 173.8° east longitude with 22,250.6-mi (35,809-km) apogee, 22,225.1-mi (35,768-km) perigee, 22-hr 15-min period, and 1.3° inclination.

February 5-7 (continued)

Intelsat-III F-3 was second successful launch in INTELSAT III series. Intelsat III F-2 had been launched Dec. 18, 1968, as backup to Intelsat-III F-1 which had been destroyed minutes after launch Sept. 18, 1968. Satellite was scheduled to begin commercial service within two days, handling up to 1,200 voice circuits or four TV channels. (NASA Proj Off; ComSatCorp Release 69-7; AP, B Sun, 2/6/69, A3; AP, W Post, 2/8/69, A6; NYT, 2/9/69, 62; GSFC SSR, 2/15/69; ComSatCorp PIO)

February 5: President Nixon authorized immediate \$10-million increase in expenditure ceiling placed on National Science Foundation by Johnson Administration in 1968. He said, "The colleges and universities of this Nation provide a critical resource which needs to be fostered and strengthened. Our higher educational system provides the advanced training needed for tomorrow's leaders in science and technology, industry and government, and also conducts the basic research which uncovers the new knowledge so essential to the future welfare of the country. It is essential that these programs of education and research be sustained at a level of high excellence." (O'Toole, W Post, 2/6/69, A15; Schmeck, NYT, 2/6/69, 20; FD, 2/10/69, 224-5)

New tempest was brewing in national scientific community over whether defense establishment absorbed exorbitant portion of U.S. scientific and technological energies, John Lannan said in Washington Evening Star. In New York, younger physicists had called for political activism at annual meeting of American Physical Society Feb. 3. MIT group, Union of Concerned Scientists, had scheduled day-long "research stoppage" March 4 and initiated letter campaign to spread its views to other institutions. Union's proposals included "a critical and continuing examination of government policy in areas where science and technology are of actual or potential significance"; redirection of research from defense-oriented to environment-oriented projects; call to start students questioning their future professional commitments; opposition to anti-ballistic missile system; and organization of scientists into effective and vocal political action group. (W Star, 2/5/69, A7; Sullivan, NYT, 2/9/69, 7E)

February 5: In message to Senate, President Nixon urged prompt ratification of nuclear nonproliferation treaty: "I believe that ratification of the Treaty at this time would advance this Administration's policy of negotiation rather than confrontation with the USSR. I believe the Treaty can be an important step in our endeavor to curb the spread of nuclear weapons and that it advances the purposes of our Atoms for Peace program." (PD, 2/10/69, 219; W Star, 2/5/69, A1; Semple, NYT, 2/6/69, 1; Kilpatrick, W Post, 2/6/69, A1, A14; Large, WSJ, 2/6/69)

Report on aviation safety submitted to House Committee on Interstate and Foreign Commerce by Joseph J. O'Connell, Jr., Chairman of National Transportation Safety Board, gave statistics for 1968: For all scheduled air carrier services there was roughly one fatal accident for every 500,000 hrs or departures, or for every 100,000 trans-continental flights. One passenger was lost for every 370 million passenger miles flown. Number of fatalities in scheduled domestic and international passenger service was second worst of decade; however, total scheduled air carrier accident rates, fatal and non-fatal, continued downward. In general aviation, 1968 accidents totaled 5,069. Rate for fatal accidents on basis of hours flown had increased but remained below rates of 1965 and before and was third best in decade. Total number of fatal accidents--692, killing 1,374 persons--was highest in history. (Text; NYT, 2/9/69, 94)

February 5-7: During two-day Paris visit Apollo 8 Astronaut Frank Borman met with President Charles de Gaulle. At dinner given by Ambassador R. Sargent Shriver, Jr., on Eiffel Tower, Borman received offer of racing car from French manufacturer who had presented similar gift to Cosmonaut Yuri Gagarin in 1965. During Paris news conferences and on TV interview, Borman stressed international character of space exploration. He said, "I don't know why we aren't going to Russia. I would like to visit Russia.... I think we have some fair means of cooperation in space and I would hope to see more." (Garrison, NYT, 2/6/69, 2; 2/7/69, 3)

February 6: Aerobee 150 MI sounding rocket launched by NASA from Churchill Research Range carried Univ. of Minnesota Institute of Technology payload to 83.2-mi (133.8-km) altitude to study neutral composition of polar atmosphere with neutral mass spectrometers. Rocket underperformed; burnout occurred at 42 secs. All instruments worked perfectly. Useful data were obtained in 68.4- to 87.0-mi (110- to 140-km) region. (NASA Rpt' SRL)

February 6: At confirmation hearing on his appointment as Director of Office of Science and Technology before Senate Labor and Public Welfare Committee, Dr. Lee A. DuBridge said he would place his energies on analysis of weapons systems, environment and effect of technology and pollution on environment, and utilization of science and technology by Government departments. He planned to concern himself with social problems and hoped to increase social scientists on President's Science Advisory Committee from one to two. He hoped for increased funding for HUD and DOT, and regretted allocations for basic research were declining in DOD, NASA, and AEC because such agencies "will profit by good relations with universities." (Nelson, Science, 2/14/69, 657)

- . U.S.S.R.'s Venus V (launched Jan. 5) and Venus VI (launched Jan. 10) were on course and functioning normally, Tass announced. Spacecraft were expected to reach Venus in late May. Venus V was 4,785,000 mi from earth; Venus VI, 4,050,000 mi. (Reuters, NYT, 2/7/69, 14)
- . Sperry Rand Corp. announced election of former NASA Administrator James E. Webb to Board of Directors. He had been vice president of company's Sperry Gyroscope Div. in 1943. (Sperry Rand Release 2/6/69: SED, 2/11/69; 140)
- . Univ. of California astronomers, Dr. E. Joseph Wampler and Dr. Joseph S. Miller, reported they had photographed winking of pulsar in Crab Nebula--first of pulsars to be unequivocally associated with observable star--by spinning disk before star's image projected by 120-in telescope at Lick Observatory, Calif. Hole in disk, spun slower than flash rate of pulsar, permitted light from star to penetrate once each revolution. For first time star was shown photographically to be flashing on and off. Rate of light pulses was identical to that of previously observed radio pulses. (NYT, 2/7/69, 22; UPI, W Post, 2/7/69, A6)
- . Cambridge Univ. announced radioastronomy team under Sir Martin Tyle, professor and astronomer, would build world's largest, most sensitive radiotelescope, to cost \$4.8 million. It would be operational in two years and capable of picking up signals which started to earth 8,000 million years ago. Cambridge team had discovered pulsars. (UPI, W Post, 2/7/69, A20)

February 6: NASA awarded Grumman Aircraft Engineering Corp. \$3,438,400 supplemental agreement for changes in Apollo lunar module contract. Modifications--to documentation and reporting procedures for LM test and checkout, to flight and ground test hardware, to test and effect analyses, and to crew safety hardware--brought total value of contract to \$1.6 billion since January 1963. (MSC Release 69-14)

. Washington Evening Star said, "As man's horizon of space expands, the costs of maintaining an effective program expand in direct proportion. Already, the first limited steps have resulted in an economic burden that the richest nation in the world finds almost intolerable.

