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SENATE TO PROBE MOL/AA OVERLAP. The Senate Space Committee, whose post-APOLLO hearings (SPACE Daily, Aug. 24-31) ended on the day the MOL program was officially announced, will devote a selective portion of the annual NASA authorization hearings after the first of the year to possible duplication between the Air Force MOL (Manned Orbiting Laboratory) program and the AA (APOLLO Applications) program space station plans (SPACE Daily, Aug. 30). Both programs call for the initiation of a multi-manned Earth space station program during 1968. Dr. Harold Brown, secretary of the Air Force, admitted recently that in the Earth-orbital field "the military program tends to overlap fairly considerably, and therefore requires and gets considerable coordination with those parts of the NASA program which are aimed at end applications, not scientific experiments."

The Committee also intends to explore in depth the re-definition of the VOYAGER program when NASA defends its budget request for FY '67. Because of the probable \$1.5 billion-plus cost of VOYAGER and the extensive reorientation of the program (SPACE Daily, Aug. 3 & Oct. 4) the Committee will take a "special interest" in this part of the NASA presentation.

KARTH TO VIEW JPL/LUNAR ORBITER/156. Representative Joseph E. Karth (D-Minn.), chairman of the House Space Science Subcommittee, will return to Jet Propulsion Laboratory and Hughes Aircraft, the scene of a recent Subcommittee investigation of the troubled SURVEYOR program (SPACE Daily, March 1 & Oct. 6). Accompanied by Subcommittee staff members, Rep. Weston E. Vivian (D-Mich.) and perhaps a few other members of the Subcommittee, Karth plans to view SURVEYOR progress at JPL and Hughes, observe the demonstration firing of Lockheed's three-million pound, 156-inch solid rocket motor with liquid injection thrust vector control, to be tested on December 1, and move on to review LUNAR ORBITER progress at the Boeing plant in Seattle.

SNAP-8/SNAP 10A MATING DELAYED. Early mating of the SNAP-8 reactor with thermoelectric elements to provide higher powers is not planned by the AEC-NASA Space Nuclear Propulsion Office (SNPO) at this time. Studies of the direct radiating unit (used in SNAP 10A) and the compact thermoelectric converter unit designed to operate in the 1300-degree F temperature capability of SNAP-8 indicate production of about 15 kilowatts of electric power.

The SNPO position is that "it is not necessary to develop such a system now," citing that the major components--the reactor and the thermoelectric subsystem--are under

The Leader in Missile/Space Reporting

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investigation plus the SNAP-10A itself provided verification of the overall operating capabilities of such a system. SNPO concludes that if mission requirements for such a system develop, then overall system development could be undertaken.

STATE WANTS TO KNOW IF USSR SERIOUS ABOUT ORBITAL WARHEADS.

The State Department has filed an official query with the Soviet Union seeking to determine the Soviets' intentions with the orbital missile which was displayed in Red Square this year. State wants to know if the USSR is going to abide by its United Nations pledge not to do what the orbital missile is claimed to be capable of doing.

While the State Department is not objecting to the display of the rocket as a violation of the UN resolution, it is objecting to "the disturbing implications" of the missile in conjunction with Soviet claims of its capability. The Soviet Union has been asked to make clear its "future intentions."

DIPLOMACY USED AS ANTI-ORBITAL MISSILE (An Analysis).

The whole debate over the "orbital missile" i.e., Russia's claim and the State Department's interest in possible violation of previous pledges would be asinine if it did not expose the weakness of our unilateral actions.

The VOSTOK/VOSKHOD booster, displayed Sunday and last May, is capable of the "global" or "orbital" claim by Breznev, as analyzed in July (SPACE Daily, July 7) and so is the TITAN III-C which has made two flights and is readying for its third. The only point of debate and concern, and it would indeed be serious, would be a Soviet Union announcement that it had launched an orbital weapon. At that point, the academic debate of the orbital missile's accuracy and the dangers of its psychological effects would be a thing of the past. In effect, a Cuban crisis in space would be upon us.

However, unlike the Cuban Crisis where we supported our intentions to force a back-down on the part of the Soviet Union in the United Nations from its intent to arm Cuba with a wealth of surveillance photographs, we would have only a very dangerous course of action left to us, i.e., the threat to try and shoot down every Soviet satellite not specifically described for us to our satisfaction. In other words, space would become a no-man's land.

From-space inspection and surveillance is a technique our DOD has not only approved but has come to value but in-space inspection is still deemed either too complicated for our national budget in unmanned versions and too impractical for the intellectuals to accept in a manned version. Until this status quo is drastically altered, and sometimes it seems that MOL will never get around to answering the preliminaries, (Ironically, GEMINI VII and VI may provide the first proof not of APOLLO capability but of DOD SAINT capability.), we have to be content with the State Department providing our defense structure.

