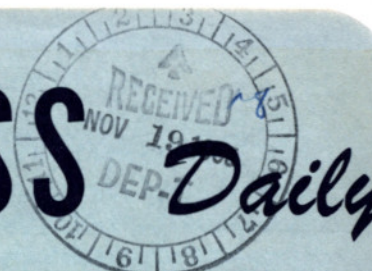


# SPACE BUSINESS



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## BSD TO DEVELOP RE-ENTRY DECOY.

At least 49 companies or research organizations will receive requests for proposals for the development of a decoy system having the image and/or signature of a high-altitude re-entry vehicle. The Ballistic Systems Division at Norton wants models of the decoy built for tests in wind tunnels, high altitude chambers and for radar cross section measurements. At present no flight testing of the vehicle or models is anticipated. The program is to obtain extrapolation data on a decoy with basically the same radar return as a re-entering vehicle at the high altitudes.

On the original RFP invitation list are: American Machine & Foundry, AVCO, Aeronutronic, Battelle, Bendix, Bjorksten Research, Boeing, Chrysler, Cornell, Cutler Hammer, G.C. Dewey, General Electric, Emerson Electric, Douglas, Fairchild Stratots, Federal Scientific, General American Transportation, General Dynamics, General Motors, Goodyear, Honeywell, Hughes, Kaman Nuclear, Ling-Temco-Vought, Lockheed Missiles & Space, Lundy Electronics, Martin, McDonnell, Motorola, North American, University of Michigan, Northrop Nortronics, Ohio State, Planning Research, RCA Defense, Radiation, Raytheon, Republic, Southwest Research, Sperry-Phoenix, Stanford Research, Sylvania, Systems Laboratories, TRG, TRW Systems, University of Texas, Watkins - Johnson, Westinghouse.

## GT-6/GT-7 RECOVERIES TO BE TELEVISED LIVE.

Despite ComSat's rates for EARLY BIRD service, CBS reports a "95 per cent" chance that the three major American television networks will provide live TV coverage of the recovery operations of the two upcoming GEMINI missions. Expected since the beginning of this month (SPACE Daily, Nov. 1 & 12), the decision will be firmed this week once the networks have worked out the cost estimates and assigned each network a coverage area (NASA-Houston, Cape Kennedy, and downrange). The ground station on the recovery carrier will be the same ITT terminal intended for coverage of the original GT-6 recovery telecast (yesterday's SPACE Daily). The networks consider the ComSat rates a "stumbling block" but only one of many factors that must be considered before the final decision can be made. The coverage must be given prior FCC approval.

## VENUS III LAUNCHED.

The third official, and what is believed to be at least the fourth unofficial, attempt to gather data from a Venus probe has been undertaken by the Soviet Union in a new launch from the Baykonur-Karsakpay complex. Identified as VENUS III, this latest experiment follows VENUS II by only four days (SPACE Daily, Nov. 15) and apparently was planned as a supplementary/back-up to VENUS II.

MORE

Weighing almost the same as VENUS II (2119 pounds), VENUS III's 2112-pound package is engineered to "obtain additional scientific information about Venus," carrying somewhat different equipment than VENUS II. It appears that the Venus launching window was priority for the lunar and interplanetary unmanned missions at Baykonur, pushing the continuing efforts for a lunar soft-landing temporarily into the background.

**NASA SEEKS AUTOMATED PROGRAM MANAGEMENT.** NASA-Washington will hold a briefing conference in Washington on November 23 for the design of an automated program management and information system for all on-going space and aeronautics research and technology programs. The request for proposals for the system will be due on December 20.

**NASA ORDERS RAE ANTENNA DEVELOPMENT.** The structural design development of the RADIO ASTRONOMY EXPLORER satellite antenna will be contracted with Astro Research Corporation of Santa Barbara by NASA-WOO. AVCO/RAD is under contract for the investigation of the RAE satellite when employing what is expected to be a 750-foot antenna (SPACE Daily, June 24 & 28). The RAE is expected to improve radio astronomy observations by providing frequencies lower than the 10-to-15,000-megacycle capabilities of Earth-based systems. The 250-pound RAE will be injected into a 50-degree, high, circular orbit.