"If the adventure is to continue much longer, it will have to be as an international effort. Nixon's inaugural statement raises the possibility that some international body, a sort of United Nations for space exploration, could be established to pool the talents and the resources of all nations. It is an idea well worth pursuing. For if the nations can ever combine their energies as they reach into space--can learn to share the burdens and the rewards--then perhaps man's fear and suspicion of his fellow man will subside, and the ignorant slaughter will end." (W Star, 2/6/69, A10)

. DOD announced month delay in site acquisition and construction work on Sentinel ABM system. Action had been taken previous week to permit review of program. At White House news conference, President Nixon said, "I do not buy the assumption that the ABM system, the thin Sentinel system, as it has been described, was simply for the purpose of protecting ourselves against attack from Communist China." System, like those U.S.S.R. already deployed, "adds to our overall defense capability. ...as far as the threat [of nuclear attack] is concerned, we do not see any change...we are examining, therefore, all of our defense systems and...postures to see how we can best meet them consistent with our other responsibilities." (FD, 2/10/69, 228; WSJ, 2/7/69, 6; Maffre, W Post, 2/7/69, 1; Corddry, B Sun, 2/7/69, 1; SBD, 2/7/69, 120)

. State Dept. announced U.S. AEC would join Australia in exploring economic, technical, and safety aspects of producing deep-water harbor at Cape Keraudren in northwestern Australia using atomic explosives. (W Post, 2/7/69, A5)

February 7: U.S.S.R. launched Cosmos CCLXV into orbit with 457-km (284-mi) apogee, 272-km (169-mi) perigee, 91.8-min period, and 71° inclination. (GSFC SSR, 2/15/69)

- . Aerobee 150 MI launched by NASA from WSMR carried Johns Hopkins Univ. payload to 101.7-mi (163.6-km) altitude to measure vacuum UV spectral emission lines from Venusian atmosphere, using 14-in-dia, two-meter-focal-length telescope and lithium fluoride prism with photomultiplier and STRAP III attitude control system. Experiment worked satisfactorily except for one second near end. No fine mode acquisition was received and Vernier star-tracker could not track. No data on Venus were obtained. Terrestrial air glow data were obtained. (NASA Rpt SRL)
- . Senate confirmed appointment of Dr. Lee A. DuBridgE as Director of Office of Science and Technology. (NASA LAR VIII/26; CR, S1536-7)
- . Secretary of Transportation John A. Volpe said in Washington, D.C., that committee of academicians, committee within DOT, and committee representing other agency executives had begun extensive review for Nixon Administration to determine whether Government should continue subsidizing SST development. (Herbers, NYT, 2/8/69, 1; Reuters, W Post, 2/8/69, A2)
- . Royal Crown Cola International announced former Astronaut John H. Glenn, Jr., had become its president. He had been chairman since January 1967. (NYT, 2/8/69)
- . Committee of air traffic controllers said it had evolved program which would enable FAA to postpone restrictions scheduled to go into effect April 27 at five major airports. Professional Air Traffic Controllers Organization would petition Secretary of Transportation John A. Volpe to substitute "revamped procedures which would make operations safer and more efficient," said F. Lee Bailey, counsel. Restrictions would curtail services into New York, Chicago, and Washington, D.C. (NYT, 2/8/69)
- . In Science, Walter Orr Roberts, President of University Corp. for Atmospheric Research, wrote: "Manned exploration of the moon will provide answers to age-long speculation about its nature. Perhaps even more important than what we find will be the fact that we have done it. The event will mark the successful attainment of a goal that demanded technological attainments of unprecedented complexity

February 7 (continued)

and difficulty. Our sights were set upon this goal nearly a decade ago by President Kennedy. I was, I confess, one who feared he had asked the impossible."

.. Weather forecasting--one example of earth-oriented use of space science--would require space satellites of new and sophisticated character. "We will not solve this problem unless we can somehow inspire atmospheric scientists of all the world to commit themselves to the goal.... Global cooperation is essential to its achievement. Space technology is perhaps the most important single component of the technology development needed for success. What better use could be found for our incredible talents in space? After the moon, the earth!"
(Science, 2/7/69)

February 8: In directive issued at Key Biscayne, Fla., President Nixon asked Science Adviser, Dr. Lee A. DuBridge, to report on possible cost reduction in specified portions of space program, to assess recommendations that DOD and NASA be directed to coordinate space studies, and to recommend on establishing interagency committee to advise on scope and direction of post-Apollo program. (PD, 2/17/69, 248-9; Cornell, AP, W Star, 2/9/69, A8; Semple, NYT, 2/9/69; 1; SBD, 2/11/69, 134)

February 9: DOD's Tacomsat I Tactical Communications Satellite was successfully launched from ETR at 4:09 pm EST by Titan III-C booster into synchronous equatorial orbit over Pacific. Orbital parameters: apogee, 14,233.1 mi (22,906 km); perigee, 14,198.3 mi (22,850 km); period, 144.6 min; and inclination, 0.6°. The \$30-million, 1,600-lb cylindrical satellite would test feasibility of using satellite system to communicate over great distances with small military units, such as aircraft, ships, and small ground stations. Tacomsat I was powerful enough for ground forces to use portable, lightweight receiving antennas as small as one foot in diameter. It also would test new Gyrostat stabilization system. (W Star, 2/9/69, C1; 2/10/69, A5; AP, W Post, 2/10/69, A1; AP, B Sun, 2/10/69, A4; InteraviaAirLetter, 3/18/69, 7; GSFC SSR, 2/15/69; DOD Release 64-68)

NASA announced it would flight test "supercritical wing"--with airfoil shape developed in four-year wind-tunnel studies at LaRC by Dr. Richard T. Whitcomb--on USN F-8 fighter at FRC. If wind-tunnel performance was achieved in flight, wing could improve performance and efficiency

February 9 (continued)

of future aircraft, particularly jet transports. It would allow efficient cruise flight near speed of sound at 45,000-ft altitude and reduce operational cost of subsonic flights by increasing operational range or permitting less fuel and more payload on faster schedules.

