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SPACE-ABM BY 1975 SEEN NEED FOR RED CHINA THREAT.

The Defense Department has concluded that a light anti-ballistic-missile (ABM) system using exoatmospheric space interceptor missiles and terminal defenses around a limited number of cities will provide the most effective defense against ballistic missile threats such as can be expected from the Red Chinese during the next decade (SPACE Daily, Dec. 16 & Jan. 26).

Defense Secretary Robert McNamara says it has been estimated that such a defense system could be provided (initial investment and 5-year operating costs) for about \$8-\$10.5 billion.

The selection of this type of system throws a shadow over the **SPRINT** program early deployment future because it is not considered the most effective for what is considered the most immediate threat unless it is coupled with the space-interceptor **ABM** concept which is still further down the deployment road. The DOD, in its analysis of possible nuclear attack threats, divided possible defense concepts into two postures, E & F. Posture E provides only a **SPRINT** terminal, low-altitude defense while posture F would combine the **SPRINT** with a Space Interceptor Missile (**SIM**) high altitude area defense. Posture F, in the preliminary analysis, is considered not only superior as far as cost-effectiveness is concerned but a "highly effective defense" against the Chinese type of threat which, from all evidence, is the only threat that is receiving immediate response toward actual **ABM** deployment planning.

The selection of Posture F, with the **SPRINT/SIM** combination, reflects the continuing delay by the DOD (McNamara) to produce and deploy the **NIKE X** system until it has the capability, in addition to the **SPRINT**, of the **SIM**. The DOD indicates that it prefers to respond immediately only to the Red Chinese threat which, with a mid-70's ICBM capability, will provide enough lead time for the development of the **SPRINT/SIM** system and would hold off any immediate deployment of the current **NIKE X** system against a Soviet Union threat. Rather, McNamara says, "Our choices should be responsive to projections based upon the observed development of the Soviet threat and our evolving knowledge of the technical capability of our own forces."

The DOD believes the **SPRINT/SIM** system would remain effective against the Red Chinese threat for "some time" and could be augmented to increase its effectiveness against possible heavy ICBM threats such as would be posed by the Soviet Union. This augmentation would take the form of an increase in the number of long range **SIMs** and improved radar or by increasing the number of cities protected by the **SPRINT**-type of system. The **SPRINT/SIM** system's deployment would therefore be required, using current DOD estimates, before 1975, or earlier if the Chinese display an acceleration of progress.

In conjunction with this most recent DOD planning, the Air Force Ballistic Systems Division recently initiated the **EX-O-TAC** (EXO-atmospheric Penetration Aids deployment Concept program) for the development of more advanced methods of utilizing and deploying penetration aids as a means of offsetting the capabilities of **SIM** systems. (SPACE Daily, Dec. 7). DOD has scheduled the anti-**SIM** program as a multi-billion-dollar effort in the years ahead (See following story).

SPACE-ABM WILL BE SUPPORTED BY SAM-D/SLBM/F-12. Supporting either Posture E, using the **SPRINT** for anti-ballistic-missile defense, or Posture F, employing both the **SPRINT** and Space Interceptor Missiles (**SIM**), would be the anti-bomber defense system, **SAM-D**, the anti-submarine-launched ballistic missile defense system (**SLBM**) and the new manned interceptor version of the **YF-12A**, the **F-12**.

McNamara explains that this combination "could complicate even a sophisticated attacker's ballistic missile penetration problem. It could also improve overall system performance compared to an equal cost system employing lower altitude interceptors only." Further, the DOD believes that "Feasible improvements in missile accuracy and re-entry vehicles could greatly increase the efficiency of our offensive forces against Soviet hard targets." In furtherance of this the DOD is accelerating its penetration aids development program.

The PENAID Program. The research and development budget for penetration aids will be doubled for FY '67 from \$15 million to \$35 million. A total of \$1.2 billion has been invested in this program over the past four years, a program that will now be accelerated in order to "defeat" an area **ABM** defense employing **SIM** systems.

MINUTEMAN III. Major improvements, in addition to penetration aids, which includes multiple warheads, post boost propulsion and guidance, improved guidance and upper staging, in the **MINUTEMAN II** has resulted in the redesignation of the missile to the **MINUTEMAN III**. An initial procurement will be made of the missile in FY '67.