**GUIDANCE FOR LOW THRUST VEHICLES.** General Precision will be awarded a contract by NASA-Marshall for the design study of the guidance techniques to be employed for the low thrust space vehicles under study by the center. General Electric and United Aircraft have been under contract for several months for the design and development investigation of low acceleration space transportation systems for NASA-Marshall (SPACE Daily, Feb. 2).

**COMSAT BREWSTER CONSTRUCTION CONTRACT DUE NEXT WEEK.** Six undisclosed firms have responded to the new ComSat RFP for land preparation and construction of the Brewster, Wash., ground station site (SPACE Daily, Oct. 28 and Nov. 1), and the winner will probably be chosen next week in order to help expedite the station's establishment. The six respondees have already selected dozens of potential subcontractors. Work under the contract will include roading, grading, and building. Ground-breaking ceremonies at the Brewster site were held yesterday (SPACE Daily, Nov. 15).

**FR-1 LAUNCH NOW SET FOR EARLY DEC.** The seesawing of the launch date for France's FR-1 satellite (SPACE Daily, Nov. 10 and yesterday) continues, with the liftoff now envisioned as coming between the 1st and 8th of next month. The satellite is at Vandenberg being mounted on its SCOUT vehicle for spin balancing and then prelaunch checking. A definite launch date may be scheduled next week.

**1-2 FOOT NEAR RENDEZVOUS OF GEMINI VII/VI NOW PLANNED.** NASA has again revised its flight plan for the upcoming dual flight of GEMINI VII and VI, this time to an exercise where the two spacecraft approach 1-2 feet of each other.

### ADMINISTRATION URGES GO-AHEAD FOR NUCLEAR PROPULSION

Dr. Edward C. Welsh, executive secretary of the National Space Council, delivered a warning to "space planners" today to stop sitting on nuclear propulsion concepts and to expedite development programs.

"We must not wait for clear-cut space requirements for these nuclear systems before moving forthrightly with their development," Welsh told the American Nuclear Society Atomic Industrial Forum.

"If we wait for precise mission definitions the technology will not be available when it's needed. Moreover, we can be sure that our Soviet competitors will take positive actions, whether we do or not. For this country to sit back on its technological haunches and let someone else, bolder and more imaginative, show us the way is unthinkable to me."

Welsh said he expected opposition to nuclear capabilities among budget cutters, whose job it is to trim costs, "but I cannot understand why people without budgeting responsibilities would suggest delaying policies for the nuclear power field," the Space Council executive said.

He called on government, the nuclear research organizations and the space industry to provide "nuclear missionaries" to acquaint "the aerospace decision makers and planners. . . and the potential space user of nuclear energy" with the current state of the art of nuclear propulsion, with its promise and with its problem. He said this must be done now.

"We all know that the nuclear going in space won't be easy," Welsh said. "The technical problems are of the toughest kind; the price tags are not low; and the development can't be accomplished overnight. Yet I am confident that the technical problems are resolvable and the investments warranted."

### NUCLEAR ROCKET TIMETABLE

If the go-ahead was given by the NASA, the first flight of a nuclear rocket engine "could take place in the mid-1970 time period," according to Dr. Harold B. Finger, manager of the AEC-NASA Space Nuclear Propulsion Office. Finger explains that major new launch facilities for nuclear-powered rockets would not be required since the existing launch facilities for the **SATURN V** will be directly applicable.

### CHARGES LEVELLED AT PRESENT NUCLEAR INSPECTION SYSTEM

William Webster, president of the Yankee Atomic Electric Co., a 175,000-kilowatt nuclear power plant at Rowe, Mass., charges that the present international inspection system of nuclear materials is not adequate to keep governments from diverting atomic materials for use in nuclear warheads.

Webster, speaking before the annual conference of the Atomic Industrial Forum, said that the International Atomic Energy Agency (IAEA) inspections provide only for inspection of the materials (plutonium and uranium) while they are in the reactor, but that other points on the production route are not checked under the present system. The president of Yankee Atomic, which is one of the U.S. plants under IAEA unlimited inspection, pointed out to the delegates that "Any system of inspection that fails to permit complete 'cradle-to-the-grave' coverage is worse than useless."