Supercritical wing shape was developed to delay rise of drag force and onset of buffeting at high speeds. Flattened top was designed to reduce intensity of airflow disturbances, and downward curve at rear of wing supplied lift lost by flattening. Flight program would validate wing's operational potential; validate design techniques and specific direction for further ground-based research leading to practical applications; demonstrate, through direct correlation with flight test results, improvements in drag rise and buffet onset indicated from tunnel tests; evaluate behavior of wing in actual flight involving both high lift maneuvering and off-design performance; and determine sensitivity of supercritical wing to wing contour variations associated with manufacturing processes and deformations due to flight loads. (NASA Release 69-27; FRC Release 4-69; UPI, W News, 2/7/69, 25; Witkin, NYT, 2/9/69, 1; Butz, AF, 2/69)

Boeing Co. test pilot Jack Waddell flew 355-ton, \$20-million prototype of 490-passenger Boeing 747 jet transport from Paine Field, near Seattle, Wash., for 1 hr 15 min of scheduled 2½-hr maiden flight. Waddell returned aircraft to field after encountering "minor malfunction" of wing surface control while lowering wing flaps to 30° angle. Later he said aircraft was "a pilot's dream" which could be "flown with two fingers" and indicated flap misalignment would not delay further testing. The 210-ft-long 747 used only 4,500 ft of runway to become airborne at 170 mph. Spectators were impressed with quietness of its engines. (W Post, 2/10/69, 1; AP, W Star, 2/10/69, A5; AP, B Sun, 2/10/69, A1)

Lunar module was "first manned spacecraft ever built that's not tough enough to survive a return to earth," said Thomas O'Toole in Washington Post. Vehicle from which two astronauts would descend to moon's surface in summer 1969 was 23 ft high, weighed 8,000 lbs, and carried 12 tons of propellant. It contained 25 mi of electrical wiring and more than a million parts, most of which had been designed "from scratch," held together by 216,000 "pins". Pin bent more than five degrees out of shape would have to be replaced. NASA had contracted for 15 LMs at total cost of \$1.9 billion from Grumman Aircraft Engineering Corp., which had taken six years to get it from drawing board to launch pad. (W Post, 2/9/69, B2)

- February 9: In Brussels, Astronaut Frank Borman and family attended dinner given in his honor at palace by King Baudouin and Queen Fabiola. Borman showed Apollo 8 film. (NASA Off of Int'l Affairs; AP, B Sun, 2/10/69)
- . Hungary and Romania had issued souvenir stamps commemorating Apollo 8 mission and astronauts, U.S. newspaper philatelic columns announced. Photograph taken from Gemini IV of Arabian coast provided design for new stamp in sultanate of Muscat and Oman. (Faries, W Star, 2/9/69, D10; AP, W Post, 2/9/69, K8)
 - . Johns Hopkins Univ. associate professor of mechanics, Dr. Robert L. Green, had designed and perfected "visualization apparatus for X-ray crystallography," device which permitted continuous observations of changes in structure of atoms in metal under stress. Device could lead to discovery of hitherto unknown properties of metals, nonmetallic crystals, and living molecules; enable scientists to study changes in internal structure of metals during deformation caused by air and water pressure; enable scientists to project image of atomic structure on closed-circuit TV screen; and result in development of stronger submarine hulls, aircraft wings, and spacecraft. (Reuters, NYT, 2/9/69, 92)
 - . FAA had awarded United Aircraft Corp. Pratt & Whitney Div. \$665,241 contract for two-year study to develop design for quieter jet aircraft engines. (NYT, 2/9/69, 94)
 - . Astronaut Walter M. Schirra, Jr., and his first-grade school teacher, Mrs. Peggy Crowley, would receive 1969 Golden Key Awards from six national school organizations at annual convention of American Assn. of School Administrators, Atlantic City, N.J., Feb. 15, Parade reported. Awards had been founded to dramatize teacher's role in U.S. life. (Parade, 2/9/69, 4)
 - . In Washington Post, Thomas O'Toole said NASA Administration was "the last big Federal post President Nixon has left unfilled." He asked, "Is it because he can't find the man he wants? Is it because no man he wants the job? Or is Mr. Nixon playing with the possibility of appointing [Acting Administrator Thomas O.] Paine to the post of Administrator?" Washington "space watchers" felt job could not be kept vacant much longer, "if only because the program to land American astronauts on the moon is rapidly nearing its goal." (W Post, 2/9/69, All)

February 9: New York Times editorial: "The Congressional pressure that spurred the Nixon Administration to halt deployment of the Sentinel antiballistic missile system signals a healthy new disposition on Capitol Hill to challenge the military-industrial complex, against which President Eisenhower warned eight years ago." (NYT, 2/9/69, 12)

February 10: NAS published NRC Div. of Engineering's Useful Applications of Earth-Oriented Satellites, Report of the Central Review Committee of NRC Summer Study on Space Applications, prepared for NASA. Study concluded that space applications program was "too small by a factor of two or three." Benefits from program were expected to be large, "certainly larger than the costs of achieving them." However, "an extensive, coherent, and selective program" would be required to achieve benefits.

Committee recommended that NASA give greater emphasis to earth-satellite programs with promise of beneficial applications, commit additional funds to expanded R&D and prototype operations for certain applications, and commit \$200 million to \$300 million yearly to space applications program at level "in the best interest of the United States." Manned space programs must be justified in their own right, not in terms of space applications; near-term benefits for mankind would be achieved "more effectively and economically with automated devices and vehicles."

Noting that in meteorology and communications "satellites have already entered solidly into the area of economic usefulness," report recommended that NASA grant high priority to development of multichannel distribution system for public and private network TV; multi-channel system for educational broadcasts in developing countries and for special interest groups such as physicians, lawyers, and educators; and North Atlantic satellite navigation system for traffic control of transoceanic aircraft and ships. In satellite earth-sensing, report said practical use lay "in the near future" but was dependent upon R&D in sensor signatures--form of information provided by instruments. It recommended immediate pilot program for providing information in familiar and immediately usable form, exploration into use of side-looking radar, and start of 10- to 12-yr development plan for more sophisticated sensors. (Text; NRC Release; Sehlstedt, B Sum, 2/10/69, A4)

February 10: Apollo 8 mission (Dec. 21-27, 1968) was adjudged successful by NASA. All objectives of manned circumlunar mission were attained, as well as four detailed test objectives not originally planned. (NASA Proj Off)

- . MSFC announced it would manage two recently awarded \$300,000 six-month contracts, one to Lockheed Missiles & Space Co. and one to General Dynamics Corp., for conceptual study of low-cost, manned logistics (space shuttle) system. Similar study contracts awarded to North American Rockwell Corp. and to McDonnell Douglas Astronautics Co. would be managed by MSC and LaRC. Integral Launch and Re-entry Vehicle (ILRV) studies would investigate aspects of reusable transportation system for post-1974 use in support of proposed space stations. (MSFC Release 69-34)
- . MSFC announced \$3,288,914 modification to contract with Boeing Co. for continued configuration management support on Saturn V launch vehicle program, including processing of vehicle and ground support equipment configuration changes, configuration accounting, and change integration and tracking. (MSFC Release 69-35)
- . USAF contract awards: \$4,305,295 fixed-price contract to Computer Sciences Corp. for services and supplies to develop, install, operate, test, and maintain hardware to improve capabilities of space tracking equipment; and \$1,600,000 initial increment to \$4,200,000 fixed-price contract to United Technology Center for KSC launch and support services. (DOD Release 102-69; WSJ, 2/11/69, 17)
- . DOT announced over 35 civil and military aircraft including C-5A transport and Boeing 747 would be displayed at U.S. exhibit in Paris Air Show May 29-June 8. (DOT Release 1569; UPI, NYT, 2/16/69, S25)

