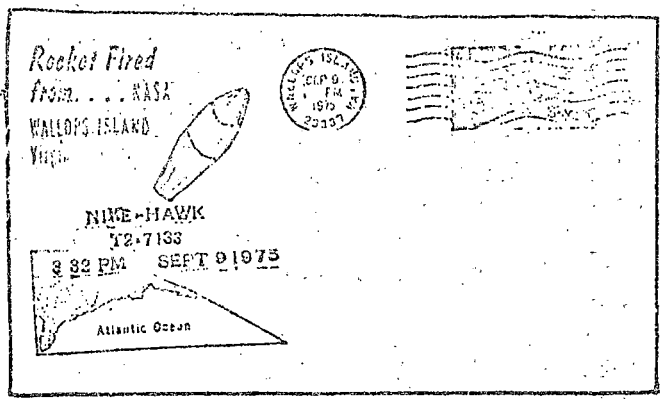
THE DISH

MARCH 1976

WALLOPS ISLAND LAUNCHES NEW SOUNDING ROCKET CONFIGURATION



A two-stage solid propellant sounding rocket carrying a 185-pound payload was successfully launched at 3:32 p.m. EDT on Sept. 9, 1975. This *Nike-Hawk* was the first test of a new system developed by the Wallops Flight Center. A secondary objective was the flight test of a newly developed recovery system for future use with both the single-stage Hawk and the Nike-Hawk vehicle. After reaching a peak altitude of 164 Km (102 statue miles), the payload impacted about 178 Km (96 nautical miles) downrange in the Atlantic Ocean and was successfully recovered at about 6 pm by the research vessel, "Annandale", under contract from the Marine Science Consortium at Wallops Island, VA. A piggy-back experiment was carried for the University of Pittsburgh to test a new high-resolution photoelectron spectrometer. Bobby J. Flowers of Atlantic, VA was the Vehicle Manager; Carl W. Balance, Jr., of Parksley, VA, the Recovery Systems Manager; Dempsey Bruton of Onancock, VA, Project Engineer; and Dr E.C. Zipf of the University of Pittsburgh the Project Scientist.

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WERNHER VON BRAUN SAID

Its not in my makeup to lead a quiet life. I had, perhaps naively, thought that when I left the space program things would slow down a little. Not so. Not so at all. I believe the challanges are here on earth. All this technology must be brought back to the people-to help in solving terrestrial problems. I really believe that space technology can make a very great contribution here on earth. After the successful lunar flights; the agency lost its impetus. The challenges had apparently disappeared. Besides, there were already too many old plans still to be implemented and there was too little money with which to do it. The so-called "grand tour of the planets" was scratched and the nuclear rocket was moth-balled. We were told that perhaps more funds would be forth coming at some later date. But I had to have the challenges and I suppose I couldn't wait until the grass got greener. When I was 13, math and physics were my two critical subjects. I did so poorly in them I actually was set back a grade. But a telescope, a magazine on astronomy, a book on rocketry and a patient mathematics teacher all helped turn the gaze to the moon, the stars and beyond. I was interested in astronomy and my parents gave me a telescope at 13. That opened up whole new worlds to me. I subscribed to an astronomy magazine. There was an ad about a book on interplanetary space rockets. When it arrived I was grimly dismayed-because it was completely filled with mathematical equations I didn't understand. The math teacher who councseled that the only was would ever understand this work was to bone up on sciences. I progressed so rapidly that not only did they give me back the year I losr, but I also skipped a grade.

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Two star-tracker instruments identical to the ones scheduled for use in the High Energy Astronomy Observatory (HEAO) are reported functioning well as part of the Small Astronomy Satellite (SAS-C)

A DAY FOR DALEY AND DETENTE

by Tim Cash

It was a rainy Tuesday morning on October 14 when I heard a Radio News that the 5 members of the ASTP would be in Chicago for the day. Since I had expected a visit by the crews of both countries, I was partially prepared in my plans.

I took the South Shore Railroad from South Bend to Chicago at 7:55 AM and arrived at 10:00 AM. I brought with me a 35mm camera so I could take photographs along the parade route and about 8 covers, so I could have them canceled at the main Chicago postoffice to commemorate the parade. Upon arriving at the Randolph & Clark street station, I embarked on a trip to the post office at Van Buren & Canal street.

Upon my arrival at the postoffice, I requested on where I could obtain a Chicago Hand Cancel and was told at the information window. I received a nice Hand Cancel on my covers and the clerk even agreed to doub;e cancel my KSC/NASA cachet launch cover after checking with his superiors. I then preceeded to the corner near the Chicago River where the parade was to start. I arrived at 11:25 and the parade started at 11:30. The fire boats started the parade by shooting out a multi-color stream of water dye which the large crowd gathered around the street corners semmed to enjoy very much. There were several cars in the parade and the Apollo crew all rode in one car. The Soyuz crew rede in another car with their families and Mayor Daley in anther.

I ran ahead of the parade all the way to their destination at the Conrad-Hilton hotel on Michigan Avenue. I was able to get into the crowd of officials entering the hotel and ended up in the press balcony. I asked one of the press reporters for a program of events and was given a luncheon seating chart, which was all that was available to anybody because of the change made in the crews schedule in their Chiago visit itinerary. The VIP's present were; Gen and Mrs Stafford, Gen and Mrs Leonov, Gen and Mrs Shatalov (Soviet director of ASTP and flew Soyuz 4,8 & 10), Mr and Mrs Brand, Mr and Mrs Slayton, Mr and Mrs Kubasov, Miss Viktoria Leonova, Miss Katya Kubasova and Miss Oksana Leonova (daughters of the Soviet crew). Also present were Mayor Daley and several city officials.

The Soviet National Anthem was played by the band of the Great Lakes Naval Training Center followed by our own national anthem. Followed were several favorite Russian cultural songs played by a band of strolling violin players. The Cosmonauts seemed to enjoy this more than the Astronauts, I suppose because they were entertained by the American military playing Russian music. Afeter the music was finished, Mayor Daley presented several awards to both crews including a plaque to the Cosonauts with an artists rendition of the "handshake in space".

A surprise presentation to Mayor Daley from Gen. Stafford was a plaque from all of the astronauts that have been honored in Chicago parades since Gemini program. This was followed by a gift presented to Mayor Daley by the crews of both countries which were flags of the crews respective countries which were carried on the flight.

After the awards were over, I was able to attend a press conference on the 2nd floor in which Aleksei Leonov told reports that he could see the city of Chicago from orbit, but had to come there personaly to experience the warmth and friendship of the people living there.

There was also a question about if the Soviets sent any Nuclear missiles into orbit aboard their spacecraft to which the reply was an emphatic no. I received the impression that alot of the press did not realy think that the ASTP was such a great feat for peace.

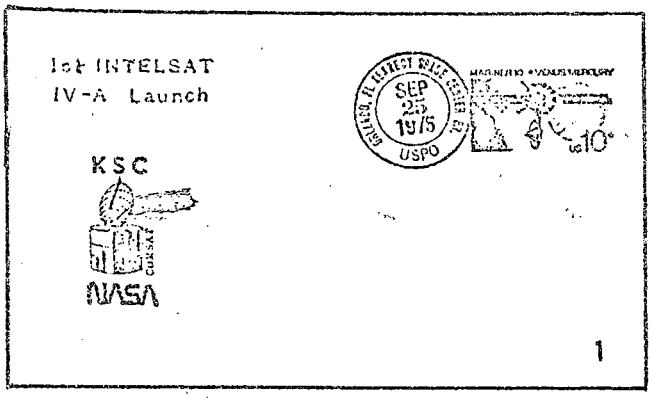
After the press conference, I was able to obtain the autograph of Gen. Shatalov, but an aide hurried out the two ASTP crews so I missed getting their autographes. I was determined not to leave Chicago without their autographes so I waited in the hotel labby from 1:30 until 5:30 when the crews returned.

I then received my only disappointment during my trip when a Chicago city detective refused to even let me get near the crews. Earlier, I had witnessed the crews giving autographes freely to city officials so I was very surprised at the extreme rudeness of this city employee. I then departed for the South Shore station and home with the realization that I would never again come to Chicago for an Astronaut parade. If you want the Soviet crew's autographs, I suggest you write to Star City in Moscow instead of trying to get their autographs in person.

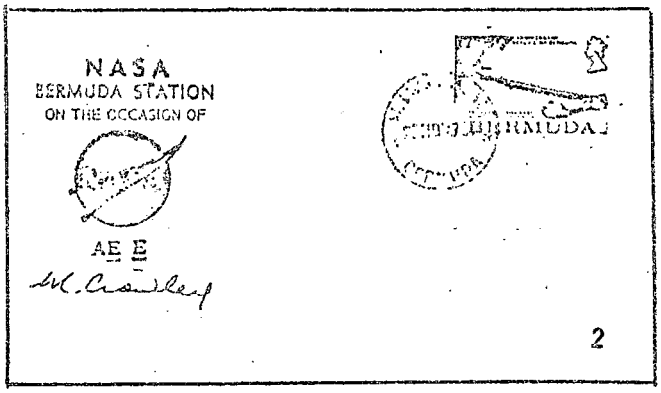
Cachets

On the following pages are covers with cachets. If not stated the cachet and postmark are in black. Listed is person servicing cover if not your own.

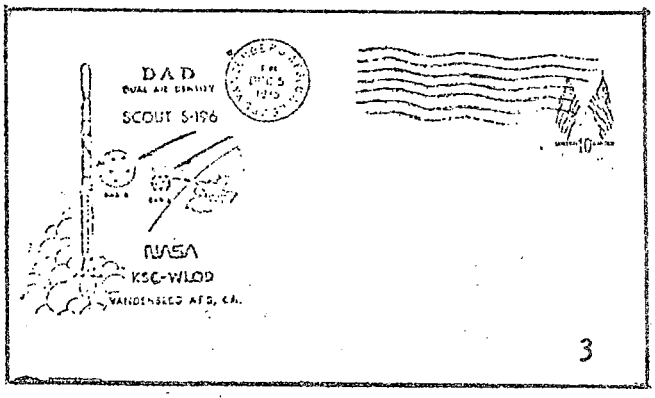
(1) for the INTELSAT launch with the Orlando Kennedy Space Center hand cancel. Cachet is blue(top) and red(bottom) and by Havekotte. (2) for the AE-E from the Bermuda station with poor cancel. Cachet is in blue and red and autographed. (3) for the DAD, cachet in off red, cancelled Vandenberg AFB by WLOD. (4) for the RCA Satcom A Communications Satellite with cachet in blue from Patrick AFB and by Whitney. (5) is for the HELIOS-B with cachet in blue from Goddard Space Flight Center and cancelled in Greenbelt, MD, serviced by GSFC Stamp Club. (6) for the HELIOS-B with cachet in blue and cancelled Wessling Deerbay West Germany and this is X-119 in Ekas Directory.



