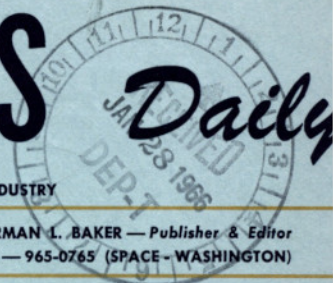


SPACE BUSINESS



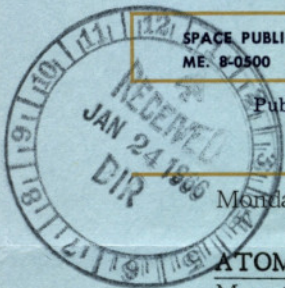
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ATOM PICKED FOR AA-AOSO ROLE.

The **APOLLO** Telescope Orientation Mount (**ATOM**) (*SPACE Daily*, Sept. 23 & 27) is scheduled to carry the **AOSO** experiments on the Manned Solar Observatory Missions (MSOM) of the **AA** (**APOLLO** Applications) program (*SPACE Daily*, Jan. 21). The **AOSO** program was recently cancelled by NASA (*SPACE Daily*, Dec. 16).

ATOM (which some officials prefer to call **ATM** even though it conflicts with Anti-Tank Missile), the result of a Ball Brothers unsolicited proposal which prompted a \$117,175 NASA study contract, is a mounting spar attached to the top of an extension mechanism in the experiments sector of the **APOLLO** Service Module. While in space, the mechanism extends the **ATOM** out of its compartment where the mounting spar can be rotated 360 degrees, with a 40- to 60-degree elevation.

Some of the **AOSO** experiments are fully designed and some have just reached the definition stage, but all of them have been proven feasible. The use of the **ATOM** system would require the redesign of several of the experiments to some extent.

The use of the **ATOM** instead of **AOSO** would provide some advantages and some disadvantages. Because it is a manned flight, the **ATOM/AOSO** concept would have a much higher data return because photographic film would be used rather than a photoelectric telemetry system, as envisioned for **AOSO**. The manned system would also provide a greater observational selectivity. On the other hand, the **ATOM/AOSO** system would have the major disadvantage that it would not provide the continuous monitoring which was one of the major objectives of the **AOSO**. Even during the flight it would not be possible to monitor the Sun's events continuously due to the requirements of the astronaut's work and sleep schedule, and small quantities of film carried and the limited amounts of fuel carried for attitude stabilization. In order to provide the capability for continuous monitoring, the **AOSO** had been planned for a polar, Sun-synchronous orbit, which the manned **ATOM/AOSO** flights will not be able to achieve.

The Option After AOSO.

The cancellation of **AOSO** left solar physics program officials with four possible options. The best possibility, if the **AA** program receives sufficient funding in the next several years, will be the **ATOM** system on **AA** flights. Another possibility would be to include some of the **AOSO** experiments on future **OSO** flights (*SPACE Daily*, Jan. 21). The **OSO** spacecraft is limited however by its lack of an accurate pointing ability and a limited data return capability. A third option would be to include some of the **AOSO** experiments on future **OAQ** (Orbiting Astronomical Observatory) flights. This spacecraft is not planned for a Sun-synchronous orbit, however, again limiting the objective of continuous monitoring.

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The fourth option is the desire of many scientists in the solar physics field for a restoration of the **AOSO** project.

POST-APOLLO DECISION MUST COME IN 1967. The House Space Committee's Oversight Subcommittee has been warned that the Administration must decide which direction the national space program is going to take after the manned lunar landing within the next 18 months to two years in order to take advantage of the technological gains which have been made in the **APOLLO** program. Apprehension has been expressed about the dangers of allowing these technological advances to atrophy, necessitating the development of new technology and a loss of both time and money.

A staff report on NASA advanced planning is now being prepared, but it will not be available in time for next month's budget hearings. The report, which contains information from both NASA and DOD management, has been extended to include the opinions of government space contractors and scientists (both pro and con).

FY '67 BUDGET PAYS ONLY FOR APOLLO. The House Space Committee's report on **APOLLO** pacing systems (SPACE Daily, Oct. 21) states that "A corollary finding of this study indicates that limited additional funds of the order of \$200 million over the amount NASA requested in fiscal year 1966 would have provided to NASA increased program alternatives providing additional assurance that a lunar landing will be accomplished in this decade." However, the report concludes that "Given the objective of a lunar landing in this decade, NASA currently is progressing on schedule with the **APOLLO** program. NASA **APOLLO** management is demonstrating maturity of skill and knowledge which is surmounting the complex technological program problems."