February 11: Initial thermal and vacuum testing of flight model of SERT II (Space Electric Rocket Test) in preparation for fall 1969 launch had been completed, LeRC announced. SERT II, second flight test in development of ion propulsion for space use and first LeRC orbital spacecraft, would be launched from WTR by Thorad-Agena booster into 621-mi (999.4-km) circular orbit to evaluate inflight performance

February 11 (continued)

of electron-bombardment engines for six months or more. SERT I had carried first ion thruster to operate in space on suborbital mission July 20, 1964. (LeRC Release 69-2)

- . In Bonn during European tour, Apollo 8 Astronaut Frank Borman addressed enthusiastic crowd of 1,500 students and government officials after film showing on lunar mission in Beethoven Hall: "I believe this research will teach us that we are first and foremost not Germans or Russians or Americans but earthmen." Borman met West German Chancellor Kurt Georg Kiesinger at lunch and later discussed space research with Scientific Affairs Minister Gerhard Stoltenberg. He attended evening reception given by West German Air and Space Research Institute. (Falbe, B Sun, 2/12/69)
- . U.S.S.R. had ordered 100 space pens developed for U.S. astronauts and 1,000 special pressurized ink cartridges which enabled pen to write in weightlessness according to pen's inventor, Paul C. Fisher. When he presented models of pen to Soviet Cosmonaut Alexey Leonov at German trade fair in 1968, Leonov said Soviet cosmonauts were writing with grease pencils during space flights and incurring difficulty with their flaking. (UPI, W Post, 2/13/69, D24)

February 12: Pentagon sources estimated U.S.S.R. was spending equivalent of \$60 billion in 1969 on national defense and space efforts, while U.S. was spending \$85.2 billion, of which \$29 billion was for Vietnam war. Figures left U.S.S.R. \$4 billion ahead of U.S. in spending on weapons and space technology. Between 1965 and 1969, Soviet spending on offensive and defensive strategic forces increased by 40% but amount spent on intercontinental missiles and surface-to-air missile defense systems rose by 75%. (Kelly, W Star, 2/12/69, D4)

- . Aerobee 150 sounding rocket launched by NASA from WSMR carried Naval Research Lab. payload to 116.8-mi (187.9-km) altitude to record photographically 18 EUV spectra of solar photosphere, chromosphere, and corona, using SPARCS and flight design verification unit of high-resolution spectrograph planned for ATM-A and ATM-B. Rocket and instruments performed satisfactorily. (NASA Rpt SRL)

February 12: During visit to West Berlin, Apollo 8 Astronaut Frank Borman drove past U.S.S.R.'s war memorial near Berlin wall and looked across wall into East Berlin. At Tempelhof airport Borman told press, "I was here before [during 1949 Berlin airlift] amid many bags of coal. There have been many space advances in the last two decades, yet we have so many troubles here on earth." (C Trib. 2/13/69)

- . MSFC announced it had issued \$1,182,175 contract modification to Chrysler Corp. Space Div. for continued systems engineering and integration on Saturn IB launch vehicles. (MSFC Release 69-37)
- . USAF F-111A piloted by Capt. Robert Earl Jobe (USAF) and instructor pilot Capt. William D. Fuchlow (USAF) failed to return to Nellis AFB, Nev., after 750-mi training mission. USAF and Civil Air Patrol were searching area between Las Vegas, Nev., and Great Salt Lake. (UPI, W Star, 2/13/69, 1; AP, W Post, 2/14/69, A4)

February 13-14: NASA successfully launched one Nike-Tomahawk and six Nike-Apache sounding rockets carrying chemical cloud experiments from NASA Wallops Station between 6:11 pm and 6:13 am EST. Rockets ejected vapor trails between 50- and 186-mi (81- and 299.3-km) altitudes to measure wind velocities and directions. Nike-Tomahawk launched at dusk and Nike-Apache launched at dawn carried sodium experiments which created reddish-orange trails. Other five payloads consisted of trimethylaluminum (TMA) experiments which formed pale white clouds. Data were obtained by photographing continuously motions of trails from five ground-based camera sites. Launches were conducted for GCA Corp. under GSFC contract.

In conjunction with vapor series USA Ballistics Laboratory at Aberdeen, Md., fired six projectiles containing cesium experiments to 330,000-ft altitude between 8:07 pm and 6:23 am EST for comparative study of winds. Three experiments failed to eject chemical; dispersion of cesium from remaining three projectiles was recorded by ground-based radar and ionospheric sounding stations. (WS Release 69-5; NASA Release 69-28; NYT, 2/14/69, 41)

February 13: President Nixon's Science Adviser, Dr. Lee A. DuBridge, announced at his first Washington press conference that overall plan for next decade of U.S. space program would be drafted at President's request by his office, NASA, NASC, and DOD for submission to President

February 13 (continued)

about Sept. 1. Charting "new directions, new goals and new programs for the entire United States Space program" was necessary. "Bringing to the benefit of people the marvelous space technologies that have been developed in the last decade and certainly orbiting satellites for the purpose of learning more about the earth must be an important element in our future space program," Dr. DuBridge said. "Whole problem" was balance between that enterprise and planetary and lunar exploration and "this is the problem which our group will seek...to bring into perspective as we project ahead and consider the budget problems that also lie ahead."

In answer to question on White House appointments, Dr. DuBridge said, "We have not yet located the right man" for either Administrator of NASA or Executive officer for Space Council. (Transcript; White House Memo; Schmeck, NYT, 2/14/69; W Post, 2/14/69, A3; Randal, W Star, 2/14/69, D15; B Sun, 2/14/69, A4; Nelson, Science, 2/21/69, 794)

- . Winners of 1969 annual Arthur S. Flemming Awards for 10 outstanding young men in Federal Government were announced and awards were presented in Mayflower Hotel ceremony in Washington, D.C. Winners included James J. Kramer, Chief of LeRC Propulsions Systems Acoustics Branch, who kept solid rocket program "on schedule and within budgeted costs," and Dr. Norman F. Ness, head of Extraterrestrial Physics Branch, GSFC, who made "significant contributions" to understanding space through Explorer satellite program. Dr. Richard E. Hallgren, Director of Commerce Dept.'s world weather systems was named for "imaginative leadership" in recognizing and integrating requirements of oceanographers and meteorologists." (W Star, 2/13/69, B6; LeRC Release 69-3; AFJ, 3/29/69, 6)
- . Washington Post reported Washington Airlines President Robert Richardson had said first scheduled STOL air shuttle in U.S. had lost more than \$100,000, cut back operations 41%, and operated at less than half break-even load factor during first four months of service. He attributed most difficulties to start-up problems, including minor equipment shortcomings which had been corrected. Airline was lowering fares and could, said Richardson, break even in 12-18 mos. (Koprowski, W Post, 2/13/69, C9)

February 13: At GSFC, satellite mapping authority Dr. John A. O'Keefe was preparing first precise maps of Tibet using photographs taken from 100-mi altitude by U.S. astronauts and data obtained between 1890s and 1935 by Swedish explorer Sven Hedin during only extensive survey of area by outsider. Expedition's survey sightings on mountain peaks were being applied to numerous photographs from space. Revised maps would be published in Sweden. (Sullivan, NYT, 2/13/69, 14)