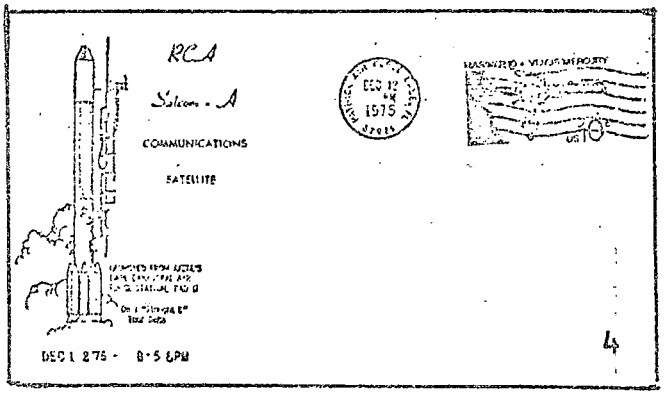
1



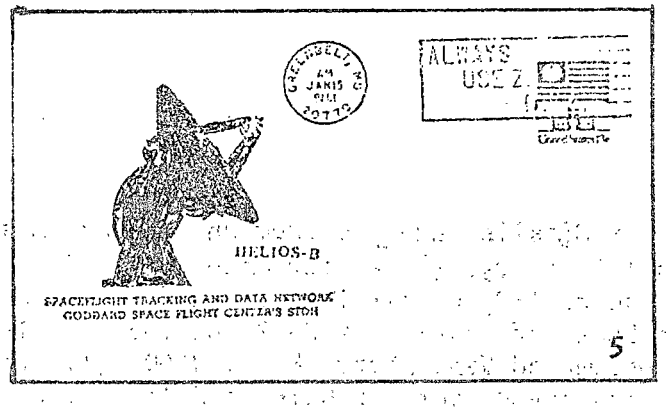
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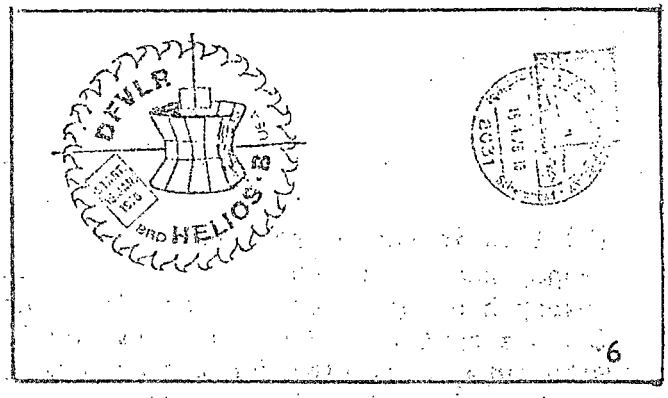
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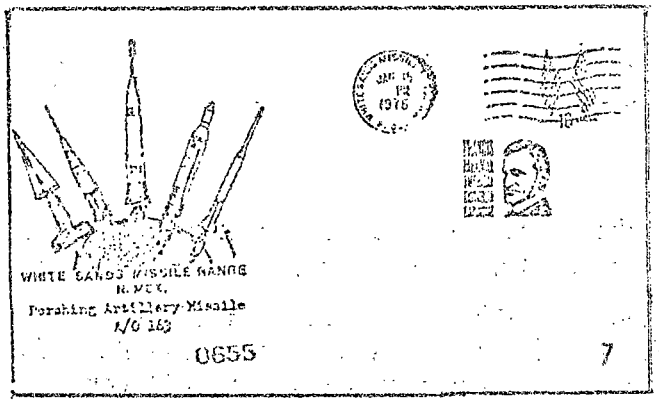
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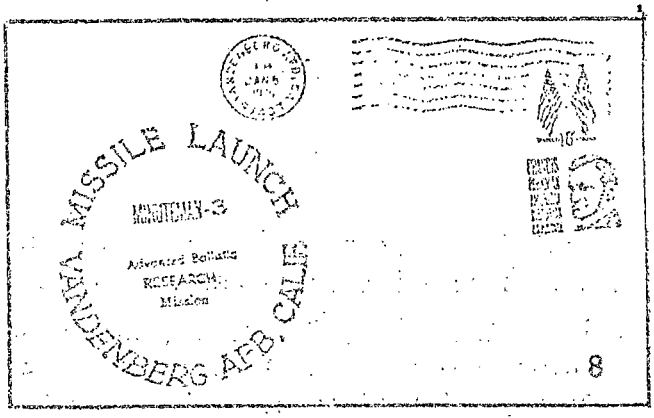


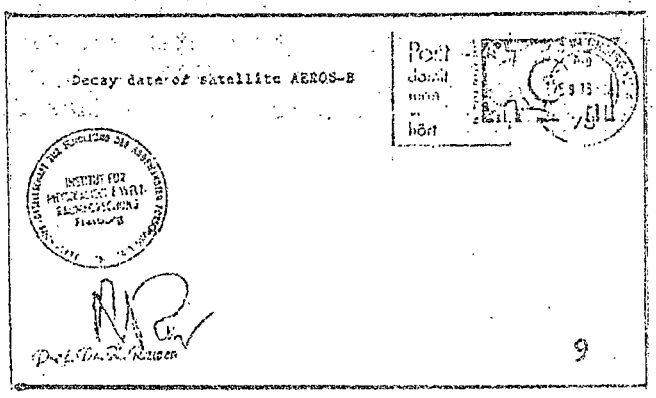
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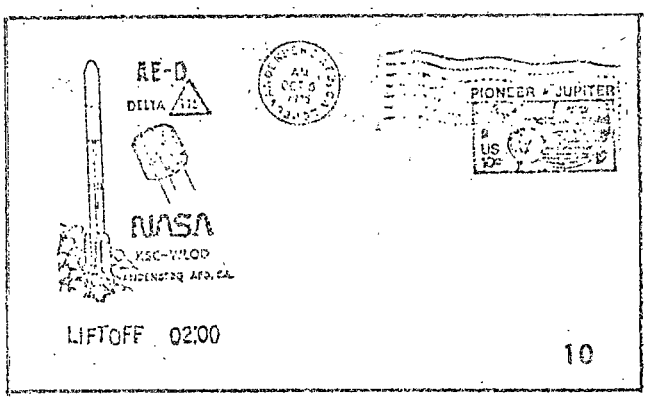


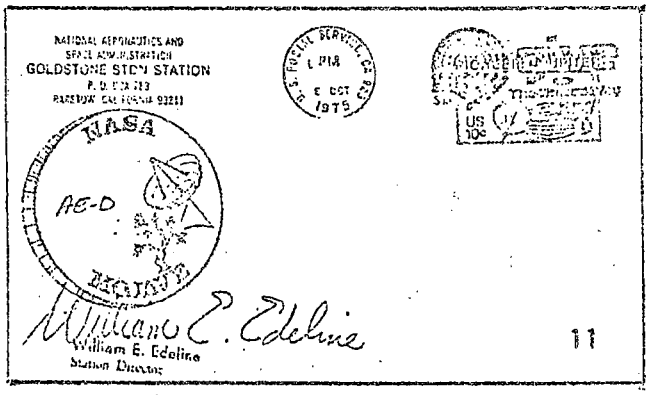
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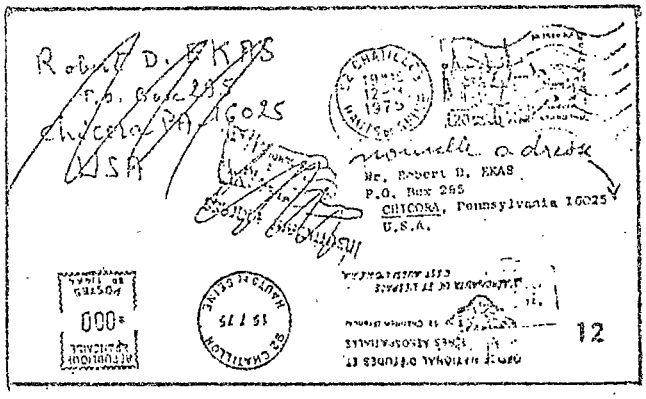


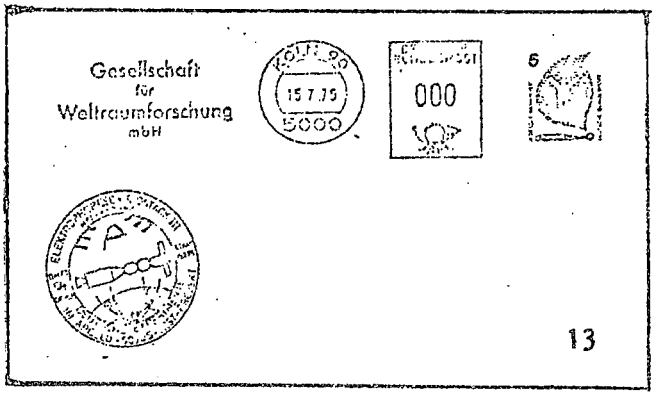


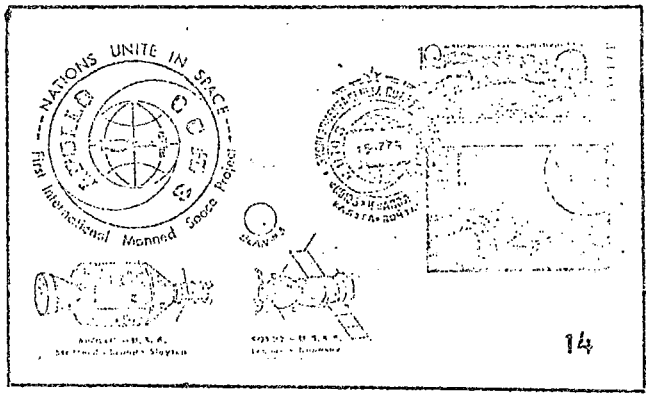




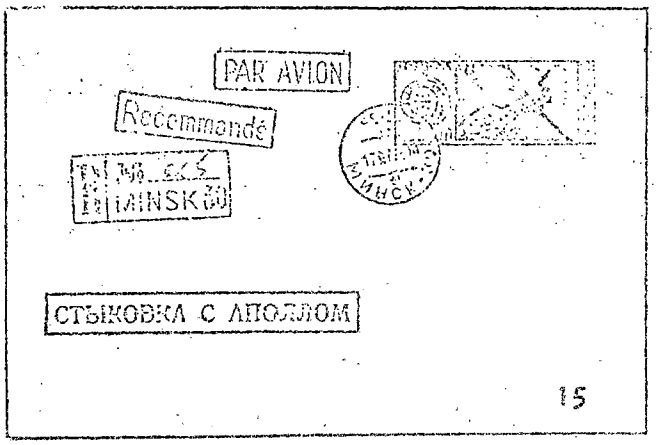




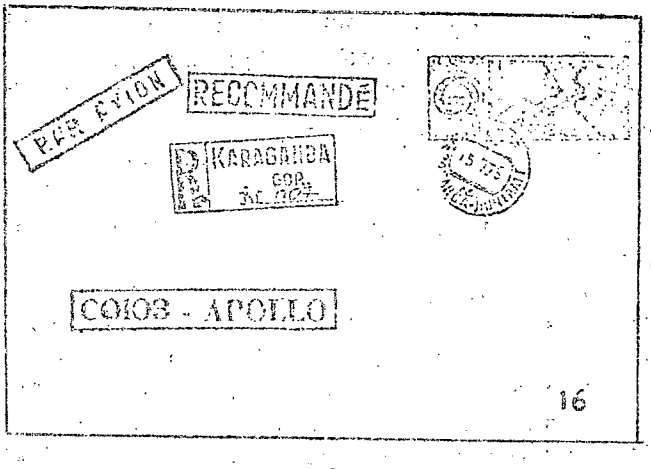




(7) this is one of four Pershing Artillery Missile launches from White Sands Missile Range, cachet redish brown and by Michael Lovelady. (8) an advanced Ballistic research of Minuteman-3, cancelled Vandenberg AFB, cachet is deep red and by Vandy. (9) was sent for ASTP, but serviced for Decay of AEROS-B by X-126 on Sept 25, 1975 with autograph. (10) for the AE-D and postmarked Vandenberg AFB by WLOD. (11) for the AE-B from GLD with cachet in blue. (12) cover sent for ASTP to X-161 and sure is a mess. (13) from Koln W Germany for ASTP, postmark in red. (14) Russian ASTP by Bean.