POSEIDON. With a total cost estimated at \$1.3 billion, the **POSEIDON** program is being greatly accelerated in the engineering development program, resulting in a budget request of \$300 million in FY '67.

Advanced ICBM. Both the Air Force and Navy programs for the future development of an Advanced **ICBM** are being funded at \$13 million in DOD's FY '67 budget. The Air Force will continue to follow several courses with a budget of \$10 million while the Navy will conduct an advanced development study of improved propulsion systems for future sea-based missiles with a budget of \$3 million.

FB-111/SRAM. This program, with "the objective of forcing the Soviets to split their defense resources between two types of threats and force the Soviets to build expensive terminal bomber defenses or be vulnerable to low altitude attack," will be funded heavily in FY '67. The **SRAM** weapon system, estimated to have a development cost of \$170 million, including the avionics, will be funded at \$40 million in FY '67.

The **FB-111** weapon carrier, with a currently estimated total investment cost of \$1.9 billion, will be funded at \$202 million in FY '67 to be added to the \$26 million for FY '66. A force of 210 of these aircraft will be purchased. The decision to go the **FB-111/SRAM**

course was made in preference a major move in the direction of the **AMSA** (Advanced Manned Strategic Aircraft).

AMSA. Only an additional \$11 million is being requested for FY '67 for avionics development even though the total of \$46 million available in FY '66 is being utilized. DOD provided \$24 million of the FY '66 funds from FY '65 funds, and received their \$15 million request plus \$7 million made available by Congress.

MANNED SPACE SHUTTLE PROVED FEASIBLE. McDonnell and Northrop Norair, after six months of design feasibility studies (SPACE Daily, May 3), have reported to NASA-Edwards that a minimum manned lifting body flight test program is "highly feasible." The results of the study have been submitted after a brief delay or extension of the effort (SPACE Daily, Dec. 6 & Jan. 11).

Both studies show that a flight test program of a simple, low-cost, "off-the-shelf" minimum manned lifting body vehicle is well within the state-of-the-art, that there are no areas of difficulty. The flight test program could be performed, they estimate, for a total cost of around \$250 million.

The test program envisioned would use the **M-2** lifting body configuration, outfitted with **GEMINI** spacecraft systems, utilizing the **TITAN-GEMINI** launch vehicle, and taking advantage of the **GEMINI** launch facilities and tracking network. The mission would consist of seven total flights -- two unmanned, five manned -- each of which would be a suborbital flight from Cape Kennedy east to land near NASA-Edwards in California. This program, and the \$250 million price tag, is based on starting flights in 1967. If the program were delayed, or scheduled for later, the **GEMINI** launch and tracking systems will have been dismantled and the cost of such a program would rise. The two company studies are now being evaluated to determine whether or not to proceed on program definition.

NASA-Langley is also conducting a feasibility study (SPACE Daily, Dec. 6) "an optimum manned lifting body" concept to determine the optimum size of the vehicle, the optimum number of the crew, and the equipment necessary to secure the optimum research potential. The concept would ultimately lead to an extended logistics vehicle or Space Shuttle.

The NASA-Edwards unpowered lifting body flight tests have already started with two low altitude captive flights of the **M2-F2** vehicle completed. The dry lake bed in California used for landing area for the glide-landing tests has been damaged by the record rainfall in the area which has delayed the rest of the flight program. This program is due to be resumed in mid-March with one more captive flight of the **M2** after which NASA will be ready to move into the first free-fall flights of the vehicle.

The **HL-10** vehicle, which like the **M2** is being developed by Northrop Norair, was just recently delivered to Edwards (SPACE Daily, Jan. 18) and is scheduled to begin testing shortly.

POST-DIAMANT DECISION EXPECTED SOON. The French space industry is expecting a decision before spring from the French Government on a go-ahead for a post-DIAMANT booster project. Several configurations have been under study, including several versions of the so-called **Improved DIAMANT, REGENT** and **ORION**. (See SPACE Daily, Dec. 21.)