### MARTIN TO SUPPLY SNAP-19S FOR NIMBUS B

Under a \$2.4 million contract extension from the Atomic Energy Commission, Martin-Baltimore will provide four (two pairs) **SNAP-19** radioisotope-fueled nuclear generators for the initial NASA-Goddard **NIMBUS B** weather satellite, which is scheduled for launch in 1967 to become **NIMBUS III**. One pair of the generators will be used on the satellite--the first meteorological payload to have nuclear power--while the other pair will be a backup system.

**SNAP-19** will be the secondary power source on **NIMBUS III** (with solar cells as the primary) but will be the primary on later **NIMBUS Bs**. The generator delivers 30 watts, weighs 30 pounds, is 22 inches in diameter and 11 inches high, and has a five-year lifetime. It is an advanced version of **SNAP-9A**, the generator for the Navy's **TRANSIT** satellites, and uses plutonium-238.

Under the contract extension, Martin will also supply NASA with four unfueled generators for reliability testing with a **NIMBUS B** mockup and will run reliability tests of its own six other generators. In addition, it will build a dc-dc conversion unit, a generator-analysis telemetry system, a support structure for the generators, and ground support equipment. Under the original contract, the company supplied six unfueled prototype generators for the **B** configuration.

**NIMBUS III** is now at General Electric's Space Technology Center for integration and testing under Goddard's direction.

### FAIRCHILD ESTABLISHES MEMORY PRODUCTS DEPARTMENT

Fairchild Camera's Fairchild Semiconductor division has established a Memory Products Department to design, manufacture and market components and systems for memory sections of electronic computers as an extension of its solid state capabilities.

Harley Perkins, formerly manager of memory development at the Fairchild R&D Laboratory, will head the new department which is located at the division's headquarters in Mountain View, Calif. Others named to positions in the Memory Products Department include: Millard H. Phelps Jr., who has managed microcircuit, new product and industrial marketing for the Semiconductor Division, named as department marketing manager; Jack Schmidt, formerly with the R&D Laboratory memory research unit, named as engineering manager; Ed Watson is manufacturing manager; and Joseph Katz, formerly with Computer Ferrites Corp., is core production manager.

The new department, which was established as the result of a research and development program instituted in 1962, will begin operations by manufacturing monolithic semiconductor "scratch-pad" assemblies, ferrite memory cores, wired memory core planes and "stacks" of core planes.

### NEW SPACE ENVIRONMENT CHAMBER TESTED

NASA-Houston's Space Environment Simulation Laboratory will test its new 35-foot altitude chamber when a technician, wearing a **GEMINI** space suit, will step through the air lock into a vacuum equal to 60 miles out. The chamber will then be cooled to minus 250 degrees F. and the solar lamps and Earth albedo lamps will be turned on to simulate the extreme heat and cold of space.

### AVCO/RAD WINS THREE BORON FILAMENT AWARDS

The Air Force Materials Lab at Wright-Patterson AFB has contracted with AVCO/RAD for three separate R&D programs on the production and use of boron filaments. The first, at \$594,900, calls for a pilot production plant; the second, at \$195,300, for the development of new composites; and the third, at \$90,022, for a micromechanical study of composite behavior.

The first contract seeks "the most efficient and economical means of achieving volume production" and involves "a complete working study of filament preparation techniques." The pilot plant will have four continuous-production lines and two experimental process-improvement lines. When fully operational, the plant will produce 20 pounds of filament per month.

The second contract concerns the collection of data on the chemical, physical, and mechanical characteristics of boron composites. Various composites will be fabricated and tested to provide such data.

The third contract embraces an investigation of the micromechanical performance and failure mechanisms of aluminum reinforced with various filaments, including boron. Data will be gathered on "composites that combine high strength, high modulus, and low density in a metal matrix."

United Aircraft recently began marketing boron filament (SPACE Daily, Oct. 29).