15



16

(15) is a Russian cover for the Link-Up of the ASTP and cancelled in the city of Minsk with lower word cachet in red. (16) another Russian cover for the launch of ASTP, cancelled at Karaganda in the region where Russian launch took place.

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GATE (GARP Atlantic Tropical Experiment)

In the March 1975 issue of The Dish was an article on GATE. The first letter of GATE is Global Atmospheric Research Program and the last three letter is Atlantic Tropical Experiment. This event took place in 1974 and at this time am reporting the covers serviced from ships and stations around the world.

Meteor-Germany '73 Hamburg '74 same
Researcher GATE label
Planet-Germany Kiel
Capricorne-French Marseille GARE-PM-information on stuffer
USNS Vanguard lines across stamps
France II-French La Rochelle-Pallice Charente-Mme
NOAA Oceanographer (Red GATE cachet) ship cancel
Plane-Sabreliner, N307D-Dakar word cachet "N3070 from Dakar to Dakar radiation study of 12 30 N 21 W altitude 39,000 ft. to 3000 ft."postmark poor from Senegal
BDA "Bidassoa"-French Paris NAVAL
R/V Columbus Iselin GATE cachets ship cancel
R/V James Gilliss (red) GATE cachet ship cancel
USCCC Dalas (red) GATE cachet ship cancel Autograph R.A. Schrik
U.S. Field Office-Dakar Red cachet postmark poor
Rockville, MD Red cachet,postmark Aug 14, 1974
Campagne G.A.R.P.-Dakar R.P. SENEGAL
C-135 N 96 (in pencil) GATE, Dakar, Senegal
Okla City,OK (Federal Aviation Admin) autograp Erine L. Rowe
Jean Chavecot-29 N Brest P pal Nord Finistere
U.S. Naval Oceanographer Office (red) GATE cachet USCGC Dallas cachet

NOTE: Poor cancel job was done on most covers as it was understood when and where was not to be known.

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Engineers from the National Aeronautics and Space Adminisration will place a giant experimental windmill into operation after indications it may be a practical, supplemental energy source. If the machine being developed by Lewis Center pans out, you may see hugh, twin-bladed windmills with vanes spanning 190 feet going up in many parts of the country within a few years. Energy costs will run "from like 7 cents a kilowatt hour to 2 cents a kilowatt hour for sites with average winds of 12 to 18 miles per hour.

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One of the differences between the Soviet Union and the United States has been the relative openness of the Americans and the general secrecy of the Russians. At the moment, that deliberateness is particularly irksome to NASA. The Russians successfully landed two unmanned spacecraft on Venus. The United States has scheduled probes of the atmosphere of that planet in 1978. NASA wants details of the Soviet mission now, not later and NASA is seeking a meeting with Soviet scientists.

RADIO ASTRONOMY (From Australian Philatelic Bulletin)

The story of radio astronomy began in 1932 when a young engineer working in the Bell Telephone Laboratories in America discovered that radio waves were reaching the earth from outer space.

In 1942, when British radar observers were searching the sky for enemy aircraft, they sighted mysterious "blips" on their radar screens; it was realised later that the mysterious signals appeared only when the radar aerials were scanning across the sun.

It was not until 1946 that the C.S.I.R.O. Division of Radiophysics, with radar equipment developed during the war, showed beyond all doubt that the unusually strong signals from the sun came from active sunspots. In the same year the Division made another exciting discovery. It identified the Crab Nebula as a direct source of radio emission; this was the first so-called "radio Star". The Division also found that its radio equipment could be used to study cloud and rain formations.

In the last 25 years the Division of Radiophysics has developed some remarkable radio telescopes. The most famous of these is the 64-metre telescope at Parkes, New South Wales. At Culgoora, near Narrabri, in New South Wales another giant radio telescope for taking moving "radio pictures" of the sun is located. It consists of 96 dish-shaped aerials each 13.7 m across, spaced in a circle with a diameter of 3 km. Each dish is automatically steered to follow the sun. The radioheliograph thus gives a detailed second by second picture of the sun. Near the centre of the giant ring of aerials, the C.S.I.R.O. Division of Physics has set up optical telescopes to study the sun. The combination of optical and radio astronomy facilities has enabled C.S.I.R.O.'s observatory at Culgoora to take its place as one of the world's leading centres for solar research.

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Here are some award winners at Conventions or Exhibitions. At the AAMS convention at the Midwest Postage Stamp and Coin Show saw Les Winick receive a Silver Medal for Cuban Rockets. At Goldpex-Midaphil '75 a Bronze Award to Vivion M. Green for Journey to the Moon. The ATA Gold Award winner at SOJEX '75 for "USA Conquest of Space" was Karel Lipa of Oak Park, Mich. Wallace Tolman received a Gold Ribbon for "Copernicus-Father of Modern Astronomy" at OAKPEX '75. A First Place went to Betty Rutherford for Manned Flight and a Third Place for Gemini Flight at CERAPEX. A Bronze Award to Chuck Claar for "Man Ventures into Space" at Scopex '75. At LINPEX-TOPEX '75 a Bronze Award went to Jack Green for Astronaut-American Man in Space and also a Bronze and the Astronomy Unit Award of the ATA for Nicolaus Copernicus-Great Astronomer. Maplewood Stamp Club exhibition saw Eugene Whyte receive 2nd Place for Space Topical. At SPACEPEX '75 the Johnson Space Center Stamp Club Award for Achievement in Space was taken by Ross Christiansen, along with the AAMS Award, for his exhibit, "Domestic Communications Satellite History". A second Place Award went to Robert Boyd for "Kohoutek the Little Comet that Couldn't". Third place to Reuben Ramikissoon for "Jovian Journeys-And Beyond", Ray Cartier for "Man in Space". VENPEX '75 saw Wallace Tolman receive a Gold Award, the ATA certuficate for "Copernicur-Father of Modern Astronomy".

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Would like to hear from anyone that can top this one, Ron Allan of Tampa, Florida is an avid Skylab First Day Cover collector and has over 250 different cachets in his collection for Skylab First Day.

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A copy of a letter was received from Sean Marsar from Headquarters, Southern Region, Memphis, TN 38166 of the U.S. Postal Service concerning the cancellation of the July 15th covers at Cape Canaveral of the German dealer. On July 13 the Postmaster of the Cape Canaveral postoffice placed a sign in the post office window that covers deposited as late as twelve midnight July 15 would receive a same day postmark. The only employee on duty during these hours was the postmaster and no overtime was used. Approximately 50,000 covers were deposited between the normal closing hours of 5:00 P.M. and midnight.

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Jupiter's largest moon, Gabymede, has been probed by radar for the first time and found to have a surface considerably rougher than those of Mercury, Mars and Venus

LAUNCH SCHEDULE

The dates given are not firm, schedules do change. Listed are flights, date, vehicle, range and stations, any of these could change.

FLIGHT	DATE	VEHICLE	RANGE	STATIONS
SOLRAD II-A	Mar 4		ETR	BDA HAW ORR ROS ULA ETR GSC
INTELSAT IVA-C	Mar 4	Atlas Cent	ETR	ACN BDA MIL ARIA ETR GSC
RCA-B	Mar 24	Delta	ETR	ACN BDA GWM HAW MIL ARIA ETR GSC
NATO-C	Apr 21	Delta	ETR	ACN BDA GWM HAW MIL ARIA ETR GSC
LAGEOS	Apr 29	Delta	WTR	ACN AGO MAD ORR QUI ULA WNK ARIA SAM GSC
MARISAT-B	May	Delta	ETR	ACN BDA GWM HAW MIL ARIA ETR GSC
COMSTAR-A	May 20	Atlas Cent	ETR	ACN BDA MIL ORR ARIA ETR GSC
GP-A	May 31			ACN BDA ETR MAD MIL WLP GSC
ITOS-E2		Delta	WTR	AGO HAW MAD ORR QUI ROS ULA WNK SAM ARIA GSC
WESTAR-C		Delta	ETR	
MARISAT-C		Delta	ETR	
COMSTAR-B		Atlas Cent	ETR	
ESA-GEOS		Delta	ETR	
INDONESIA-A		Delta	ETR	
RCA-C		Delta	ETR	
SIRIA-A		Delta	ETR	
GOES-B		Delta	ETR	
ITOS-H		Delta	ETR	
COMSTAR-C		Delta	ETR	

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COMING TOTAL SOLAR ECLIPSES

Date	Place	Time
1976 Oct 23	Africa Australia	4.9 min.
1977 Oct 12	Northern S. America	2.8 min.
1979 Feb 26	Northwestern U.S.A. Canada	2.7 min.
1980 Feb 16	Africa India	4.3 min.
1981 July 31	Siberia	2.2 min.
1983 June 11	Indonesia	5.4 min.
1984 Nov 22	Indonesia S. America	2.1 min.

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Do not look for covers from the French Guiana rocket base as all launches have come to a halt. The main launch site for a European joint space effort has fallen victim to Europe's economic problems. Jean Pierre Morin, head of the operations said the base closed down after seven years in which 275 rockets or balloons were launched, many of them under U.S. government programs. It is expected to be at least four years before space research gets under way again with the launching of a three-quarter-ton communications satellite under a French-led program.