NASA/DOD RANGE COOPERATION QUESTIONED

Members of the Military Operations Subcommittee of the House Committee on Government Operations have questioned the usefulness of DOD/NASA cooperative agreements on tracking, data acquisition and communications facilities.

John S. Foster Jr., director of Defense Research and Engineering, told the subcommittee that the Department of Defense and NASA have cooperated to a certain extent in the use of the so-called national ranges--White Sands (Army), Kwajalein (Army), Pacific Missile Range (Navy), Eastern Test Range (AF), Western Test Range (AF), and the Satellite Control Facility (AF). In May 1965 a DOD/NASA Agreement on Tracking, Data Acquisition and Communications Facilities was signed. The agreement states that the two agencies are to "achieve a maximum of mutual assistance, to avoid unwarranted duplication, and to realize economies wherever practical and consistent with mission requirements, by means of coordination and planning and efficient division of responsibilities."

The subcommittee was reminded that the Astronautics and Aeronautics Coordinating Board was set up to effect necessary coordination in the area and to plan for the best possible joint use of these ranges. A new committee--the Manned Space Flight Policy Committee--has been established to solve inter-agency problems in this area. Joint systems will be chosen, wherever practical, in terms of the most capability for the least cost. Foster serves as co-chairman of both boards along with NASA Deputy Administrator Robert C. Seamans. The board, which was agreed to by NASA Administrator Webb and Secretary of Defense McNamara, is made up of six members--three from NASA and two from DOD. If an impasse is reached, the decision theoretically would revert back to the heads of the two agencies.

APOLLO/MOL Tracking Systems Not Compatible

In the light of NASA/DOD duplication of effort, the subcommittee wanted to know if it would have been feasible for the Air Force and NASA to share a manned space tracking and data acquisition system. As it now stands, NASA is expending \$26 million for APOLLO unified S-band tracking and data acquisition equipment, while the Air Force's Space Ground Link System (SGLS) has been tagged at \$32 million for development and installation. Foster explained that the basic difficulty is that the NASA system is limited to a frequency range of between 2100 and 2300 megacycles, while the Air Force requires a broader bandwidth for its Manned Orbiting Laboratory. He added that if the agencies had known from the beginning how the systems would ultimately develop, then there is a possibility that they could have been merged. It is possible, Foster said, that within a few years, NASA will find a use for the SGLS.

It is also possible that the DOD will be able to use the NASA/ComSat BLUE BIRD (303A)-APOLLO communications satellite system for transmittal of non-classified data. Foster said that the DOD is waiting until the cost of the channels has been determined before making a final decision on its use.

HOUSE SPACE COMMITTEE DISCUSSES DADDARIO REPORT

The House Space Committee, meeting in closed session, discussed Rep. Emilio Q. Daddario's (D-Conn.) report, which recommends strengthening the policy-making powers of the National Science Foundation (SPACE Daily, Jan. 10). The report, which said that NSF "should take the initiative and be held broadly responsible for the nation's science resources," also recommended that increased attention be given to the social sciences and engineering.

NATIONAL SPACE PROGRAM BUDGET (In Millions)

Agency	NEW OBLIGATIONAL AUTHORITY			EXPENDITURES		
	1965 actual	1966 estimate	1967 estimate	1965 actual	1966 estimate	1967 estimate
NASA ¹	5,167.6	5,087.9	4,908.3	5,035.0	5,521.0	5,211.0
DOD	1,579.4	1,693.5	1,620.7	1,591.8	1,640.0	1,650.0
AEC	228.6	195.6	173.5	232.2	201.0	173.7
ESSA	12.2	27.3	35.8	24.1	19.2	27.0
NSF	3.2	3.6	2.9	3.0	3.5	2.8
TOTAL	6,991.0	7,007.9	6,741.2	6,886.1	7,384.7	7,064.5

¹Excludes aircraft technology.

ESSA FUNDING AT \$26.8 MILLION FOR FY '67. The Environmental Science Services Administration (encompassing the Weather Bureau) is asking Congress for \$26.8 million in fiscal 1967 to support its meteorological satellite program **TOSS** (**TIROS** Operational Satellite System).