. Intelligence briefings to high DOD officials had indicated U.S.S.R. missile defense was three-quarters complete and had been slowed in recent months to improve its radar system, said William Beecher in New York Times. Briefings also made it clear that antimissile system around Moscow, even when finished, would not alter balance of power between U.S.S.R. and U.S. or undermine U.S. retaliatory power. (NYT, 2/13/69, 1)

February 14: ComSatCorp announced broadcasters had booked 40 hrs of satellite time for TV coverage of President Nixon's European trip Feb. 23-March 3. More than 17 hrs had been requested from abroad to date for coverage of Apollo 9 Feb. 28-March 3. (ComSatCorp Release 69-8; W Star, 2/16/69, C6)

. In Science Hudson Hoagland, President Emeritus of Worcester Foundation for Experimental Biology, commented on Condon Report on UFOs released Jan. 9, 1968: "The basic difficulty inherent in any investigation of phenomena such as those of psychic research or of UFO's is that it is impossible for science ever to prove a universal negative. There will be cases which remain unexplained because of lack of data, lack of repeatability, false reporting, wishful thinking, deluded observers, rumors, lies, and fraud. A residue of unexplained cases is not a justification for continuing an investigation after overwhelming evidence has disposed of hypotheses of supernormality, such as beings from outer space or communications from the dead.... Science deals with probabilities, and the Condon investigation adds massive additional weight to the already overwhelming improbability of visits by UFO's guided by intelligent beings." (Science, 2/14/69, 625)

February 14: In Science, Leonard Mandelbaum examined history of U.S. decision to adopt Apollo program. "Cautious approach" to manned space flight gave way after impact of April 12, 1961, "Russian spectacular"--flight of Cosmonaut Yuri A. Gagarin--and U.S. Cuban foreign policy fiasco, Bay of Pigs. "Congress acted without hearing testimony of compelling military need. The Apollo decision was made without reference to any comprehensive and integrated national policy designed to maximize the use of scientific and technological resources for social objectives.... It was a typical Cold War reaction."

Well-integrated policy, Mandelbaum said, "would recognize that scientific and engineering manpower, including systems analysis capability, are required for basic social objectives before surplus resources may be allocated to prestigious or otherwise marginal projects. The latter would be entitled to more serious consideration if the cost were minimized by international cooperation, minimal duplication, and adequate research experience prior to heavy development outlays. Such a policy is impossible within the fragmented framework of federal R&D decision-making which has not substantially changed since 1961." (Science, 2/14/69, 649; CR, 3/25/69, E2330-3)

February 15: Project Tektite, multiagency-industry program to determine capability of men to perform satisfactorily scientific research mission while living isolated on ocean floor under saturated diving conditions for long period, began at St. John, Virgin Islands. Four U.S. aquanauts, Richard A. Waller, H. Edward Clifton, John G. Van Derwalker, and Conrad V. W. Mahnken jumped into sea at Beehive Cove and swam to "habitat," underwater capsule moored 42 ft below sea level for 60-day experiments. Basic habitat systems were two connected vertical cylinders containing wet work area, crew quarters, and engine room connected by bridge which served as laboratory for scientists and control center. Tektite program was jointly sponsored by USN, NASA, and Dept. of the Interior, with participation by U.S. Coast Guard. Prime contractor, General Electric Co., furnished undersea habitat and assisted with planning and scientific mission coordination. Four Interior Dept. scientist-aquanauts would swim from habitat each day to measure plankton activity, tag spiny lobsters with miniature sonar beacons to observe migration habits, and study sediment and rock formation. NASA and USN behavioral and biomedical teams would observe aquanauts continuously to identify psychological and physiological reactions to long-term mission performed in hostile and isolated environment common to undersea and space missions. (NASA OMSF PAO; Lannan, W Star, 2/16/69, A3; 2/17/69, A6; Lyons, NYT, 2/17/69, 18)

February 15: Pope Paul VI received Apollo 8 Astronaut Frank Borman and family for 17-min audience in Papal library. Pope said in English, "Man's reaching out to unravel the mysteries of the universe reveals more and more the wonders of God's work and shows forth His glory." Pope Paul sent personal greetings to Astronaut James W. McDivitt who had audience in 1967. (UPI, W Star, 2/16/69, C5)

February 16: USN's Sealab III project, in which five acquanaut teams were to spend 12 days each in 60-day test of man's ability to work under water for long periods, started early when four of first team of nine men were dispatched to repair helium leak in 57x12-ft "habitat," 600 ft beneath Pacific Ocean off San Clemente Island, Calif. Remaining five acquanauts were scheduled to descend in pressurized personnel-transfer capsules 12 hrs later to join colleagues in performing experiments in marine biology, geology, acoustics, and ecology. If project succeeded, USN would produce prototype system for supporting divers in protracted salvage and rescue operations at depths to 1,000 ft--lower limit of continental shelf. (B Sun, 2/17/69, A7)

February 17: Tenth anniversary of Vanguard II, fifth U.S.-IGY satellite, launched by NASA to produce cloud-cover images using two photocells. Wobbling had prevented interpretation of data. Satellite was still in orbit. (A&A 1915-60; SBD, 2/17/69, 162)

USN suspended Sealab III project when veteran Acquanaut Berry L. Cannon was stricken while he and Acquanaut Robert A. Barth, Jr., were attempting to open habitat's hatch after Cannon's second dive to check gas leaks. He was pronounced dead of "cardiac arrest" in decompression chamber of mother ship U.S.S. Elk River and body was flown to San Diego for autopsy. USN said cause of death would have to be determined before Sealab project could be resumed. First findings of autopsy revealed Cannon did not die of heart attack. USN on Feb. 18 officially called off \$10-million project. (Stevens, NYT, 2/14/69, 41; 2/18/69, 1; 2/20/69, 93; AP, B Sun, 2/17/69, A7; O'Toole, W Post, 2/18/69, A1; 2/19/69, A3; 2/20/69, A3; AP, W Star, 2/18/69, A1)

February 17: President Nixon submitted to Senate nomination of former NASA Associate Administrator for Advanced Research and Technology James M. Beggs as Under Secretary of Transportation. (PD, 2/24/69, 293)

- . In Madrid during European goodwill tour, Apollo 8 Astronaut, Frank Borman placed wreath at statue of Columbus and met Cristobal Colon de Carvajal y Maroto, 17th duke of Veragua and hereditary "admiral of the ocean sea," title created in 1537 for explorer's son, Diego Columbus. (AP, C Trib, 2/18/69)
- . USAF said ground test of F-111A had revealed large crack in test version of one of aircraft's most critical parts, belly section to which movable wings were attached. No F-111As would be grounded, as test did not indicate safety hazard to aircraft in service. Crack was not related to one which was detected Aug. 25, 1968. USAF said there was no estimate of time it would take to determine effect of crack on F-111A program. (Witkin, NYT, 2/19/69, 41; UPI, W Post, 2/18/69, A4; AP, W Star, 2/18/69, A6)