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Another step toward the tracking and communications control of satellite by other satellites was taken during April 1975 in a unique experiment using the Applications Technology Satellite-6 (ATS-6). Conducted by Goddard Space Flight Center, the experiment involved the tracking of and communications with NASA's GEOS-3 geodetic satellite by the ATS-6. During the experiment, the ATS-6 was first commanded by the ATS ground station in Rosman, NC, to point at and track the GEOS-3. Ranging signals were then transmitted to the ATS-6 for relay to the GEOS-3. The ranging signals along with spacecraft condition and experiment data, were returned to Rosman over the same communications loop. As the GEOS-3 disappeared behind the Earth in its lower orbit, the ATS-6 continued to track a path across the Earth indicating the location of the geodetic satellite. And as the GEOS-3 appeared over the edge of the Earth, the ATS-6 again locked into it and tracked it for over 50 percent of its orbit. Present ground stations tracking of the GEOS-3 can cover only 15 percent of the orbits.

FOR THE AUTOGRAPH COLLECTOR by John J. Macco

VIKING A&B launched Aug. 20 and Sept 9, 1975-Titan Centaur 304 launch vehicle
NASA Headquaters, Washington, DC 20546
Robert Kraemer-Director,Planetary Program;Walt Jakobouski-Program Manager;Dr Richard Young-Chief Program Scientist;Loyal Goff-Prcgram Scientist;Robert Kennedy-Deputy Program Manager(Orbiter);Rodney Mills-Deputy Program Manager(Lander)
Langley Research Center, Hampton, VA 23369
J.S. Martin Jr-Project Manager;H.T. Wright-Deputy Project Manager;Angelo Guastafeno-Deputy Project Manager;Dr G.A. Stoffen-Project Scientist;D.A. Ward-Launch Operations Manager;A.T. Young-Mission Operations Manager;W.J. Boyer-Deputy Mission Operations Manager;J.E. Harris-Spacecraft Performance Manager;W.L. Watson-Space Vehicle Manager;E.A. Brummer-Lander Subsystem & Component Manager;H.G. King-Lander Software Manager;G.C. Broome-Lander Science Instrument Manager
Kennedy Space Center, Fla., 32899
Harold Zweigbaum-KSC Viking Representative;William Brosier-Viking Project Enginee
Lewis Research Center, Cleveland, Ohio 44101
Richard Geye-Viking Project Engineer
Jet Propulsion Lab., 4800 Oak Grove Dr., Pasadena, Calif., 91103
Henry Norris-Project Manager;Kermit Watkins-Deputy Project Manager;Conway Snyder-Orbiter Scientist;Al Wolfe-Spacecraft Systems Manager

Atmosphere Explorer E (Explorer 55) launched Nov 19, 1975 Delta 117 launch vehicle
NASA Headquarters, Washington, DC 20546
Frank Gaetano-AE Program Manager;Dr E.R. Schmerling-AE Program Scientist
Goddard Space Flight Center, Greenbelt, MD 20770
David W. Grimes-Project Manager;Robert Weaver-Deputy Project Manager, Technical; John Underwood-Deputy Project Manager, Resources;Nelson Spenser-Project Scientist; Richard Donnelly-Experiment Manager
Kennedy Space Center, Fla., 32899
John J. Bunn-Spacecraft Coordinator

RCA-A launched Dec 12, 1975 Delta 118 launch vehicle
Kennedy Space Center, Fla., 32899
David Bragdon-Spacecraft Coordinator

Dual Air Density Explorer A&B launched Dec 6, 1975 Scout launch vehicle
Langley Research Center, Hampton, VA 23369
John Canady Jr-Project Manager;William Hinson-Assistant Project Manager;James Mayo-Project Chief Engineer;James Cheely-Spacecraft System Manager;Alfred Beswick-Mass Spectrometer & Calibraton Manager;Lovis Hunt Jr-Electronics & Instrumentation Manager;David Butler-Technical Project Engineer
DAD Science Team-Gerald Keating-Principal Investigator-Langley;Dr Alfred Nier-Investigator-University of Minnesota,Minneapolis,Minn 55401;

Helios-B launched Jan 15, 1976 Titan Centaur launch vehicle
NASA Headquarters, Washington, DC 20546
Fred Kochendofer-Program Manager;Dr Albert Opp-Program Scientist
Goddard Spaceflight Center, Greenbelt, MD 20770
Gilbert Ousley-Project Manager;Charles B. White-Assistant Project Manager;William Will, Jr-Assistant Project Manager;Dr James-Trainer-Project Scientist
Kennedy Space Center, Fla., 32899
John Neilon-Helios Launch Director;Floyd Curinglon-Spacecraft Coordinator

Communications Technology Satellite launched Jan 19, 1976 Delta 119 launch vehicle
NASA Headquarters, Washington, DC 20546
A.J. Cervenka-Program Manager;Wasyl Lew-Flight Experiment Manager

Intersat IVA B launched Atlas Centaur 37 launch vehicle
Lewis Research Center, Cleveland, Ohio 44101
Henry Stone-Atlas Centaur Project Manager;Vernon Weyers-Inteleat Mission Project Engineer;Frank L. Manning-Launch Vehicle Project Engineer
Kennedy Space Center, Fla., 32899
John Gossett-Manager Centaur Operations;Ralph Lotspeich-Intelsat Spacecraft Coordinator

Again if anybody has any questions about autograph collecting or any experience to share, feel free to write with your questions.

TRADING & SELLING CORNER

SPACE COVER SALE No 2-Xerox illustrated list, yours at 20¢ for list and SASE with 26¢ postage. E. John Staba, 2840 Stinson Blvd., Minneapolis, Minn., 55418

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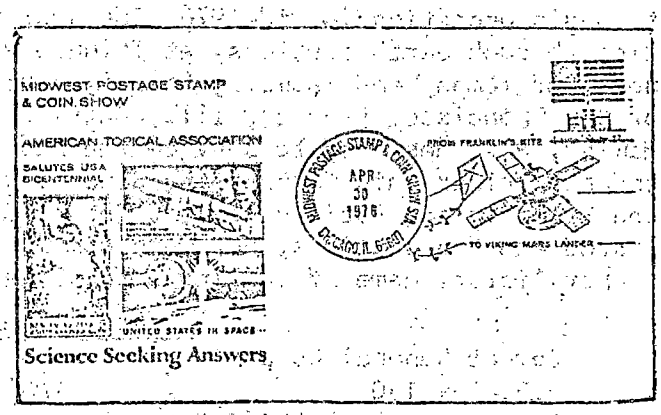
NEW PRICE LIST: 6 page Skylab FDC listing. Wide assortment of unusual FD items and cachets. Very little ASTP-none listed, state wants. American Freedom Train listing. All this and more for a #10 SASE. Send photocppy and/or complete word description of your UNUSUAL Skylab FDC's. Gene Bella, 4927 York Road, South Bend, IN 46614

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LIST of duplicate covers of Ships, Space, US and UN FDC, HPO, Antartic, Artic, First Flights, Exhibitions and etc. Send SASE (2 ounces 24¢ postage) Bob Ekas, P.O. Box 295 Chicora, PA 16025

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The U.S. Bicentennial and Space Science are themes for the U.S.P.S. pictorial handstamp cancellation and cachets for the 23rd Midwest Postage Stamp & Coin Show, April 30, May 1 & 2, 1976, Palmer House, Chicago, Ill. The pictorial postmark is inscribed "From Franklin's Kite to Viking Mars Lander" and pictures symbolical kite Benjamin Franklin used in his 1752 electrical experiments and a detailed line drawing of the space craft Viking Mars Lander due to land on Mars July 1976. The cachet is inscribed, "Science Seeking Answers" and "Bicentennial USA". Three (3) U.S. Bicentennial Space Science, pictorially cancelled covers cost $2.00 (or eight-8-covers for $5.00) from American Topical Association, 5014-B West Center Street, Milwaukee, Wis., 53210. Price includes postage and unaddressed.



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COMMERCIAL AVIATION FDC: I am taking advance orders for my second cacheted FDC. Beautiful color printed cachet for March 18 Commercial Aviation stamp at 50¢ each or 3 for $1.25 plus a #10 SASE. I still have a few of my first cacheted FDC for the 1974 Energy stamp left at 35¢ each or 3 for $1.00 plus SASE. Please order from Ron E. Allen Cachets, PO Box 2188, Tampa, FL 33601.

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Have large number of IRC's for sale at 30¢ each. The price of IRC's at the postoffice is now 42¢. US stamps accepted and send Stamped Addressed Envelope. Bob Ekas, P.O. Box 295, Chicora, PA., 16025

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List #15 SPRING-76 of Nuclear Ships, Arctic and Antarctic, First Flights, Historical events, Space, Autographes and Etc. Send 13¢ in coin or stamps: Art Silanek, 526 Willow Ave., Piscataway, NJ 08854

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"McMahan's Philatelic History of the Conquest of Space" has completed the 1972 and 1973 Supplements, number 4447 through 4991 and miscellaneous space firings, the manned missions of Apollo 16 and 17, Skylab 1, 2 3 and 4. The 1972 supplement is $2.75 and the 1973 supplement is $3.25. The complete catalog from 1944 to 1973 is $19.00 for the deluxe edition in vinyl binder, or $15.00 forcomplete catalog in manila binder. Space cover pricelist available for SASE. Manned Spaceflight Covers,DBA, Houston Hobby Center, Inc., P.O. Box 10791, Houston, Texas 77018.

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Send 40¢ postage for GIANT Space cover list, or send 4 or 5 large self addressed stamped envelopes: Sean Marsar, 6 Helena Ave., Bethpage, NY 11714

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Send a stamped addressed envelope for information on service from, Edwards, V.A.F.B., Wallops, Cape, J.F.K., Palestine, Alaska, WSMR, Alamororgo and you name it: Robert J. Boudwin, 1119 Harkin Ave., Woodbury, NJ 08096.

Tracking Station Report

Moonwatch, the worldwide volunteer satellite tracking network that produced the western world's first observations of Sputnik 1, ceased operations June 30 after nearly two decades of sky patrols. It developed out of the massive scientific endeavor known as the International Geophysical Year (1957-58) and was coordinated by the Smithsonian Astrophysical Observatory with support primarily from NASA.

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The Federal Communications Commission gave General Telephone & Electronics Corp a green light to combine its planned domestic satellite communications system with one slated by American Telephone & Telegraph Co. The combined GTE-AT&T system is due to begin operating in mid-1976. The system will be able to service Alaska and Puerto Rico through earth stations, at Triunfo Pass, west of Los Angeles; Homosassa, Fla., north of Tampa, and Taumalu, Hawaii, north of Honolulu; Three Peaks, Calif., north of San Francisco; Hanover, Ill., outside Chicago; Woodbury, Ga., near Atlanta, and Hawley, Pa., designed to service the New York metropolitan area and East Coast. In order to clear this further the General Network is to operate from satellite over the Atlantic and Pacific oceans. The AT&T is to operate from satellite over land. Listed are the stations, but more complete addresses are needed and where zip code is not listed, name of mailing address needed.