It is felt by the committee that even with this year's austere budget for NASA in the neighborhood of \$5 billion, an **APOLLO** lunar landing can still be accomplished in this decade. There is agreement, however, that the budget postpones post-**APOLLO** at least another year (see above). Last July Maj. Gen. Samuel Phillips, **APOLLO** program director in NASA's Office of Manned Space Flight, said that in terms of cost "Our fiscal 1966 budget, as it has been authorized, reflects a spending rate (for the **APOLLO** program) which peaks right now, beginning of fiscal 1966, and which must start down during this fiscal year. The planning that we have been doing, which we have not yet reflected in our budget submissions, shows some further decline in the fiscal 1967 spending rate."

Phillips went on to predict **APOLLO** funding for FY '67 of around \$3 billion, starting the year spending approximately \$250 million a month, decreasing to around \$230 million a month. Overlays of \$260 million a month down to \$240 million a month have been superimposed on the FY '67 structure, allowing for possible **APOLLO** funding requirements. Phillips pointed out that the big question remains, "... will we really be able to turn the cost rate over by the middle of this fiscal year (1966) so that we are actually starting to see a slight decrease month by month in the spending rate. If we can't, in the light of the problems that we are determined to solve, then potentially I have got a problem. I can assure you that we are determined to solve that problem. Yet I feel it is important to bring it to light and to discuss the possibility."

NASA WANTS 26 AA SATURNS. In order to meet the requirements of the full-blown plan for the **AA (APOLLO Applications)** program, NASA needs authorization for 16 additional **SATURN IBs** and 10 **SATURN V** transportation systems, which is only one vehicle short of the presently approved 27-vehicle program and includes six possible vehicles for the AA program. If approved and procured, the additional **SATURNS** would carry the **AA** program for **IB** mission SA-213 through SA-228 and for V missions SA-516 through SA-525. (See present tentative schedule for **APOLLO/AA** flight program as now approved on page 136).

SPACE-GEOGRAPHY/CARTOLOGY AGREEMENT PENDING. An official cooperative agreement between NASA and the Department of the Interior's Geological Survey for the final area in the Space Agency's **APOLLO Applications (AA)** remote sensor program--Geography/Cartology--is being held up in the Air Force, which is consulted on all matters relating to NASA geological efforts. Signing of the agreement is expected in a matter of days.

The Space-Geography/Cartology program was funded by NASA at \$800,000 in FY '66. The Geological Survey received \$525,000 from NASA in FY '66 under a cooperative agreement (SPACE Daily, Jan. 11 & 12) for the Space-Geology/Hydrology program. An additional \$875,000 was transferred for other research work. Other areas of the remote sensor program (SPACE Daily, Jan. 7) and their funding: Space-Oceanography, \$900,000 (SPACE Daily, Jan. 10); and Space-Agriculture/Forestry, \$847,000 (SPACE Daily, Jan. 14).

FAA SATCOM ANTENNA CONTRACT EXPECTED IN APRIL. The satellite communications antenna the FAA is seeking (SPACE Daily, Jan. 4), intended to be used early next year in tests with NASA's Applications Technology Satellite B, to be launched later this year, will be positioned for the **ATS-B** synchronous, 150-degree West longitude position over the Pacific. The antenna will be carried in a 707, DC-8, or DC-7 aircraft that is flying from Alaska to Hawaii, and about 100 hours of instrumented flight will be used to test it with NASA's California ground station.

The antenna RFP, due February 14, calls for a full-size feasibility model. The FAA will choose one or two of these models for development under a contract that will be awarded in April. That contractor will test his antenna at his plant before installing it in the aircraft FAA finally chooses from the above three. Boeing, among others, has developed such an antenna, which is presently being tested on Pan American flights over the Pacific (SPACE Daily, Jan. 13) and which was tested last fall in an earlier version (SPACE Daily, Oct. 25).