February 18: Secretary of State William P. Rogers told Senate Foreign Relations Committee he "hoped" U.S.-U.S.S.R. missile talks would be underway before it became necessary for U.S. to start deployment of proposed Sentinel ABM system. He said under nuclear nonproliferation treaty U.S. would have obligation to enter into strategic arms talks with U.S.S.R. and expressed hope such talks could begin within six months. (Finney, NYT, 2/19/69, 1; Unna, W Post, 2/19/69, A14)

- . Rep. Charles H. Wilson, (D-Calif.) introduced H.R. 7030, bill to encourage worldwide interest in U.S. developments and accomplishments in military and related aviation and equipment by authorizing Federal sponsorship of International Aeronautical Exposition in U.S., to be held not later than 1970. (Text)
- . In Washington Post review of CONTACT! The Story of the Early Birds by Henry Serrano Villard, John Osgood said, "Despite the technical complexities of the recent translunar injection, the mystique of flight remains undiminished 65 years after Orville Wright managed his mere 120 feet of powered flight. Mystique or no, it is still difficult to comprehend what drove the early aeronauts to attempt feats which most often won them the contempt and ridicule of their countrymen." (W Post, 2/18/69, B4)

February 19: Rep. Louis Frey, Jr. (R-Fla.), introduced H.R. 465 "providing for the establishment of the Astronauts Memorial Commission to construct and erect with funds a memorial in the John F. Kennedy Space Center, Florida, or the immediate vicinity, to honor and commemorate the men who serve as astronauts in the U.S. space program." (NASA LAR, VIII/29; CR, 2/19/69, H1087)

. House passed and returned to Senate, S. 17, bill to amend Communications Satellite Act of 1962 to provide for apportionment of ComSatCorp directors according to percentages of stock held by public and communications corporations. (CR, 2/19/69, H1037-40; W News, 2/20/69, 45)

February 20: NASA announced appointment of Dr. Hans M. Mark, Chairman of Dept. of Nuclear Engineering, Univ. of California at Berkeley, as Director of Ames Research Center. He would succeed H. Julian Allen, who had announced retirement Oct. 25, 1968, but had remained as Acting Director. Dr. Mark, expert in nuclear and atomic physics, was also Reactor Administrator of Univ.'s Berkeley Research Reactor, research physicist at Univ.'s Lawrence Radiation Laboratory, and consultant to USA and NSF. Clarence A. Syvertson, Director of Astronautics at ARC, was appointed to newly created position of ARC Deputy Director. Both appointments were effective Feb. 28. Because of prior commitments, Dr. Mark would spend one-fifth of his time at ARC until July 1969. (NASA Release 69-32; ARC Astrogram, 2/24/69, 1)

. In move to counter Senate pressure against ABM deployment, Secretary of Defense Melvin R. Laird told Senate Foreign Relations Committee U.S. should go forward with Sentinel system if DOD review found it "practical" and "effective," since U.S.S.R. was working on "sophisticated new ABM system." Curtailment in Soviet missile construction during past few months, Laird said, was due to R&D testing on more sophisticated system. U.S.S.R. had been outspending U.S. three to one in missile defense and "substantial" network around Moscow was halfway complete. (Sterne, B Sun, 2/21/69, A1; Unna, W Post, 2/21/69, A1; Finney, NYT, 2/21/69, 1)

. Apollo 8 Astronaut Frank Borman and family ended official goodwill tour of Western Europe with lecture and luncheon in Lisbon. During final European news conference previous day, he had predicted U.S. would put man on moon in summer 1969 "if everything goes well." (UPI, W Star, 2/20/69, A8)

February 20: At annual dinner of Washington Academy of Sciences, GSFC engineer Charles R. Gunn received Academy's award for "noteworthy discovery, accomplishment, or publication" in engineering field for his work as technical director of Thor-Delta launch vehicle. (GSFC Delta Proj Mgr; AP, W Star, 2/21/69, C10)

- . First International Aviation Service Award, financed by contributions from FAA employees and established in June 1968 by retiring FAA executive Alfred Hand, was presented in Washington to Theodore C. Uebel, International Liaison Officer for FAA, for "outstanding accomplishments in furthering the interests of the United States in international aviation." (FAA Release 69-17)
- . Eugene Luther Vidal, who as Director of Air Commerce of Dept. of Commerce (1933-1937) promoted growth of U.S. civil aviation, died at age 73 in Palos Verdes, Calif. He had furthered construction of airports and beacons, encouraged private flying and manufacture of small aircraft, advanced commercial aviation, and reorganized Government control of commercial flights. After leaving Commerce Dept. he had established research laboratory near Camden, N.J., where he developed process for making airframe parts from molded plywood. (NYT, 2/21/69, 45)

February 21: Apollo 8 Astronaut Frank Borman and family returned from European goodwill tour made on behalf of President Nixon. At Andrews AFB, Md., Borman told press on arrival that Europeans found it hard to believe U.S. "could spend all that money on its space program and still make public everything we learned." He said reception had been uniformly friendly, "but they would hesitate to ask us questions, because they assumed...information about the Apollo 8 flight must be classified." Borman and family reported at Capitol to Vice President Spiro T. Agnew, Chairman of NASC. Borman told press conference he had found "extreme identification of people in all walks of life in Europe with our flight. They were very well informed about it and looked on us as representatives of Earth. I hope that feeling of comradeship can continue." (AP, W Post, 2/22/69, A2)

- . ComSatCorp reported \$6.841 million 1968 net income (68 cents per share), up from 1967 net income of \$4.638 million (46 cents per share). Improvement had resulted primarily from net operating income of \$988,000, which contrasted with 1967 net operating loss of \$642,000. (ComSatCorp Release 69-10; AP, B Sun, 2/22/69, B9)

February 21: President Nixon approved policy for Expanded Use of Federal Research Facilities by University Investigators which directed Federal agencies to make equipment in Federal laboratories more readily available to qualified university scientists. (PD, 3/3/69, 304)

FAA announced award of \$35,426,283 contract to UNIVAC Federal Systems Div. of Sperry Rand Corp. for automated radar tracking systems (ARTS III) to be installed at more than 60 major U.S. airports. (FAA Release 69-22)

February 24-28: NASA's Mariner VI (Mariner F) spacecraft was successfully launched from ETR by Atlas-Centaur (SLV-3C) booster on five-month, 226-million-mi, direct-ascent trajectory toward Mars--NASA's first of two attempts to conduct Mars flyby during 1969 launch window. Launch vehicle performance and spacecraft injection were nominal. Spacecraft separated from Centaur, deployed its four solar panels, locked its sensors on sun and star Canopus, and entered cruise mode, where it remained with all subsystems performing satisfactorily while trajectory was refined. Midcourse maneuver was successfully conducted Feb. 28 to ensure that spacecraft would fly within 2,200 mi (3,540.5 km) of Mars July 31.