Comsat General Network

Comsat General Corp.
P.O. Box 150
Santa Paula, CA 93060

(MARISAT)

Comsat General Corp.
Southbury, Conn., 06488

AT&T Network

Three Peaks, CA (near San Francisco)

Comsat General Corp
AT&T Station
Hanover, Ill 61041

(Domestic)

Deluz, CA (near Los Angeles)

Comsat General Corp
AT&T Station
Woodbury, GA 30293

Comsat General Corp
AT&T Station
Hawley, PA 18428

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New Addresses (letter before each indicates the category each will be placed in)

C Jabal Ali Satellite Earth Station
United Abab Emirates

TP Fleischmann Planetarium
Reno, Nev.

TP Grace Flandrau Planetarium
University of Arizona
Tucson, Ariz.

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The National Scientific Balloon Facility near Palestine, Texas has scientists from all over the world going there to talk about, learn about, and experiment with balloons. The balloons go 100,000 feet and beyond. They are used extensively for scientific investigation and are sometimes called the "poor man's satellite." Sizes range from 11,0000,0000 cubic feet to the largest launched so far-52,600,000 cubic feet. A "super pressure balloon" is scheduled for launching this year, 70,000,000-cubic-foot capacity.

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RCA says it has received an $8.4 million contract to design and build a communications system for the Navy's Trident ballistic missile submarines.

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Those having purchased the regular or deluxe Directory-Space Addresses-Tracking-Installations may send a stamped addressed envelope for the three page supplement. This is printed on one side and is punched. Those ordering the Directory will have these pages enclosed.

In the March, June and December 1975 issues appeared the name of the city of the Satellite Tracking Stations the world over. As this list continues from A-Z help is needed with the addresses.
Listed are OPTICAL and RADIO TRACKING STATIONS. (1) Visual Tracking Stations (2) Photographic Tracking Stations (3) Lasor Tracking Stations (4) Lunar Laser (5) Doppler Tracking Stations (6) Radar Tracking Stations (7) Interometers (80 Tracking Antennas

Radio Research Laboratories
2-1 Nukui Kita-machi, 4 chome,
Koganei, Tokyo 184, Japan 5

Tokyo University
Institute of Space Aeronautical Science
4-6-1 Komaba, Meguro-ku
Tokyo, Japan 5

Kashima, Japan 5 8
Katsuura, Japan 5
Misawa, Japan 5
Uchinoura, Japan 5

NASDA
World Trade Center Building
3-5 Hamamatsucho, Shiba
Minato-Ku, Tokyo, Japan 5

Hydrographic Department
Taukiji-5, Chuo-Ku
Tokyo 104, Japan 1

c-204 Japan 5

Johnston, Johnston Island 2

Ulan-Bator, Mongolia 1 2

Puebla, Mexico 1

S-108 Malagasy 2 5 6 7 8

Laboratorium voor Ruimte-Onderzoek
Beneluxlaan 21
Utrecht, Netherlands 1 5

Ypenburg, Netherlands 2
Apeldoorn, Netherlands 1
Baarn, Netherlands 1
Breda, Netherlands 1
Bunnik, Netherlands 1
Denekamp, Netherlands 1
Ens, Netherlands 1
Gorinchem, Netherlands 1
Leek, Netherlands 1
Havelte, Netherlands 1
Hertogenbosch, Netherlands 1
Loenen (Veluwe), Netherlands 1
Nederhorst, Netherlands 1
Pijnacker, Netherlands 1
Ulestraten, Netherlands 1
Waalwijk, Netherlands 1
T-110 Netherlands 1
T-112 Netherlands 1

Werkgroep Satelliet Geodesie
Kanaalweg 2B
Delft, Netherlands 1

Norges Geografiske Oppmaling
Boks 8153, Oslo-Dep.
Oslo, Norway 1 2 5

Ny-Alesund, Norway 2
T-139 Norway 2

Invercargill, New Zealand 1
Nelson, New Zealand 1
Taradale, New Zealand 1
T-163 New Zealand 2

Polish Academy of Sciences
Palac Kultury i Nauki,
Warsaw, Poland 1 4 5

Borowiec, Poland 2
Olsztyn, Poland 2 1
Poznan, Poland 2

Katedra Geodezji Politechniki
Warszawskiej
Plac Jednosci Robotniczej 1
Warsaw, Poland 5

Bemowo, Poland 5

Observatorio Astronomico
Universidade do Porto
Monte da Virgem
Vila Nova de Gaia, Portugal 1

Porto, Portugal 2

Pasay City, Philippines 1
Quezon City, Philippines 1
San Miguel, Philippines 5

C-156 Peru 2 7
O-100 Peru 2 3

Observatoire de Bucarest
Rue Cutitul de Argint 5
Bucarest 28, Rumania 1 2

Cluj, Rumania 1 2
Timisoara, Rumania 1

Space Covers Reported & Received

WHITE SANDS MISSILE RANGE, NM

11-14-75 IMPROVED HAWK/0830 #NLA2
11-18-75 1ST ROLAND-SHORAD LAUNCH
11-22-75 1ST ROLAND AD MISSILE/FIRED BY U.S. TROOPS
12-11-75 BLACK BRANT VC,NASA SPAR PROJECT/FLIGHT 21.032NP ZERO GRAVITY TEST
1-15-76 PERSHING ARTILLERY MISSILE/A/0 160
1-15-76 PERSHING ARTILLERY MISSILE/A/0 161
1-15-76 PERSHING ARTILLERY MISSILE/A/0 162
1-15-76 PERSHING ARTILLERY MISSILE/A/0 163
1-16-76 SAM-D (E.D.M. 15)
2-11-76 SRAM NO. P-72-880
2-12-76 LANCE ARTILLERY MISSILE/NO 2152
2-18-76 BLACK BRANT NO 21030/NASA SOLAR X-RAY EXP.
2-19-76 SAM-D EDM-17

WALLOPS ISLAND, VA (Wallops Flight Center)

11-18-75 NIKE-CAJUN GRENADES/T2-8083/11 30 AM NOV 18 1975
11-18-75 NIKE-JAVELIN/T2-7599/2 01 PM NOV 18 1975
11-19-75 NIKE-CAJUN GRENADES/T208085/12 25 PM NOV 19 1975
11-21-75 NIKE-CAJUN GRENADES/T2-8086/11 11 PM NOV 20 1975
12-3-75 NIKE-CAJUN GRENADES/T2-8127/11 57 AM DEC 3 1975
12-4-75 NIKE-CAJUN GRENADES/T2-8084/00 25 AM DEC 3 1975
1-7-76 VIPER-DART/T1-8059/1 54PM
1-7-76 VIPER-DART/T1-8060/2 58PM
1-10-76 BLACK BRANT VC/G1-8069/9 16AM
1-15-76 TERRIER-MALMUTE/G2-8160/1 30PM
1-19-76 NIKE-TOMAHAWK/T2-8079/2 12PM
1-19-76 ASTROBEE D/T1-8145/2 28PM
1-23-76 ASTROBEE D/T1-8146/2 32PM
1-24-76 UTE-TOMAHAWK/D2-8140/5 34PM JAN 23 1976
1-24-76 NIKE-TOMAHAWK/D2-8142/5 45PM JAN 23 1976
1-30-76 SUPER-ARCES/T1-8244/3 25PM

CHATANIKA, AK (Poker Flat Rocket Site)

None Reported

VANDENBERG AFB, CA (Western Test Range)

11-13-75 MINUTEMAN/SAC
11-14-75 MINUTEMAN/INSTANT ICBM
12-4-75 USAF TITAN II/ICBM
12-4-75 SATELLITE LIFTED IN ORBIT/TITAN III BOOSTER
12-5-75 DUAL AIR DENSITY/pmk Vandenberg AFB (WLOD, A-3);Kennedy Space Center(A-2, MIL S-10);Ascot,Berks(WNK S-104);Santiago Chile(AGO S-102);Greenbelt, MD (GSC C-1);USPS 236(1angley)
12-11-75 UTE-TOMAHAWK/EXPERIMENTAL SPACE PROBE
12-16-75 BOMARC TARGET/MISSILE DESTROYED
12-17-75 SAC/MINUTEMAN 3/INSTANT ICBM
1-8-76 MINUTEMAN-3/ADVANCED BALLISTIC/RESEARCH/MISSION
1-29-76 MINUTEMAN/INSTANT ICBM
2-6-76 SAC/LAUNCHES/MINUTEMAN-3

PALESTINE, TX (Balloon Site)

1-12-76 MEASURE TRACE GASES. TO DETERMINE THE IMPACT OF SST EFFLUENTS/12:56 PM
1-17-76 APPARATUS TO/FREEZE OUT HALA CARBONS AT 95,000 ft

EDWARDS, CA (Dryden Flight Research Center)

9-24-75 YF-12 FLIGHT 52/CREW FITZ FULTON VIC HORTON
9-24-75 F-15 R.P.R.V./FLIGHT D-19-29
9-29-75 F-111 SUPER CRITICAL/WING FLIGHT 78/CREW STAN BOYD RON GRABE
10-1-75 F-111 SUPER CRITICAL/WING FLIGHT 79/CREW E. ENEVOLDSON R. GERDES
10-3-75 F-111 SUPER CRITICAL/WING FLIGHT 80/CREW STAN BOYD RON GRABE
10-8-75 F-111 SUPER CRITICAL/WING FLIGHT 81/CREW RON GRABE E. ENEVOLDSON
10-9-75 B-1 STRATEGIC BOMBER FLIGHT 18/CREW CHARLIE BOCK DOUG BENEFIELD
10-10-75 F-111 SUPER CRITICAL/WING FLIGHT 82/CREW FITZ FULTON E. ENEVOLDSON
1-16-75 SUPER HIPPO
10-21-75 X-24B/PILOT SCOBEE/FLIGHT NO. B-32-45
10-24-75 FLIGHT 1-19/FLYING QUALITIES/AND FLUTTER EVAL/B-1
10-31-75 X-24B/FLIGHT CANCELLED/WET LAKE BED/PILOT MCMURTRY/FLIGHT NO. B-33-46
10-31-75 FLIGHT 1-20/FLYING QUALITIES/AND FLUTTER EVAL/B-1
11-3-75 X-24B/PILOT MCMURTRY/FLIGHT NO. B-33-46
11-7-75 FLIGHT 1-21/FLYING QUALITIES/AND FLUTTER EVAL/B-1
11-11-75 NASA 747/CONTINUES WAKE/VORTEX STUDY/FUTURE SPACE/SHUTTLE FERRY
11-12-75 X-24B/OILOT EINAR ENEVOLDSON/FLIGHT B-34-47
11-19-75 X-24B/PILOT CAPT DICK SCOBEE/FLIGHT B-35-48
11-19-75 FLIGHT 1-22/PITCH EXCITER/AND FLUTTER EVAL/B-1
11-25-75 FLIGHT 1-23/ABORT/HYDRAULIC/SYSTEM FAILURE/B-1
11-26-75 X-24B/LAST FLIGHT/PILOT MCMURTRY/FLIGHT B-36-49
11-26-75 FLIGHT 1-24/MACH 1.6 ATTAINED/WITH FIXED INLET/D-1
12-3-75 NASA'S 747/CONTINUES WAKE/VORTEX STUDY/FUTURE SPACE/SHUTTLE FERRY
12-10-75 NASA'S 747/CONTINUES WAKE/VORTEX STUDY/FUTURE SPACE/SHUTTLE FERRY
12-11-75 NASA'S 747/CONTINUES WAKE/VORTEX STUDY/FUTURE SPACE/SHUTTLE FERRY
12-16-75 NASA'S 747/CONTINUES WAKE/VORTEX STUDY/FUTURE SPACE/SHUTTLE FERRY
12-19-75 FLIGHT 1-25/TERRAIN FOLLOWING/AND PERFORMANCE/B-1
12-19-75 FLIGHT 1-45/RETURNS FROM TESTS/AT YUMA, ARIZONA