### BUNKER-RAMO DATA CONTRACT RENEWED

The Department of Health, Education, and Welfare has extended its contract with Bunker-Ramo's Silver Spring, Md., facility for "an expanded automatic data processing system for management of research and training grants." In addition to its use for review, analysis, and control of scientific grants and projects, the system 1) correlates appropriations and research program budgets and makes a five-year projection review of major programs, 2) updates all programs at least thrice yearly to reflect presidential budget decisions and congressional apportionment changes, and 3) provides scientific abstracts from NASA, the Air Force Office of Scientific Research, and the Science Information Exchange.

### APOLLO/SA-201 SM TEST POSTPONED

The first ground test firing of the SA-201 APOLLO Service Module, originally scheduled for Friday and delayed until Monday (SPACE Daily, Nov. 15), was delayed again due to minor malfunctions and rescheduled for today.

### CHICAGO AERIAL NAMES OVERSEAS REPRESENTATIVE

Chicago Aerial Industries has named the firm of Bourns A.G., Zug, Switzerland, to represent it in Europe, the Middle East and Africa. The affiliate of Bourns Inc. of Riverside, Calif., has assigned sales engineer Adolph G. Dublin to represent CAI.

Richard A. Carlson, formerly a member of the sales staff, has been appointed assistant manager of product development of Zenith Sales Corp.

### LOCKHEED ENTERS HIGH PERFORMANCE SOLID FIELD

The recent Lockheed tests of a nitroplastisol wafered solid pulse motor (yesterday's SPACE Daily) signal the entry of the company into the high performance pulse motor field. The company has previously been involved in the development of the technology of wafered solid propellant motors and of three-pulse solid propellant motors for possible applications to air-launched missiles such as **SRAM** (Short Range Attack Missile) under several AF Systems Command Rocket Propulsion Laboratory contracts (SPACE Daily, Jan. 18 & Nov. 9).

Earlier work on wafered pulse-motors has involved the use of polycarbutene, a polybutadiene acrylic acid which is particularly appropriate for insensitivity to vibration and temperature extremes such as would be involved in a missile such as **SRAM**. The nitroplastisol propellant used both aluminized powder, in order to establish baseline data, and powdered beryllium for high specific impulse.

Although the recent test involved only two wafers, previous pulse-motor tests have involved as many as 40 end-burning solid propellant wafers. This multiple start-stop-restart capability is designed to provide the versatility needed to make solid pulse-motors competitive with liquid motors for space applications as well as military missions. The new nitroplastisol propellant is the same used in the proposed **MAULER** anti-tank missile and similar to that used in the **SPRINT** and **HIBEX** anti-missile missile booster development.

### C-1 CONTRACT FINALIZED

NASA-Marshall has finalized a \$16,146,000 contract with Thiokol for Phase II development of the C-1, 100-pound thrust engine (SPACE Daily, Oct. 23, '64 & Oct. 15). The cost-plus-incentive-fee contract calls for design, fabrication, flight rating and qualification testing of the small liquid hypergolic fueled engine. The C-1 is being developed by NASA as a back-up, and a possible follow-on, for all of the 52 small rockets used on the **APOLLO/SATURN** vehicle and spacecraft for attitude control, maneuvering and ullage (SPACE Daily, Oct. 19).

### DOUGLAS' ZIMMERMAN ELECTED TO RESA COUNCIL

Dr. Carroll L. Zimmerman, director of Aerospace Sciences for Douglas, has been elected to the Council of the Military Applications Section of the Operations Research Society of America (RESA). The council is the governing body of more than 500 members of the section whose purpose is to advance research in military operations, foster development and application of new techniques and to maintain high professional standards in military operations research.

Dr. John A. Jamieson has been appointed assistant manager of the Astrionics Division at Aerojet-General's Von Karman Center. Jamieson was formerly manager of research and development within the division.

M. H. Glauberman has been appointed manager, defense planning of RCA's Defense Electronic Products group. Glauberman, previously manager, defense planning (product development), on the group's planning staff, succeeds C. Keith Law, who has been named manager, product engineering, of the Communications Systems Division.