KIDDE FIRES RECORD HYDRAZINE MOTOR. Walter Kidde at Belleville, N.J., successfully fired last week its 240-pound-thrust hydrazine engine in a test that involved what is believed to be the largest motor operated to date utilizing the Shell 405 spontaneous catalyst. Other similar Kidde motors have 2, 8, 22, and 50 pounds of thrust. Kidde is the supplier for reaction control systems for satellites such as **EARLY BIRD** and **BLUE BIRD**, launch vehicles such as **BURNER II**, and vehicles such as **ASSET** and **MMU**.

EARLY BIRD IS NOT OFFICIAL NAME. None of the ComSat satellites, proposed or extant, has an official name. The Interim ComSat Committee, the acting agent for the 48-country International Telecommunications Satellite Consortium (for which ComSat is manager), has not endorsed "EARLY BIRD," the name long in use for ComSat's only present operational payload, and it has not even begun consideration of names for the other four satellites the Corporation is procuring or planning. ComSat reports that "EARLY BIRD" has been "accepted but not approved" by the Committee.

Although the failure of the Committee to authorize the name **EARLY BIRD** means it can still originate and promulgate another label, the name will undoubtedly prevail, and the Committee will probably proceed to the problem of naming the other satellites. ComSat has tried to call its **APOLLO**-support spacecraft **BLUE BIRD** (SPACE Daily, Nov. 1), but the Committee looked askance at that move because it had not been consulted (SPACE Daily, Nov. 19). Nonetheless, since the Committee has yet to come up with an alternative name, ComSat is hopeful **BLUE BIRD** will stick (SPACE Daily, Dec. 14). Neither ComSat nor Hughes (**BLUE BIRD** builder) is supposed to use the name until it is endorsed officially. The feeling has been expressed within the Corporation that the name is not really appropriate or fresh enough.

COMSAT PROFUSION INSTILLS CONFUSION (An Analysis). With five payload families now in ComSat's satellite stable, the need for authorized names has become acute. Not only is there the basic problem of conversing about the satellites within the space industry; there is the larger problem for the Corporation's--and Consortium's--various publics of recognizing and understanding the five programs when the only identifications are general descriptive phrases that vary from person to person and publication to publication. It is not uncommon, for example, to find that a ComSat contractor does not use the same phrase for a given satellite that ComSat uses. There are even cases where one ComSat employee did not recognize the phrase used by another.

The three payloads besides **EARLY BIRD** and **BLUE BIRD** are, in the order of their launch, the "Air Traffic" satellite, the "Global" satellite, and the "Multi-Purpose" satellite. **EB I** was orbited in April last year and is now operating commercially at one third of its channel capacity (SPACE Daily, Jan. 11). **EB II** and **III**, now in storage, will probably never leave the ground unless **I** malfunctions (SPACE Daily, Jan. 10). **BB I** will go aloft in August of this year with **II** on its heels in September (SPACE Daily, Jan. 10). The air traffic payload is tentatively set for launch in August of next year (SPACE Daily, Jan. 12). The global satellites are to become operational in '68, so their launches should begin in late '67 or early '68 (TRW is supplying them: SPACE Daily, Dec. 16). The multipurpose payloads (RFPs are still out: SPACE Daily, Jan. 3--there called "national satellite") will be put up "around 1970."

Of the five members of the ComSat family, the global system is chief. It is ComSat's raison d'etre. All five systems will be owned by the Consortium and managed by ComSat, but when the Communications Satellite Act of 1962 was created and passed, Congress had its eye on the global network. Practically speaking, then, the global payloads should have been named soon after ComSat came into being. The Corporation's embrace may continue to include more and more satellite systems of diverse

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purposes, but the company's core function will remain the global project. People both familiar and unfamiliar with ComSat's activities cannot be expected to adequately understand or appreciate the international venture ComSat symbolizes, or even the global system, without a concrete, meaningful name to help them. Whenever the **BLUE BIRD** battle and the other naming problems may be resolved, the Committee should at least name the global satellite without further delay.

Another major reason for the Committee to get on with the naming business is the appearance of more and more communications satellites. ABC hopes to put one up if the FCC will give the greenlight (SPACE Daily, Sept. 22 and Dec. 20). NASA is proceeding with plans for a Direct Broadcast Satellite (SPACE Daily, Nov. 29) and a Data Relay Satellite (SPACE Daily, Jan. 17 & 18). The DOD is well along the way to implementing its **IDCSP** (Initial Defense Communications Satellite Project) and **ADCSP** (Advanced Defense Communications Satellite Project) (SPACE Daily, Nov. 22 and Jan. 14, p. 79). Russia has its two **MOLNIYA** comsats up, and France is toying with a comsat of its own (SPACE Daily, Jan. 21). And, of course, there are **SYNCOM**, **RELAY** and **TELESTAR**.