KENNEDY SPACE CENTER (Eastern Test Range)

11-5-75 LAUNCH/AEROSTAT BLIMP
11-19-75 ATMOSPHERE EXPLORER-E/pmk Kennedy Space Center(MIL S-10);Patrick AFB; USPS 823(GDS S-11);Waimea,HI(HAW S-13);Ascension(ACN S-100);St David's Island, Bermuda(BDA S-101);Santiago,Chile(AGO S-102);Greenbelt,MD(GSC C-1)
12-12-75 RCA SATCOM-A/pmk Kennedy Space Center(MIL S-10);Waimea, HI(HAW S-13); Agana,GU(GWM S-15);Greenbelt, MD(GSC C-1);Patrick AFB, FL.
1-15-76 HELIOS-B/pmk Kennedy Space Center(A-2,MIL S-10);Titusville-Astronaut Trail Sta;Waimea,HI(HAW S-13);Agana,GU(GWM S-15);St David Is,Bermuda(BDA S-101); Quito,Ecuador(QUI S-103);Madrid,Spain(MAD S-105);Greenbelt,MD(GSC C-1); Wessling,Germany;Bad Monstereifeil,Germany;Weilheim,Germany;Koln,Germany; USPS 327 2-18-76(Vanguard-note on this on another page)
1-19-76 CANADIAN TECH SAT-1/pmk Kennedy Space Center(A-2,A-3,MIL S-10);Titusville Astronaut Trail Sta;Barstoe, CA(GDS S-11);Agana,GU(GWM S-15);US Navy FPO 09560(BDA S-101);Madrid,Spain(MAD S-105);Greenbelt,MD(GSC C-1)
1-29-76 INTELSAT-IV-A F-2/pmk Kennedy Space Center(MIL S-10);St David Is,Mermuda (BDA S-101);Freeport,Bahama (E-100)
2-19-76 MARISAT-A/pmk Kennedy Space Center(MIL S-10);Titusville Trail Sta;Waimea, HI(HAW S-13);Agana,GUam(GWM S-15);US Navy 10958BR,St David,Bermuda(BDA S-101);Greenbelt,MD(GSC C-1);Oxnard,CA(Santa Paula Station);Bridgeport, CT(Southbury Station)

KOUROU, FRENCH GUYANE (CNES)

None Reported

KIRURA, SWEDEN (ESRO)

1-22-76 NIKE TOMAHAWK

ANDOYA, NORWAY (Andoya Rocket Range)

2-1-76 NIKE THOMAHAWK/(Range cachet and details in hand writing)

CHURCHILL RESEARCH RANGE

2-11-76 LAUNCH/(no details-Range sticker cachet)

WOOMERA AUSTRALIA LAUNCHES

4-18-73 SUCCESSFUL SKYLARK LAUNCH
4-18-73 SUCCESSFUL SKYLARK LAUNCH
4-19-73 SUCCESSFUL UAR LAUNCH
4-19-73 UAR ROCKET FLOWN/COCKATOO ROCKET/UPPER ATMOSPHERE
6-18-73 UAR ROCKET LAUNCH
9-19-73 SUCCESSFUL/KOOKABURRA LAUNCH
9-19-73 UAR LAUNCH
11-2-73 ROCKET: 13.103 UG/ACTUAL PEAK: 108.6 MILES
11-2-73 ROCKET 13.065 UG/ACTUAL PEAK 103.0 MILES
11-10-73 AUSTRALIAN AEROBEE CAMPAIGN/ROCKET 13.105 UG/ACTUAL PEAK: 108.8 MILES
11-10-73 AUSTRALIAN AEROBEE CAMPAIGN/GENERATOR DOWN FOR 70 MINUTES
3-20-74 SUCCESSFUL LAUNCH/NEW TYPE ROCKET: LORIKEET
9-5-74 LAUNCH OF UPPER ATMOSPHERE/ROCKET "A"
9-5-74 "A"/SUCCESSFUL/UAR LAUNCH
9-6-74 SUCCESSFUL LAUNCH 6.9.74 OF NEW TYPE/ROCKET: JABIRU-I
9-6-74 SUCCESSFUL LAUNCH ON 6.9.74 OF NEW TYPE/ROCKET: JABIRU II
9-12-74 "A"/SUCCESSFUL/UAR LAUNCH
9-12-74 SUCCESSFUL LAUNCH OF/AUSTRALIAN DESIGNED/A-1 ROCKET
10-30-74 4 F-111's WHIP INTO SOUTH AUSTRALIA/BOMBING PRACTICE
1-28-75 BRITAIN FIRES NEW ROCKET/MEADOWLARK
3-18-75 SUCCESSFUL RECOVERY OF THE PAYLOAD OF A SKYLARK/ROCKET
4-28-75 ROCKET TEST/UPPER ATMOSPHERE RESEARCH
5-29-75 UAR/SUCCESSFUL UPPER/ATMOSPHERE TEST
6-24-75 SUCCESSFUL/UAR LAUNCH

SPECIAL EVENTS/POSTMARKS/CACHETS

2-10-75 SOYUZ 17 LANDS/pmk Adelaide, Australia
3-15-75 HELIOS-A/FLIES WITHIN 45 M Km OF THE SUN/pmk Adelaide, Australia
3-16-75 MARINER 10/FINAL PHOTO TAKING SWEEP PAST MERCURY/pmk Adelaide, Australia
5-26-75 RUSSIANS IN ORBIT ON BOARD SOYUZ 18/pmk Adelaide, Australia
5-26-75 SUCCESSFUL DOCKING SOYUZ/WITH SALUT 4/pmk Adelaide, Australia
7-22-75 SOYUZ 19/LANDS SAFELY/pmk Adelaide, Australia
7-28-75 SOYUZ 18/LANDS AFTER 63 DAYS/pmk Adelaide, Australia
8-12-75 5th SPACELAB EXPERIMENT/SIMULATED SPACE MISSION/pmk Marshall SFC
8-22-75 SPECIAL SPACELAB INTEGRATION TESTS/pmk Marshall SFC
8-27-75 SECOND VIKING MISSION TO MARS/CARRIED IN VIKING A SPACECRAFT/1ST "TURN AROUND" ROLLOUT CONVEY FROM SAEF-1 AT KSC/pmk Orlando, FL KSC
9-8-75 Same as above except date is 5/6 September and different time
9-29-75 GULFSTREAM II SHUTTLE TRAINING AIRCRAFT/pmk Bethpage, NY
10-7-75 HELIOS-B PROBE/ARRIVES AT CCAFA/pmk Cape Canaveral
11-18-75 SPACE SHUTTLE WIND TUNNEL TEST/pmk Moffett Field, CA
11-22-75 POLARIS A3/TEST FIRED/HMS REVENGE/11:00 AM
11-13-75 FD-LPEX/SPACE EXPLORATION FMF TRAVEL LOPO FDC/pmk Brookfield, IL
12-4-75 TENTH ANNIVERSARY/GEMINI VII/FMF LOCAL POST/pmk Cape Canaveral
12-12-75 GULFSTREAM II/SHUTTLE TRAINING AIRCRAFT/pmk Calverton, NY
12-15-75 TENTH ANNIVERSARY/GT-6/FMF/FIRST DAY/pmk Houston, TX
2-12-76 SPACE SHUTTLE/WIND TUNNEL TEST/pmk Moffett Field, CA(Hand Cancel in Red)

Covers were cancelled from several Russian cities for ASTP, but the only cover reported from a ship was on Oct 10, 1975, Odessa, had been sent to the KOMAROV.

The Voyages of Apollo: The Exploration of the Moon by Richard S. Lewis
Written by Eugene Bella

If you had more than just a passing interest in the manned Apollo flights to the moon, then you'll want to read "The Voyages of Apollo: The Exploration of the Moon", by Richard S. Lewis.

Lewis is no rookie to the space scene, having written "Appointment on the Moon", a history of the space age up to Apollo 11, to which "The Voyages of Apollo" is a sequel.

Starting with the pre-Apollo reconnaissance programs of Ranger, Surveyor, and Lunar Orbiter, Lewis narrates each of the seven lunar landing voyages in sequence, including the near-disaster of the Apollo 13 flight of April, 1970.

Lewis presents all of the arguments that attempt to solve the "cosmogenic conundrum", or the evolution and origins of the Moon. But even with the completion of Project Apollo, the controversy remains.

The legacy of Apollo is incalculable, with only 5% of the 840 pounds of rock and soil having been examined and with thousands of photographes yet to be scrutinized.

"The Voyages of Apollo" examines each lunar landing, citing some of the "unusual experiences" of the crews that most of us have probably forgotten, and which the history books will never record. These include: the lightning strike of the Apollo 12 spacecraft, shortly after launch; the failure of the television camera also during "12"; the real reason for the failure of the oxygen tank no. 2 on the Apollo 13 mission (it was dropped when it was removed from Apollo 10 service module 106 for modification and poor quality of ground testing did not discover the problems on the pad); the golf balls hit by Shepard on "14" with his makeshift golf club, or the thumper experiment which never really did work right on that mission.

Apollo 15, when the front steering on their "Rover I" failed on Saturday, but then on Sunday morning was repaired, to this day no one is sure how, Commander Scott reporting: "You know what I bet you did last night, Joe? You let some of those Marshall guys come up here and fix it, didn't you.?"

Apollo 16, with Charlie Duke spilling his breakfast orange juice in his hair: "I wouldn't give you two cents for that orange juice as a hair tonic". Or as Commander John Young and Duke set up the American flag. Capcom relayed the Senate vote the Space Shuttle, 277 to 60 which was mighty good news to space buffs wround the country.

Apollo 17, the discovery of orange soil on the Moon (leftover Tang?) and the plaque on the leg of the Lunar Module, showing each of the six landing sites.

Lewis presumes that the reader has some knowledge of the space program and this book is definitely for the para-scientific type. Lewis gives ample references where further information can be found after each chapter, some more readily accessible than others. The photographs, all in black and white, do not add much to the volumn.

Lewis seems to shy away from the political aspects of flying to the Moon, and certainly does not force justification for the program upon the reader.