The bulk of the funds, \$17 million, will go for construction and launching of operational satellites. Three new satellites will be needed in FY'67 to maintain the **TOSS** net. The system will be operational this year. Another \$5 million will go for establishment and operation of ground facilities for command of **TOSS**, acquisition of observational data, and transmission of data to the central processing and analysis center at Suitland, Md. The funds provide for around-the-clock operation and maintenance of data facilities at Fairbanks, Alaska, Wallops Station, Va., and at Suitland. Technical management of the program, funded at \$1.1 million, is provided by the National Environmental Satellite Center and NASA on a reimbursable basis. Funding of \$3.7 million will be used to convert satellite observational data into forms suitable for immediate operational use in forecasting and service programs, and subsequent use for research and climatological purposes. The money provides for a 24-hour operation of central analysis and processing functions, systems engineering efforts leading toward improvements of the satellite system; increased automation of data-handling systems; and continuation of the Washington-Moscow communications link.

Added to the FY '67 **ESSA** budget is \$6.79 million for changes in selected resources, including unpaid for delivered orders. Total new obligational authority for FY '67, including this figure, amounts to \$33.585 million.

Marvin R. Gore has been appointed to the newly created position of director of computing sciences for Aerojet-General. Gore will be responsible for corporate-level policy, planning, control and coordination of automatic data processing operations.

SPACE COMMITTEE GIVES OK TO NASA FACILITIES PLANNING. The House Space Committee has reported to Congress that NASA has taken major strides in developing master plan guidelines for designing and building its installations. The committee said its report of last year that "the function of master planning (for installation) lacks top policy status in NASA," "No longer holds true."

"Particular credit is due to NASA Headquarters and to the Lewis and Wallops Centers for modifying contrary policies of a year ago, and for proceeding in good faith to prepare and utilize professional master plans. Credit also is due to a number of other NASA Centers which determined on their own initiative some years ago to guide their facility development by the technique of master planning, and which have pursued this course to advantage ever since. The Manned Spacecraft Center and the Jet Propulsion Laboratory are noteworthy examples."

The Space Committee emphasized, however, that steps taken so far by NASA "may not be enough...The danger is that directives as well as master plans, may easily be left on the shelf." The committee said that "close on-the-ground surveillance of field performance at regular intervals by NASA Headquarters is called for in order to keep the master plans viable, efficient, and effective." The committee added that it should continue "periodic oversight" of NASA policy and practice.

TWO BLUE BIRDS MAY COVER PACIFIC. ComSat is planning to orbit two of its **BLUE BIRD** satellites over the Pacific Ocean to handle commercial communications if there is enough traffic to justify them. **BLUE BIRD II** is scheduled to assume a synchronous perch between Hawaii and Midway in September (SPACE Daily, Jan. 10) (**BLUE BIRD I** will go over the Atlantic in August). The **BLUE BIRDS'** main job will be to support the **APOLLO** flights, but they will also be used like **EARLY BIRD** to handle commercial traffic.

Since the trans Pacific traffic is expected to grow, there may well be ample demand to require **BLUE BIRD III** to go up near **II**. If the two satellites are deployed, they will be five degrees apart and will provide continuous year-round coverage, which **II** by itself will not be able to do because of solar eclipses (with two up there, one will be in the eclipse but not the other--thus an uninterrupted capability).

The original intention was to orbit two **BBs** over each ocean to provide a simultaneous, continuous and backup capability (SPACE Daily, Aug. 16). ComSat changed its mind, however, perhaps partly because **EARLY BIRD** has been taking more time than was hoped to become fully employed (SPACE Daily, Jan. 11). For their **APOLLO** role the **BBs** will be supported by ComSat's three ground stations--Andover, Brewster, and Paumalu--plus three foreign ground stations--Carnarvon, Ascension, and Canary--plus three shipboard stations--USS Vanguard, Redstone, and Mercury. Hughes builds **BLUE BIRD**.

Fred W. O'Green, vice president of Litton Industries, has been named to head the Defense and Space Systems Group. The Group includes Guidance and Control Systems, Data Systems, Mellonics, Amecom, Litton Systems Ltd., and Applied Science.