PERU TO JOIN COMSAT/VIETNAM AND OTHERS INTERESTED. Peru may be the next nation to enter ComSat membership, and among those expressing interest is the South Vietnamese government. The Philippines, Thailand, Malaysia, Kenya, Uganda, and Tanzania (SPACE Daily, Jan. 3) are still considering joining, and Mexico (SPACE Daily, July 8 and Jan. 3) continues to postpone its long expected entrance. Other countries that may seek membership this year are Iran, Turkey, Morocco, Korea, and Singapore. Venezuela, the latest to join (SPACE Daily, Jan. 3), brought the total enrollment to 48. Potential membership is 124-- i.e. all members of the UN's International Telecommunications Union--but countries already in account for approximately 90 per cent of the world's communications traffic. The corporate entity is the International Telecommunications Satellite Consortium, for which ComSat acts as manager.

MARSHALL TO INITIATE AROD DELAY-LOCK PHASE III. Negotiations will be opened with Lockheed Aircraft for Phase III of the AROD (Airborne Ranging and Orbit Determination) (SPACE Daily, Aug. 7 '63) delay-look application technique by NASA-Marshall. Phase II of the AROD program, which transfers the work of ground networks to the systems on board the launching vehicle, was initiated with Lockheed almost a year ago (SPACE Daily, April 16). Motorola's Military Electronics Division is developing the test model of AROD and recently received a contract modification to determine the optimum test and feasibility demonstration program (SPACE Daily, Dec. 14, '64 & Oct. 8).

Kenneth G. Farrar is retiring from his position as vice president-manufacturing of Douglas after 32 years of service with the company. After his retirement on February 1, Farrar will serve the company as a special independent consultant to the aircraft group.

NAA APOLLO CONTRACT CONVERTED TO INCENTIVE

NASA has converted its \$2.2 billion contract with North American for the **APOLLO** Command and Service Module and **LEM** adapter from a cost-plus-fixed-fee to a cost-plus-incentive-fee agreement. The conversion covers the period from October 1965 to December 10, 1966, and will be extended through additional negotiations to subsequent periods of the contract. Estimated cost of the conversion will be \$671,300,000.

LTV AEROSPACE SEEKS 2.5 STOCK SPLIT

LTV Aerospace Corp.'s board of directors is recommending that the company's stockholders adopt the following actions, which would affect the LTV subsidiary's common stock: 1) A 2 1/2-for-one stock split, 2) Adoption of an eighty-cent annual cash dividend policy for each share of publicly-held common stock after the split, and 3) A reclassification of the common shares held by the parent company into a new non-dividend Class B common stock. The board also voted to recommend a change in the subsidiary's Qualified Stock Option Plan, increasing to a maximum of 185,620 the number of shares to be reserved for options following the proposed stock split.

ABC TO (POSSIBLE COLOR) COVER GEMINI VIII RECOVERY

ABC, the television network pool agency for downrange operations during the next **GEMINI** mission in mid March, may approach industry this week for proposals on the shipboard ground station that will help provide live TV coverage of the **GT-8** splashdown and recovery as CBS did with an ITT terminal for **GT-6** and **-7** (SPACE Daily, Nov. 1 and Dec. 6). ABC production personnel have met with their counterparts at NBC and CBS and with NASA public affairs people and have visited the USS Wasp, the recovery carrier, which puts out to sea today from Boston for a 36-day trip.

ABC would like to use color cameras aboard the Wasp and is studying that possibility. ITT has already expressed interest in supplying its terminal, as has Western Union, which hoped to do so last time (SPACE Daily, Sept. 24 and Nov. 16). As soon as the station supplier is chosen, the FCC will be asked for permission to use the terminal with ComSat's **EARLY BIRD** as CBS did.

ESRO GIVEN OK FOR ALASKAN GROUND STATION

The Senate has cleared the way for ESRO (European Space Research Organization) to establish its Fairbanks, Alaska, ground station. Normally Congress would not have to rule on the use of American soil for such a purpose, but since ESRO wants to bring in foreign equipment and personnel, it had to be exempted from the U.S. import duties. The House passed the bill last session, but the Senate could not find time. The bill is now at the White House. ESRO recently initiated its third satellite family (SPACE Daily, Jan. 3).