Lewis appears not to be entirely sure of the meaning of the acronym MESA: at one point calling it the "modular equipment stowage assembly", and later referring to it as the "modularized equipement stowage area". And at one point, we see Apollo 15 being launched on June 26, 1971, a full month before the event. Little errors creeping in, but nevertheless distracting to the space buff, the reader for which the book appears to have been written.

If you understand the jargon of the NASA moon landing program, then you'll enjoy this book. And if you want to learn some of the scientific results of the Apollo program, then THE VOYAGES OF APOLLO is for you.
(Quadrangle/The New York Times Book Co., 308 pp., plus photographes, $12.50)

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President Ford proposed spending $1.4 billion this coming year to keep the new space shuttle rocket plane on schedule. Ford's $3.7 billion space agency spending plan for 1977 is 4 per sent higher than the 1976 budget. Unlike last years budget, included is funds to begin work on a new space program, a satellite to study the sun during its period of peak activity in 1979-1980. Start of a satellite to map earth's magnetic variations with a eye toward a mineral exploration payoff. The budget proposal postpones for one year the start of manufacture of a third space shuttle. It also delays start of an orbiting space telescope and a satellite and probe of Jupiter.

WEATHER AND LIGHTNING SUPPRESSION AT KSC by Tim Cash
(Courtesy NASA News Center document of June 14, 1975)

Starting in 1969 shortly after the Apollo 12 incident (lightning) striking the spacecraft) NASA asked the NOAA (National Oceanic and Atmospheric Administration) our help in the lightning at launch site problem. The NOAA lightning measuring problem involves three tasks: (1) Measuring the thresh-hold electric field which induces lightning strikes; (2) Measuring of the electric field both at ground level and aloft; and (3) Dissipating the incipient electric fields that attract lightning strikes after the spacecraft is launched.

The method of measuring the electric field on the ground was solved quite simply by modifying standard equipment. For measuring the electric fields while aloft; a pilo less aircraft is used. The solution to the problem of dissipating the electric field around the spacecraft involved rockets at first (The Mighty Mouse Program) until we arrived at our present solution.

At the NOAA experiments in Colorado in 1973, it was found that when millions of tiny needles were dropped inside a storm cloud, the needles would be able to produce Corona and discharge the electricity. The needles were thinner than a human hair and made of Fiber glass coated with aluminum.

The experiments were successful and this method is not standard practice with NASA and the NOAA.

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NASA's Large Space Telescope (LST), a multi-purpose optical teiescope scheduled for launch into Earth orbit in the early 1980s, will enable scientists to gaze deep into space-seven times farther than ever before and possibly to the outer edges of the universe. Because it will be in orbit above Earth's hazy and turbulent atmosphere, the LST will see the heaves clearly. Scientists expect the LST to add significantly to man's ability to observe the universe.

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An invention that may improve radar tracking and communications with spacecraft has been patented by Prof. Malvin G. Teich. The discovery may also be used to detect and analyze air pollutants and gases existing in outer space. The system offers greater sensititivity and cuts down on the interference, of "noise" that now plagues radar and space communications receivers. The new design works by automatically compensating for the Doppler effect which distorts signals received from rapidly moving objects. The Doppler effect also causes a shift in the radar signals that bounce back from an airplane, spacecraft or satellite as it passes overhead. In Teich's system, radar sets send out two signals rather than one, with a fixed and known difference in modulation between the two. The "difference signal" will also appear when the two signals bounce back to the radar receiver. Since the receiver must pick up only one sonstant signal, it can be made much more sensitive than conventional radar and will not receive interference from other frequencies. The invention is applicable to microwave infrared or laser radar and communications systems.

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Copernicus, the U.S. space agency's satellite observatory, is scanning three stars for possible laser signals from other civilizations. Copernicus already has searched the star Epsilon Eridani and will scan Tau Ceti and Epsilon Indi this summer and fall.

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Fishing vessels, reasearch ships, airplanes, oil platforms and space satellites are to be combined in a giant cooperative effort to assess the marine enviroment of the Gulf of Mexico. The mission is sponsored jointly by NASA and the Commerce Department, National Oceanic and Atmospheric Adminisration (NOAA). In conducting it over a Period of 18 months, they will bring together as participants a commercial fishing fleet of some 70 vessels, three oceanographic research ships, a low-slying "spotter" band of nearly 40 aircraft, several medium-altitude planes, four marine oil platforms, two LANDSAT satellites and a weather satellite. The operational base for the experiment will be NASA's National Space Technology Laboratories (NSTL) at Bat St. Louis, MS, where federal and state cooperating agencies are located. The installation provides computer, laboratory, logistics and technical service. Goddard Space Flight Center, which operates the LANDSAT spacecraft and processes the data, will serve in a supporting role.

UFO

In a recent television interview Dr. Allen Hynek, Astronomer, Northwestern University discussed UFO's. In 1948 Dr. Hynek was teaching astronomy at Ohio State University, when the Air Force called for his assistance. Dr Hynek stated of the sightings made, four fifths can be explained and since 15,000,000 have been reported this leaves 3,000,000 we have no answer for. No bolt or nut hardware has ever been recovered, but burn marks of UFO's have been examined. Dr. Hynek is the person first using the word "swamp gas" and has saw UFO's and photoes of them. The Apollo 13 astrouants saw something and could be explained as space junk. Most sightings come in waves, in different parts of the world, not counting China and Russia. Sightins are mostly made between 2 and 3 am. Dr Hynek reports the people picked up by UFO's are not lieing, but do very much believe what they tell. Dr. Hynek is head of a UFO center investigating UFO's and at the present has 80,000 entries. If you have any to report, send to; UFO, Box 11, Northfield, Ill 60293.

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EDWARDS CAPER by Bob Ekas

Much has been said about the cover service from Flight Research Center at Edwards AFB and very little of it has been good. The latest dissatisfaction is with the special cover for the last flight of the X-24B. I understand many collectors had their covers returned unserviced stating they were received late. Your writer and I know of one other collector, when covers were returned, the service fee was not. A letter was also enclosed stating if one wanted to buy a cover, it would cost $1.00

Copies of two letters were sent to your writer and have the signature of Don Black. We either have two Don Black's at Flight Research Center or someone is signing his name as they do not match.

One letter gives dates of X-24B covers being sent on these dates; 7-28-75, 8-14-75, 9-3-75, 9-18-75, 10-2-75, 10-16-75, 10-29-75, 11-4-75, and 11-20-75. In my records I cannot find X-24B flights on these dates. I do find on 8-13-75 an F-111 flight and 11-3-75 and 11-19-75 X-24B flights.

One letter states Flight Research Center Exchange serviced covers for over 200 people, but didnot give the total amounts serviced.

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This information should have preceded the above Edwards Caper. The Flight Research Center at Edwards, California is now named Hugh L. Dryden Flight Research Center. Dr Dryden was Director of the National Advisory Committee for Aeronautics from 1947 until it became NASA in 1958. He was a Deputy Administrator until his death in 1965.

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NEW PUBLICATION

A new space philatelic publication was issued on February 11. The new publication, "THE GRAND TOUR" is being edited and produced by Eugene Bella of Sout Bend, IN. Bella has produced the "Space Primer", a supplement to the Space Primer was released by Bella in February 1975.

Bella is active locally in the Northern Indiana Philatelic Society, serving as treasure in 1974, currently secretary, and has been editor of its' publication THE STAMPAZINE. He is a frequent contributor to THE ASTROPHILE, THE EXPLORER and THE DISH. Bella has also contributed to LINN'S WEEKLY STAMP NEWS.

The February issue of THE GRAND TOUR is available for $1, postpaid via 3rd class mail. First class is 22¢ extra. Subsequent single issues are 75¢ postpaid third class, weighing not less than two ounces. Yearly subscriptions are $7.50 third class and $8.50 first class. Interested collectors may write to Eugene Bella, 4927 York Road, South Bend, IN 46614 for further information.

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Eskimos and Indians who live in remote villages in Alaska, will substitute the phone for dogsled messenger service and other means of communication as soon as they learn how to use a phone. A public phone is being installed in each of 161 villages with 25 or more persons, aided by the new RCA Satcom I domestic communications satellite, the electronic relay station in the sky. An illustrated booklet is being published with instructions in several native languages, dialects and English.

WHAT'S YOUR SPACE SHUTTLE I. Q.?

(This was submitted by Eugene Bella and is from the International Telephone and Telegraph Corp. (ITT)

1. The Space Shuttle craft proposed by NASA would be about the size of: (a) a Piper cub; (b) a hot water heater; (c) a DC9 aircraft; (d) a Caribbean cruise liner; (e) a compact station wagon.
2. Payload, or the object carried by the Shuttle into orbit, can be up to how many feet in diameter: (a) 1.75 ft.; (b) 60 ft.; (c) 14,387 ft.; (d) 6.5 ft.; (e) 15 ft.
3. Length of that payload can be as much as: (a) 147 ft.; (b) 283 ft.; (c) 17.4 ft.; (d) 60 ft.; (e) 3.5 ft. providing supporting booms are used.
4. The Shuttle will be equipped and supplied to operate in earth orbit for: (a) 63 orbits; (b) 1 week; (c) 4 days; (d) indefinitely; (e) just long enough to release its payload
5. The John F. Kennedy Space Center is responsible for desigh of launch and recovery facilities for the Shuttle. ITT's Federal Electric Corporation, prime contractor at KSC, supports NASA in the fields of computation, measurements, telemetrics and: (a) landscaping; (b) consultation; (c) communications; (d) logistical analysis (e) prognostic indicators.
6. America's first satellite, Explorer 1, cost $100 thousand per pound to put into orbit. A pound of payload, using the Space Shuttle system, will be put into orbit at a cost of: (a) $10,282; (b) $4,050; (c) $800; (d) $1,000; (e) $100.
7. The Space Shuttle has been called "a flying service station". One prime use seen for the Shuttle is: (a) repair and maintenance of satellites in orbit; (b) a radio reference point for interstellar navigation; (c) a flying tanker to refuel intergalactic rockets; (d) a new outpost for motor clubs; (e) an orbiting "tow truck" for assisting future Mercury and Gemini flights.
8. Fully fueled and ready for launch, the projected weight of the Shuttle on the pad will be about: (a) 17 tons; (b) 100 million pounds; (c) two tons; (d) 4.7 million pounds; (e) 1.1 million pounds.
9. The Shuttle will take off like a rocket, orbit like a spaceship and land like an airplane. It consists of these stages: (a) launcher and retriever; (b) booster orbiter; (c) pusher and puller; (d) shooter upper and bringer downer; (e) articulated first stage and configurated retropackage.
10. The orbiter will be powered by three engines, with propellants carried in an outside disposable tank. These propellants are: (a) oxygen and hydrogen; (b) compressed air and carbon dioxide; (c) baking soda and vinegar; (d) gasoline and bottled gas; (e) highly refined kerosene.
11. Sixty foot-plus long hatches on the back of the orbiter will open up wide in orbit to facilitate: (a) gathering of upper air samples; (b) measurement of rainfall over Canary Islands; (c) unloading and deployment of spacecraft; (d) in-flight repairs; (e) collection of asteroids for scientific analysis.
12. Equipment and supplies for normal missions will last for a week, but a longer mission can extend to: (a) 8 days; (b) 158 days; (c) 92 days; (d) 30 days; (e) 120 days
13. The Shuttle is called a multipurpose vehicle because it can serve, among others, this need: (a) replace almost all present expendable launch vehicles, military and civilian; (b) ferry passengers and freight between earth and orbiting laboratories; (c) space rescue missions; (d) none of these; (e) all of these.
14. To pilot and operate this huge vehicle from launch to orbit to splashdown, this size flight crew will be needed: (a) 14 people; (b) two people; (c) 33 people; (d) 70 people; (e) zero people, flight will be automatic.
15. The orbiter will normally carry two passengers, in addition to the crew. With special passenger modules, the number of passengers will extend to more than: (a) 120; (b) 300; (c) 4; (d) 6; (e) 12.
16. The Shuttle will provide a shirtsleeve atmosphere for passengers and crew. By this is meant that: (a) shirts and ties will be required at all dinner meals: (b) shirts and ties will be worn for maunch and reentry but ties may be removed during orbit; (c) a pressurized compartment will allow wearing normal street clothing; (d) astronauts must follow a strict dress code; (e) each mission will have a laundry on board.