SMALL FIRMS RECEIVED 17% OF NASA'S FY '65 BUSINESS

During fiscal 1965, NASA placed contracts with small business valued at \$286 million or seven per cent of the total contracted. In addition to the \$286 million in direct awards, small business concerns received \$417 million in subcontract awards from 57 large business firms participating in the NASA Subcontracting Program. A total of \$703 million of NASA's procurement dollars went to small firms in FY '65, or 17 per cent of the agency's total awards to business.

George J. Vecchiotti, director of procurement in NASA's Office of Industry Affairs, told the Subcommittee on Government Procurement of the Senate Select Committee on Small Business that in the case of contracts valued at less than \$25,000, which totaled \$148 million, small business firms were awarded contracts valued at \$84 million or 57 per cent of the total.

Under the agency's small business set-aside program, set-asides totaled approximately \$67 million or 24 per cent of the total awards to small business. Vecchiotti also told the subcommittee that small business concerns received \$105 million or 17 per cent of the \$629 million in new prime contracts over \$25,000 awarded in fiscal 1965.

DSA Exceeds '65 Goal by 2.8 Per Cent

Rear Admiral J. W. Bottoms, executive director of the Procurement and Production Directorate, Defense Supply Agency, reported that for FY '65 the DSA exceeded its small business goal of 41.1 per cent by 2.8 percentage points. Of the agency's awards 43.9 per cent or a total of \$1.174 billion went to small firms. This is the highest percentage achieved so far by the DSA for a full fiscal year.

LOCKHEED SEES CONTINUED AEROSPACE GROWTH

Even if the Vietnam War should come to an end "this country's military, space and commercial program will add up to a growing level of activity for aerospace this year and next," Dudley E. Browne, Lockheed's group vice president-finance and administration said last night.

ABC/ITT MEETING TODAY TO DISCUSS GT-8 COVERAGE

ABC, the pool TV agency for live coverage of the **GEMINI VIII** splashdown and recovery (SPACE Daily, Jan. 24), is conferring with ITT today to further study the feasibility of color coverage. ITT, the only party to come forward thus far with a shipboard ground station, supplied the terminal last time for **GT-6** and **-7** when CBS was the downrange pool agency (SPACE Daily, Nov. 1 and Dec. 6). If ITT can offer a color capability with its terminal and if the TV networks can provide proper color equipment to augment the terminal, color programming of the recovery is probable. If not, the coverage this time will largely duplicate that of last time.

Robert M. Schulman has been appointed manager of public relations for Aerojet-General's Downey, Calif., plant. Schulman was formerly in charge of the company's promotional and sales literature.

DOD NEGOTIATIONS

General Precision Inc., Kearfott Division--with Army Missile Command for a series of studies to determine the optimum instrumentation program for acceleration vector control.

Honeywell, Inc.--with Army Missile Command for a series of studies to define the optimum system for automatic laying and aiming of missiles employing a 2-axis pendulous platform.

Thiokol Chemical Corp.--with Air Force Systems Command for a follow-on production of solid propellant motors.

William K. Stamets Co.--with the Navy Bureau of Ships for **ASROC** loader crane, left hand.

Raytheon Co.--with Army Missile Command for industrial prototypes for self propelled **HAWK** system.

NASA NEGOTIATIONS

Space General--with Goddard for the continuation of a contract to obtain engineering and analytical services for the **AEROBEE** family of vehicles.

Hughes Aircraft Co.--with Goddard for a VHF satellite transponder electric design compatible with both the Omega position location equipment (OPLE) and the **ATS-C**.

Thiokol Chemical Corp., Astro-met Division--with Goddard for the engineering and analysis of a clamshell payload housing for the **NIKE-TOMAHAWK** vehicle.

Ryan Aeronautical Co.--with Marshall for research into the design of electronically scanable phased array antenna systems.

Goodyear Aerospace Corp.--with Marshall for a study for the test and evaluation of commercially available state-of-the-art micro electronics for application to stabilized platform electronics systems.

DOD CONTRACTS**Air Force**

University of Tenn., Space Institute--\$66,162 for thrust vector control by electric arc discharge.

North American Aviation, Inc., Rocketdyne Div.--\$393,500 for aerodynamic spike nozzle development.

Litton Systems, Inc., Space Sciences Laboratories--\$51,500 for a study of high energy solid fuel.