### SPACE SYSTEMS ANALYSIS SEEN SOLVING URBAN PROBLEMS

Karl G. Harr Jr., president of the Aerospace Industries Association, says that there is much to be learned from the space industry's experience in technology and that systems analysis techniques can point the way to solutions to the growing problems of the United States' urban centers.

Harr told members of the Rotary Club of Philadelphia (Pa.) that the key contribution from the space industry lies in the developed capability for complex systems analysis. "It is this capability which is uniquely required when the objective is a fixed but nearly impossible one such as, for instance, to analyze 10 years in advance what will be required on each of a thousand interrelated fronts to get man safely to the Moon and back." The AIA president contends that this capacity to cope with complexities and unknowns of a task of this size and to chart a schedule for its completion "is the relevant art engendered by our space and defense demands. It is relevant because, in one form or another, our cities are already faced with systems analysis challenges of a comparable order."

#### California Serves As Pilot Program

Harr told the Rotarians that, although urban problems might seem too staggering in their size and complexity for any one segment of our population to be able to solve them, the space industry has already proved that it has the tools and technology to handle a task of this complexity.

The State of California let research contracts to space-oriented firms to study four key areas: transportation, pollution, information collection, and crime control. Governor Pat Brown, in evaluating the results of the completed contract on crime control, said that "The systems engineers put California in a laboratory, so to speak. And in just six months, they have documented many methods of dealing with crime they think could be improved. . . We intend to call this report to the attention of officials in Washington; to point out its national applications; and to ask for financial help in pushing through the followup work that must be done to put this new systems approach into operation."

In conclusion, Harr emphasized that his contention is not that the space industry alone can solve urban problems, but that ". . . the approach, the attitudes, the acceptance of the realities of today and the future as they are--not as we might wish they were--which have been brought about by the aerospace age are essential to coping with the future."

### CLUSTERING NUCLEAR MOTORS IS PRACTICAL

Douglas engineer Jan Woyski has told the American Nuclear Society that using nuclear propulsion systems in clusters for deep space missions "presents no significant problems. Conjecture about some difficulty in operating nuclear engines in a cluster without a complicated control system appears to be unfounded," he said. He added that clustering eliminates certain design and development problems and is helped, not hurt, by neutronic coupling, another suspected bugaboo.

### INTERSTATE ELECTRONICS EXPANDS MARKETING FACILITIES

Interstate Electronics Corp. of Anaheim, Calif., has opened marketing offices in Atlanta, Ga., to be headed by John S. Lewis, and in Houston, Tex. Astro-Tec of Huntsville, Ala., and Astro Associates of Houston have been appointed as representatives.

**DOD NEGOTIATIONS**

Manlabs Inc., Cambridge, Mass.--with Air Force Systems Engineering Group for research and development of a computational technique for predicting high temperature behavior of refractory compounds.

Lockheed Aircraft Corp., Lockheed Missiles and Space Co.--with Air Force Systems Engineering Group for instrumentation for orbital evaluation of solar reflector candidate materials.

**NASA NEGOTIATIONS**

Littleton Research and Engineering Corp., Littleton, Mass.--with Langley for a research program to investigate the application of piezo-electric actuation of a fatigue testing machine.

Hughes Aircraft Co., Hughes Research Laboratories--with Lewis for additional testing of a 4 strip ion engine.

G. T. Schjeldahl Co.--with Goddard for development of two blackbody temperature sensors.

**DOD CONTRACTS****Army**

Martin-Marietta Corp.--\$4.8 million modification to an existing contract for continued production of **PERSHING** missile during FY '66.

**Air Force**

The Boeing Co.--\$1.4 million for modification of early **MINUTEMAN**; \$1 million for modification of early **MINUTEMAN**.

Georgia Institute of Technology--\$29,995 for research and development to determine the spectral intensity distribution of sky-light at high altitude.

General Dynamics Corp., Rochester, N.Y.--\$792,000 for design, development and test of reproduction type "E" mistram transponder.

**NASA CONTRACTS****Houston**

Hughes Aircraft Co., Ground Systems Group--\$38,700 for polarization for **APOLLO** components.

Franklin Institute, Philadelphia, Pa.--\$38,700 for **APOLLO** initiator resistance measuring units.