Primary mission objective was to conduct equatorial flyby mission for exploratory investigations of Mars which would set basis for future experiments, particularly those relevant to search for extraterrestrial life. As secondary objective spacecraft would develop technology needed for succeeding Mars missions. The 900-lb spacecraft carried six complementary experiments to provide information about Martian surface and atmosphere. Mission offered first opportunity to make scientific measurements on night side of Mars. Two onboard TV cameras would take pictures of Mars disc during approach with 15-mi optimum resolution and of surface during flyby with 900-ft optimum resolution. Infrared spectrometer and UV spectrometer would probe Mars atmosphere, and occultation experiment would obtain data on atmospheric pressures and densities. Infrared radiometer would measure surface temperatures on both light and dark sides of Mars, and celestial mechanics experiment would utilize tracking information to refine astronomical data. Sharp increase in data returns would be achieved over 1964 Mariner missions. Mariner VI TV pictures would contain 3.9-million bits of information; Mariner IV contained 240,000 bits in 1965. Mariner VI would transmit

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data at rate of 270 bps; Mariner IV transmitted 8 1/3 bps.

Mariner VI was follow-on to 1964 Mariner/Mars missions and precursor to 1971 orbital and 1973 landing missions. First Mars probe, Mariner III (launched Nov. 4, 1964), had failed to achieve desired orbit when shroud remained attached to spacecraft. Mariner IV (launched Nov. 28, 1964) had transmitted first close-up photos of Mars in July 1965. Mariner VII (Mariner G) would be launched March 24. 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. Atlas-Centaur launch vehicle was managed by LeRC. (NASA Proj Off; NASA Release 69-26; W Post, 2/25/69, A7; 2/26/69; Miles, LA Times, 2/25/69; Lannan, W Star, 2/25/69, A3; NYT, 2/26/69)

February 24-March 3: First documented pulsar acceleration was discovered in Pulsar PSR 0833-45 in Vela constellation in southern sky by JPL radio-astronomers Paul Reichley and Dr. George S. Downs using 85-ft dish antenna at Goldstone, Calif. While pulsars normally showed moderate but steady slowing in pulse rate, Vela's rate accelerated, then slowed at slightly faster rate than before; during week's observation. Findings in NASA-sponsored research were confirmed by Parkes Observatory astronomers in Australia. (JPL Release BB-513, 4/16/69)

February 24: At State Dept. meeting of more than 60 INTELSAT member nations, U.S. delegation chairman Leonard H. Marks said, "I can think of no more important step we can take towards reducing world tensions than that of broadening communications links between power nations representing different political systems"--as U.S.S.R. and 13 other observer nations listened.

In written memorandum, France had questioned whether strong centralized system desired by U.S. could or should be established and urged that any new agreement leave participating countries free to join other satellite systems. (Samuelson, W Post, 2/25/69, D5)

. Federal Council for Science and Technology transmitted to NASA Expanded Use of Federal Research Facilities by University Investigators approved by President Nixon Feb. 21. (NASA Off of Policy Memo, 3/14/69)

February 24: Vice President Spiro T. Agnew told American Management Assn. briefing on oceanography in Washington, D.C., that Nixon Administration was not yet ready to endorse concept of "a wet NASA"--marine-oriented Government agency. As Chairman of National Council on Marine Resources and Engineering Development he was studying opinions of advocates of such an agency, as well as [Jan. 11] report by Commission on Marine Science, Engineering and Resources. (Smith, NYT, 2/25/69, 53)

February 25: Cosmos CCLXVI was launched by U.S.S.R. into orbit with 336-km (208.8-mi) apogee, 202-km (125.5-mi) perigee, 89.8-min period, and 72° inclination. Satellite reentered March 5. (GSFC SSR, 2/28/69; 3/15/69; AP, W Post, 2/26/69)

- . NASA's OSO V (launched Jan. 22) had successfully completed more than 496 earth orbits and had satisfactorily operated all spacecraft systems, including raster scan and both tape records. Torque coil had been turned on Jan. 25 to help minimize spacecraft pitch motions and reduce gas consumption. Primary objectives had been achieved and OSO V had acquired scientific data from eight onboard experiments. (NASA Proj Off)
- . NASA announced selection of 38 scientists organized into eight teams to assist in design and development of Martian soft lander for 1973 Viking missions. Teams would participate in early instrument development, designing of soft lander, and planning of missions. Final selection of investigations and participating scientists for both landers and orbiters making up 1973 Viking missions would be made December 1969, when initial results of Mariner flybys of Mars in summer 1969 would be available. Planetary Programs Directorate would have management responsibility for Viking Mars 1973 mission; LaRC had been assigned overall project management and direct responsibility for managing planetary lander portion; JPL had management responsibility for orbiter spacecraft. (NASA Release 69-31)
- . County Coroner R. L. Creason in San Diego, Calif., gave official cause of Feb. 17 death of Aquanaut Berry M. Cannon as "acute hemorrhagic pulmonary edema and congestion due to acute cardio-respiratory failure due to carbon dioxide poisoning." Earlier USN spokesman had acknowledged that one of rigs used by Cannon

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and colleagues on fatal dive contained canister empty of chemical used to absorb carbon dioxide from aquanauts' air supply and also that Cannon "was not in contact." USN opened formal inquiry into death Feb. 26. (AP, W Star, 2/20/69, A3; 2/21/69, A15; 2/25/69, A7; UPI, NYT, 2/25/69, 28; UPI, W Post, 2/25/69, A7)

- . USAF and Lockheed Georgia Co. jointly announced six-month delay in C-5A production schedule attributed to labor strikes and material shortages caused by Vietnam War. First aircraft would be delivered to USAF in December rather than June. Announcement followed successful test flight during which 250-ton aircraft reached complete stop on 1,500 ft of runway-- $\frac{1}{4}$ distance required by conventional 85-ton airliners. (Lindsey, NYT, 2/26/69; AP, W Post, 2/27/69, A18)
- . FAA announced it had amended its Dec. 3 rule intended to ease congestion at five of Nation's busiest airports. Amendments provided for extra sections of scheduled air carrier flights without regard to established quotas at all airports except John F. Kennedy, increase in flight quotas at Kennedy between 5:00 pm and 8:00 pm to accommodate scheduled air taxis and other general aviation aircraft, and effective date of June 1 instead of April 27 and termination date of Dec. 31. (FAA Release 69-23)
- . Senate Foreign Relations Committee recommended U.S. ratification of nuclear nonproliferation treaty and said it would send treaty to Senate floor for action by March 6. (W Post, 2/26/69, A5)

February 26: NASA successfully launched ESSA IX (TOS-G) ninth meteorological satellite in ESSA's Tiros Operational Satellite (TOS) system from ETR by two-stage Long-Tank Thrust-Augmented Thor (LTTAT)-Delta booster. Primary NASA mission objective was to place and operate spacecraft in sun-synchronous orbit with local equator crossing time between 2:15 pm and 2:35 pm so that daily advanced videcon camera system (AVCS) pictures of entire globe could be obtained regularly and dependably. Satellite achieved nearly polar, sun-synchronous, circular orbit with 935.2-mi (1,505-km) apogee, 888.6-mi (1,430-km) perigee, 115.2-min period, and 101.8° inclination.