THREE TO RECEIVE AIAA GODDARD AWARD

The Goddard Award of the American Institute of Aeronautics and Astronautics (AIAA) will be presented jointly to three scientists tomorrow night at a special Honors Convocation of the AIAA 3rd Aerospace Sciences Meeting in New York.

The Goddard Award, the AIAA's highest, will be presented to Hans J. P. von Ohain, chief scientist, Aerospace Research Lab., Wright-Patterson AFB for "his contributions to the achievement in 1939 of the first successful application of turbojet propulsion to aircraft;" and to A. W. Blackman, chief of propulsion, United Aircraft Corp., and George D. Lewis, project engineer, Pratt & Whitney Aircraft Division of UAC for "their contributions to the understanding of the phenomenon of combustion instability and for their recognition of acoustical liners as a method of suppressing such instabilities in turbojet afterburners and rocket engines."

The award carries with it an honorarium of \$10,000 donated by United Aircraft and a gold medal donated by Mrs. Esther Goddard, widow of Dr. Robert H. Goddard.

ALLIED RESEARCH FORMS NEW DIVISION

Allied Research Associates has formed a new Aradyn Division to perform analysis, measurement, testing, and control of dynamic environments. The increasing importance of shock, vibrations, and acoustics problems in the design and fabrication of precision equipment prompted the creation of the new unit.

ITEK TO ACQUIRE PENNSYLVANIA OPTICAL

An agreement has been reached whereby Itek Corp. will acquire Pennsylvania Optical Co. (Reading, Pa.) for a total consideration of 195,000 shares of Itek common stock. The plan is subject to the approval of Itek's shareholders. The company will continue to operate autonomously and its personnel and operating procedures will not be affected by the proposed acquisition.

BURROUGHS' EARNINGS REACH RECORD HIGH

Burroughs had sales of \$459,414,000 for 1965, contrasted with last year's \$392,462,000. Earnings rose 71 per cent from \$10,212,000 last year to \$17,528,000 to establish a new record for the company.

President Ray R. Eppert said that important factors in the increased profits were the increased demand for commercial products and systems, and the continuing build-up of stable rental income from leased equipment. He predicted that the company's total net earnings in 1966 are expected to exceed those of 1965 by approximately 25 per cent.

George E. Spaulding Jr. has been appointed as a senior vice president of Bell & Howell's Consolidated Electrodynamics Corp. Spaulding will be responsible for Consolidated Vacuum Corp., the Analytical & Control Division, and the Devar-Kinetics Division.

24 SATURNS NEEDED BEFORE FIRST APOLLO LANDING

Under present planning, NASA would hope to land the first astronauts on the Moon by the fourth quarter of 1969 with the **SATURN V/APOLLO** flight 512, after 23 flights of the **SATURN IB** and **SATURN V** (See below). Six of these flights would be unmanned tests (three each) of the two vehicles and another six would be manned **AA (APOLLO Applications)** flights, leaving only 11 preparatory flights of the two vehicles specifically missioned for **APOLLO** training. Any necessary repeat of **APOLLO** flight experience missions would remove one of the vehicles from what is now a six-vehicle **AA** program.

APOLLO AND APOLLO APPLICATIONS SCHEDULE

Based upon present production and launch capabilities the following chart was prepared as a tentative schedule of the **APOLLO** and **APOLLO Applications (AA)** programs. The vehicle numbers listed are for the 12 **SATURN IB**s and the 15 **SATURN V**s in the presently approved procurement program. It is possible that the launch rate of the **SATURN V**s will be accelerated in the later stages of the program. Some of the earlier **AA** flights will be Alternate Missions which may not be used for **AA** if the **APOLLO** program has not at the time met its scheduled objectives.

SATURN IB

Quarter/Year	1/66	2/66	3/66	4/66	1/67	2/67	3/67	4/67	1/68	2/68
Flight	201	202	203	204	205	206	207	208	209	210
	/--unmanned --/									AA

SATURN IB - Contd.