17. The shirtsleeve environment would allow scientists, doctors, artists and photographers their first real chance to fly into space because: (a) there would be room for anyone wanted to go; (b) physical stamdards of health could be ignored; (c) it would be a pleasant change for the crew; (d) no special flight training would be necessary for passengers; (e) stewardesses would serve four meals a day.
18. Marshall Space Flight Center has responsibilities for design of the booster stage and for Shuttle main engine. ITT's Federal Electric Corporation, working at MSFC under a reliability contract, has helped NASA achieve an Apollo program reliability of: (a) 73.559 percent; (b) 99.999 percent; (c) 87.3004 percent; (d) 112 percent; (e) 20 percent.
19. Development costs for the Space Shuttle have been estimated at this fraction of the cost of the Apollo program: (a) 1/4; (b) 1/3; (c) 1/2; (d) 15/16; (e) 3/4.
20. The booster which launches the orbiter carries a crew of: (a) 4; (b) 0; (c) 8; (d) 1; (e) 14.
21. One prime benefit of the Shuttle is the fact that it can be brought to earth safely and reused. It returns to earth by: (a) landing it like an aircraft; (b) special hydrogenated parachute packs; (c) splashdown in the ocean on 14-foot diameter neoprene "donuts"; (e) air-to-air pick up by conventional aircraft.
22. The Shuttle will be operational by the end of this decade. Actual development is expected to take: (a) one year; (b) six years; (c) nine years, three months; (d) nine years, six months; (e) ten years.
23. The Space Shuttle is seen as encouraging international participation in space flight in that: (a) it will cross international boundaries in orbit; (b) controls will be labeled in eight languages; (c) foreign nations will buy Shuttle craft; (d) each menu served on board will feature exotic meals; (e) foreign observers can ride with no flight training.
24. On its return from orbit the Shuttle will be supported in the atmosphere by: (a) balloons; (b) retro rockets; (c) wings; (d) thrusters; (e) steam jets, which use moisture taken from the atmosphere.
25. To accommodate the returning Shuttle craft, Kennedy Space Center engineers are planning a gigantic runway north of the Moonport. It will be 300 feet wide, and its length will be: (a) 1,500 ft; (b) just under 15 miles; (c) 1.5 miles; (d) 15,000 ft; (e) 4.8 miles.

HOW DID YOU SCORE? 25 right, Aerospace genius! 20-24 right, Aerospace expert.
15-19 right, Aerospace leader. 10-14 right, Aerospace whiz.
5-9 right, Aerospace authority. 0-4 right, Aerospace inquirer.

ANSWERS: 1. c; 2. e; 3 d; 4. b; 5. c; 6. e; 7. a; 8. d; 9. b; 10. a; 11. c; 12. d; 13. e; 14. b; 15. e; 16. c; 17. d; 18. b; 19. a; 20. b; 21. a; 22. b; 23. e; 24. c; 25. d.

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COMMENT: In the February 21st issue of Western Stamp Collector on page 4 under "Collectors' Voice" was a letter about the rip-off of some foreign countries issuing Bicentennial stamps and covers and when it comes to the UN, that is a different matter and all is wanted is the US dollar. This is not just a Bicentennial matter, but has been going on for years with stamps and covers for the US Space Events. Some of these countries do not have a thing to do with Space and am sure some people in these countries do not know men have landed on the Moon. These same countries also capitalize on the Russian space events.

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The first weather satellite, the TIROS-1 (Television Observation Satellite), was launched by a Thor-Able rocket from Cape Canaveral, FL on April 1, 1960. Since then, 30 experimental and operational weather satellites have been launched to test additional instrumentation or to use newly developed and proven techniques for more accurate forecasting.

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A psychic Clarisa Bernhardt has predicted, America's space probe to Mars will discover that the planet was once inhabited by an advanced civilization.

THE DISH
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Dear Space Collector:

You will note this issue is 22 pages and this is a smaller issue than normal. In the future this will probably be the size. Past issue had been 24 pages and when making the September Dish and taking to the postoffice it was discovered the weight was over two ounces. A quarter inch had to be cut off the sides in order to reach the two ounces and in inquiring found printers can no longer rely on paper weigh being uniform.

For future issues would like articles from some of you readers. This need not be a full page and count 84 spaces per line and 60 lines to the page including title.

For those of you having purchased the Directory of Addresses and Installations, a three page Supplement is now available. This Supplement gives all additions and changes per page and no cost outside of sending your addressed stamped envelope. A stamp or two would be appreciated but not necessary.

If a RED CHECK (√) is on the address label, this indicates you have not paid for 1976. If a figure is with the check, indicates the balance you have from 1975. Please send payment at once as of next mailing those not paid will be crossed off the files.

As this is being wrote INTERPEX is a little over two weeks away and once again I hope to see many of you.

GOOD COLLECTING

Sincerely,

Bob

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A 10-foot-wide mirror that was to serve as a lens for the world's largest infrared telscope cracked during testing in what could turn out to be one of the most expensive mishaps in the history of astronomy. The mirror cracked on a test table at Arizona's Kitt Peak National Observatory. It was being readied for a long grinding process before being shipped to Hawaii's Mauna Kea Observatory and fit into a $6-million infrared telescope which the National Aeronautics and Space Administration is building there. The crack entens completely through the 30-inch-thick mirror and about 40 inches across. The mirror is made of a trademarked material called Cervit, a glass-ceramic composite that does not expand or contract in extreme heat or cold. It is a popular mirror material among the world's astronomers, who have ordered it for telescopes built over the last five years in Chile, Hawaii and Australia. It was ordered orginally by the space agency as a possible mirror for the large space telescope, which is to be carried into earth orbit by the space shuttle sometime in the next decade. Loss of the $500,000 mirror almost surely means that Mauna Kea telescope will not be operating by the spring of 1977.

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The engineers and scientists responsible for the Soviet Unions Venera 9 and 10 probes of Venus have accomplished some very remarkable feats. They have secured the first photographes of the planetary terrain.

(The following is a Press Release (in part), Statement of Gerald M. Truszynski, Associate Administrator for Tracking and Data Acquisition, NASA, before the Subcommittee on Space Science and Applications of the Committee on Science and Technology, U.S. House of Representatives)

Support is provided for manned and unmanned flights; for spacecraft, sounding rockets, and aeronautical research aircraft; for earth-orbital and suborbital missions, for lunar missions; and for space probes to the distant planets. Major types of support provided include (a) tracking to determine the position and trajectory of vehicles in space, (b) acquisition of scientific and engineering data, (c) transmission of commands from ground stations to spacecraft, and (d) processing of data acquired from the space vehicles. Such support is essential for achieving the scientific objective of all flight missions, for executing the critical decisions which must be made to assure the success of these flight missions, and, in the case of manned missions, to insure the safety of the astronauts.

The major portion of the support rendered the flight programs is provided through the facilities of two world-wide tracking networks: the Spaceflight Tracking and Data Network (STDN) and the Deep Space Network (DSN). The stations of these networks are interconnected by a network of ground communications links, utilizing land lines, undersea cables, and communication satellite circuits which are leased from domestic and foreign carriers and which provide the capability for instantaneous transmission of data and critical commands between spacecraft and the control centers in the United States from which the flights are directed.

Since last November our operational activities have remained at a high level. The networks have continued to support an average of some fifty spacecraft previously launched as well as several new launches. VIKING-a major mission included in the ongoing workload. The Deep Space Network is providing continous support to the two Viking spacecraft. Included in the ongoing workload are six PIONEER spacecraft, designated Pioneer 6 through 11. The Pioneer 10 spacecraft is now over 1.4 billion kilometers from Earth. The Atmosphere Explorer-5 (AE) along with the AE-3 and 4 spacecraft, places demanding requiements on the network systems. HELIOS-B has significantly increased the workload on the Deep Space Network. Helios is the largest scientific project ever conducted as a ccoperative project by two nations, the United States and the Federal Republic of Germany. The network must provide simultaneous support to Helios-A and B as the spacecraft orbit the Sun.

An example of long term support, is the Laser Gepdynamic Satellite (Lageos) scheduled for launch in April. Lageos will be placed in Earth orbit to act as a stable geodetic reference for ground observations being made in support of NASA's earth dynamics programs. To make the necessary ground observations, we will deploy a complement of laser tracking systems, principally in the continental United States. The laser systems will be mobile so that during a given year they can track Lageos for short periods from many selected locations around the world. Later, these laser systems will be used to support the Seasat mission which is scheduled for launch in 1978. These systems will provide highly accurate tracking data needed to calculate a precise orbit for the Lageos satellite. In turn, the precision orbit indicates where the satellite is at any time, allowing it to become the desired geodetic reference. Once this reference has been established, any changes in tracking measurements from those predicted by the orbit computation may be indicative of motions of the Earth surface on the order of a few centimeters. By tracking Lageos for a period of several years, characteristics of these motions can be determined, and perhaps correlated with earthquakes and other earth dynamics phenomena.

Major upcoming missions, High Energy Astronomy Observatory (HEAO), International Ultraviolet Explorer (IUE), Mariner Jupiter/Saturn '77 (MJS), Pioneer Venus, and Space Shuttle.

The proposed Tracking and Data Relay Satellite System (TDRSS) is a significant capability in our future plans. It will consist of two or more specialized communications satellites in geosynchronous orbit and a ground terminal in the continental U.S.

T carry on our program activities in FY 1977, a total of $258 million is requested in the Research and Development (R&D) Appropriation. Of this $206.8M is needed for network operations, including the related data processing and communica-

tions services. For systems implementation an amount of $42.5M is required and $8.7M is needed for our advanced systems activities.

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