An advanced version of cartwheel configuration, 320-lb cylindrical ESSA IX carried flat plate radiometer to measure atmosphere's

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heat balance and two AVCS cameras for daily global weather coverage. Photos would be stored on board satellite on magnetic tape until readout by ESSA's Command and Data Acquisition (CDA) stations at Fairbanks, Alaska, and Wallops Island, Va. Satellite was backup to ensure full coverage after failure of one AVCS camera onboard ESSA VII (launched Aug. 16, 1968) and would be primary stored-data satellite in TOS system.

Spacecraft underwent orientation maneuver to place it in wheel mode and spin rate was adjusted. Only anomaly was 20 rpm spin rate (rather than expected 10 rpm) after spacecraft spin-down.

ESSA financed and managed TOS system and would operate spacecraft after NASA completed checkout later in month. GSFC was responsible for procurement, launch, and initial checkout of spacecraft in orbit. (NASA Proj Off; ESSA Release ES-69-9; W Star, 2/26/69; SBD, 2/27/69, 212; UPI, W Post, 2/27/69)

- . U.S.S.R. launched Cosmos CCLXVII from Baikonur Cosmodrome. Orbital parameters: apogee, 331 km (205.7 mi) perigee, 202 km (126.5 mi); period, 89.8 min; and inclination, 65°. Satellite reentered March 6. (GSFC SSR, 2/28/69; 3/15/69; SBD, 2/27/69, 212; C Trib, 2/27/69)
- . LeRC announced it had completed assembly of Brayton Cycle space power generating system, which appeared promising as source of electrical power for space flights up to five years long. Self-supporting, closed-loop system operated when mixture of helium and xenon was heated to 1,600°F and circulated to drive turbine. Turbine operated alternator providing electric power and compressor which helped circulate gas through system. Cycle would undergo tests in simulated space environment in summer. (LeRC Release 68-9)
- . Secretary of Transportation John A. Volpe announced President Nixon had nominated John H. Shaffer, Vice President of TRW, Inc., as Federal Aviation Administrator. Shaffer would replace Acting FAA Administrator, David D. Thomas, who would remain as Deputy Administrator. (DOT Release 2469; UPI, NYT, 2/27/69, 73; Kilpatrick, W Post, 2/27/69, A8)

February 26: MSFC announced it had extended contract with Mason-Rust for continued support services at Michoud Assembly Facility for six months. Contract modification amounted to \$3,786,203. (MSFC Release 69-46)

February 27: White House announced President Nixon had established inter-departmental ad hoc committee to review SST program's technology, commercial potential, schedule and costs, and environmental side-effects, particularly sonic boom phenomenon. Under Secretary of Transportation James M. Beggs was designated chairman of 11-member committee, which also included Science Adviser, Dr. Lee A. DuBridge; Secretary of the Air Force, Dr. Robert C. Seamans, Jr.; and NASA Deputy Associate Administrator Charles W. Harper. (PD, 3/3/69, 329-30; AP, W Post, 2/28/69, A5; W Star, 2/28/69, A3; Miller, B Sun, 2/28/69, A5)

- . Commemorative stamp to be issued May 5 in honor of Dec. 21-27, 1968 Apollo 8 mission would include phrase "In the beginning God..." on photo of earth as seen from moon, taken by Apollo 8 crew. Postmaster General Winton M. Blount said phrase, read from Genesis by Astronaut William A. Anders during lunar orbit Christmas Eve 1968, would be included in response to many requests. Stamp would be first U.S. stamp with religious wording since 1961. (UPI, W Post, 2/28/69)
- . FRC announced award to Serv-Air Inc. of one-year, cost-plus-award-fee contract for administrative technical support services. Contract, estimated at \$750,000 per year, included provision for two one-year extensions. (FRC Release 7-69)

February 28: NASA and British Science Research Council (SRC) had agreed to conduct cooperative project to launch fourth Ariel satellite, NASA announced. Ariel IV would be launched by Scout booster from WTR in late 1971 or early 1972 carrying one U.S. and four U.K. experiments to explore interactions among plasma-charged particle streams and electromagnetic waves in upper atmosphere. SRC would be responsible for spacecraft design, fabrication, and testing; NASA would provide Scout launch vehicle. Both agencies would participate in tracking, data acquisition, and data reduction. (NASA Release 69-35)

- . Tenth anniversary of DOD's 1,450-lb Discoverer I satellite successfully launched into polar orbit by Thor-Agena booster. Tracking acquisition was hampered by stabilization difficulties

February 28 (continued)

and satellite reentered in early March 1959.

Agena launch vehicle--most widely used booster in U.S.--had completed more than 250 successful flights in DOD and NASA operations since its first mission Feb. 28, 1958, and had carried first spacecraft to achieve circular orbit, first to be controlled in orbit by ground command, and first propelled from one orbit to another. It had been continually updated and used as versatile, multipurpose vehicle. (A&A 1915-60; Space Propulsion, 2/28/69, 199; SBD, 2/17/69, 162)

- . LaRC issued RFPs for design and financial proposals for planetary lander and project integration portions of NASA's Viking project. Viking spacecraft--consisting of lander and orbiter--were to be procured for two planned flights to Mars to search for scientific data in 1973. (NASA Release 69-36; SBD, 2/25/69, 196)
- . NASA announced it would negotiate with North American Rockwell Corp. for modifications to four Apollo spacecraft for Apollo Applications program. Combined value of spacecraft and modifications was estimated at \$340 million. (NASA Release 69-84)
- . In Science, Bryce Nelson reviewed Science Policy in the USSR, sponsored by Directorate for Scientific Affairs of Organization for Economic Co-Operation and Development (OECD). It indicated, he said, that Soviet scientists and political leaders "need to spend considerable time thinking about how to correct imbalances in their R&D system. Section on science and industry, by R. Amman, M. J. Berry, and R. W. Davies of Univ. of Birmingham, concluded U.S.S.R. had succeeded outstandingly in aviation rocketry, space exploration, atomic energy, machine tools, and iron and steel technology but its R&D system seemed sluggish. Main bottleneck was relative unavailability of testing facilities for manufacturing and proving prototypes. Central planning system in U.S.S.R. reinforced separation between R&D establishments and industry and contributed to reluctance of factories to innovate. Increasing use of contract system, with industries placing growing number of R&D contracts with institutions of higher learning, was helping bridge gap between research centers and industry. (Science, 2/28/69, 917-8)

During February: In Astronautics & Aeronautics editorial, written just before his appointment as Secretary of Air Force, incoming AIAA President, Dr. Robert C. Seamans, Jr., said, "I believe that to understand adequately the challenges that confront those of us in aeronautical and aerospace activities, we must take as our perspective the commitments that challenge the nation as a whole. President Eisenhower, President Kennedy, and President Johnson, each in his own way, had a major impact on aeronautics and astronautics. And for each, his support of aerospace efforts was a function of his belief that such efforts were instrumental in the accomplishment of national goals. In the future, as in the past, governmental support of aerospace will be based largely on its demonstrated relevance to the needs of the nation."
(A&A, 2/69, 26-7)

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