Quarter/Year	3/68	4/68
Flight	211	212
	AA	AA

SATURN V

Quarter/Year	1/67	2/67	3/67	4/67	1/68	2/68	3/68	4/68	1/69	2/69
Flight	501	502	503	504	505	506	507	508	509	510
	/-- unmannd -- /						AA		AA	

SATURN V - Contd.

Quarter/Year	3/69	4/69	1/70	2/70	3/70
Flight	511	512	513	514	515
	AA		AA	AA	AA

The following promotions have been made within Aerospace Corporation's senior technical staff: **Dr. Jacob Benveniste** to director of the Nuclear Effects Subdivision in the Technology Division; **W. Donovan Schutt** to group director of the Feasibility Group in the Re-entry Systems Division; **G. William Anderson** to associate group director of Advanced Weapon Systems in the Weapon Systems Division; and **Arthur Gelernter** to director of Special Test Vehicles in the Test Implementation Group of the Re-entry Systems Division.

Future Space Business**SPACE VEHICLE INTERACTION IDENTIFICATION STUDY**

The Rome Air Development Center is interested in the possible procurement of engineering services to describe analytically, the generalized solutions for determining the character and degree of interaction between typical orbiting and ballistic space vehicles, of various sizes, shapes, and undergoing various rotational motions, and an artificial atmosphere consisting of either parachute or gaseous matter.

This study will define these interactions in terms of all fundamental modes of energy transfer (kinetic, thermal, and chemical) both to the vehicle and through the induced flow field and subsequent wake as a function of vehicle characteristics and various artificial atmosphere models.

Contact: Procurement Division, Rome Air Development Center, Attn: EMKS, Griffiss Air Force Base, N. Y. 13442. Reference: A-6-1624.
Due date: Jan. 31.

PROTOTYPE TRACKING/DETECTION TELESCOPES SUBCONTRACTING

Beckman Instruments is seeking contracting assistance on a five-month program to design, develop and fabricate two prototype tracking and detection telescopes.

Contact: Beckman Instruments Inc., 2500 Harbor Blvd., Fullerton, Calif., Attn: George N. Spain, ATO, Contracts Administration. Reference: Prime Contract AF 08/635/5185. Due date: Jan. 31.

HYDROGEN DETECTOR CALIBRATION SYSTEM

NASA-Marshall is requesting quotations for the design, fabrication, testing and delivery of a hydrogen detector calibration system for the evaluation and calibration of hydrogen detectors.

Contact: Purchasing Office, Marshall Space Flight Center, Huntsville, Ala., Attn: D. D. Firestone, PR-RG, Telephone: (205) 842-3610. Reference: RFQ 1-6-40-66598. Due date: Feb. 11.

DOD NEGOTIATIONS

Hughes Aircraft Co. --with Air Force Systems Engineering Group for a research program on active electro-optical techniques for reconnaissance.

NASA NEGOTIATIONS

Ball Brothers Research--with Goddard for refurbishment and modification of a solar pointing control and related telemetry system (see story, page 129).

Gulton Industries--with Goddard for the development of pile type high discharge rate Squid batteries.

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NASA NEGOTIATIONS

Biotechnology, Inc.--with Washington for a translation of basic biological and human factors data into terms useful for engineering design.

Thiokol Chemical Corp.--with Goddard for **APACHE** and **CAJUN** rocket motors.

DOD CONTRACTS**Army**

Bendix Corp.--\$1.1 million for stabilizer platforms for the **PERSHING** missile system.

Philco Corp.--\$5.2 million initial increment to a \$8 million cost-plus-incentive fee contract for continued research and development in support of the **CHAPARRAL** air defense system.

Navy

General Dynamics Corp.--\$1.1 million for guidance control systems for the **TERRIER** missile.

Air Force

General Electric Co.--\$6.5 million for work on the **MARK 12** re-entry vehicle program.

RCA--\$1 million for production of components for a satellite program.

General Dynamics Corp.--\$1.8 million final increment to a \$3.4 million for design and fabrication of components for a space program.

Philco Corp.--\$2 million and \$1 million in increments to two contracts for work on a satellite control network.

General Electric Co.--\$4.3 million increment to an existing contract for support of the B-70 flight test program.

Bell Aerospace Corp.--\$2 million increment to a previous contract for procurement of rocket engines.

NASA CONTRACTS**Marshall**

Dynatech Corp.--\$94,000 for research and design of a practical and economical dielectrophoretic system for the control of liquid fuels under low gravity environmental conditions.