Unfortunately, the State Department does not seem to be too qualified to handle this particular defense which for the moment is still one of psychology rather than diplomacy. The asininity of the situation is that our officials and the general press are still bogged down in the debate over accuracy of an orbital warhead rather than in equating

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a Soviet capability with a United States capability and supported with a declaration that we will follow any in-space arming with an equal reaction. We should point out in the most public place that a vehicle like the TITAN III-C is not only capable of orbital warhead transportation but are also capable of salvaging a load of smaller warheads until the accuracy of re-entry is acceptable.

Our country equated and exceeded the threat of a Soviet missile and nuclear dominance of Earth with a deterrent not questioned by any country in the world. Why, then, do we persist in the reluctance to even threaten to develop a space deterrence for fear that history will record us as the first aggressors of space.

BLUE BIRD STIRS DISAGREEMENT. The international consortium for which ComSat is the manager is not entirely pleased with the Corporation's choice of a name for the payloads that will make up the APOLLO-support satellite system to be established before this time next year. That name, BLUE BIRD (SPACE Daily, Nov. 1), continues the avian idiom begun with EARLY BIRD, ComSat's first satellite. Because the consortium originated neither name, its displeasure apparently derives from ComSat's failure to consult with it before allowing the press and general public to coin a label not officially endorsed. Whether it will insist on revoking BLUE BIRD and promulgating a new nomenclature is not now a probability, however.

ABC'S GOLDENSON CAUTIONS ON U.S. IMAGE VIA SPACE

The advent of international television via communications satellites spells danger for the American people because it means they will be observed by foreign countries as much as they will observe those countries. Thus, captured by the "pitiless and unrelenting lens" of the TV camera, the American "image" will be aired before the ultimate audience: the whole of civilization on this planet.

This is the warning given last night in Hollywood to the Hughes Aircraft Management Club by Leonard Goldenson, President of the American Broadcasting Co., which is seeking the right to own and operate a national TV-radio satellite (SPACE Daily, May 18 & Sept. 22). Hughes will build the satellite for ABC if that right is secured (SPACE Daily, June 11 & 14).

"As American citizens, we must realize that worldwide television will be a two-way street," said Goldenson, "...that America's image throughout the world can be blurred or easily warped" by what Americans do almost anywhere in the country, once the international eye is open and operating.

With the FCC ruling on ABC's application expected this year (SPACE Daily, Oct. 29), optimism is mounting within the space community over the company's chances to receive a favorable decision (SPACE Daily, Nov. 12).

MCDONNELL WORKERS TO STRIKE

Members of the International Association of Machinists at McDonnell Aircraft in St. Louis have voted to strike the company as of midnight tonight. Federal Mediation and Conciliation Service Director William Simkin has called a meeting for 10 AM this morning at the Labor Department in Washington to attempt to settle the dispute between McDonnell and the local union. The strike, which has been approved by the IAM may spread to McDonnell workers at Cape Kennedy.

NERVA II DESIGN/PLANNING NARROWS

Harold Finger, manager of the AEC-NASA Space Nuclear Propulsion Office (SNPO), reports that SNPO has defined the NERVA II single engine nuclear engine system and a single propulsion module, which would be made up of a nuclear rocket and its associated propellant tankage. NERVA II would have a thrust level between 200-250,000 pounds and would perform all of the missions presently foreseen for nuclear rockets.

He said this single propulsion module offers a development goal for the nuclear rocket program "that is as independent of the particular mission definition as possible." Finger said the unit aims at a broad class of future missions, including extending the capabilities of the SATURN V vehicle, and would utilize the technology that is already available and being developed under current programs.

For manned planetary missions, the propulsion module would be used in clusters for the Earth departure stage, and in single modules for the planetary orbit and Earth return stages. It would be used singly in the lunar and unmanned missions.

Finger said AEC-NASA envisions phasing over into development of the NERVA II nuclear rocket engine (thrust of 200-250,000 pounds, with reactors designed for four to five thousand megawatts) as the NERVA technology, engine experiments and engine system tests phase out.

ASTRONUCLEAR NEAR-FUTURE NOT PROMISING

Despite pleas by space leaders Dr. Edward C. Welsh and Harold Finger (SPACE Daily, November 17 & 18), the 1965 Atomic Industrial Forum is winding up in Washington with the hard fact remaining that the national nuclear rocket program is no nearer major funding than it ever was.

In fact, the point is becoming increasingly clear that it is most likely that the major development funds for the program will not be forthcoming until the mid 1970s.

Dr. F. P. Dixon, director of planetary mission studies in NASA's Office of Manned Space Flight, emphasized the point of view of those who oppose major development funding of the program now, as he spoke at an AIF panel "Advancing the Applications of Nuclear Power in Space."

NASA To Delay Mission Planning Until Flight

Dixon indicated that NASA will make a decision to "go to Mars with nuclear rockets" after the rocket has first been flown--and only then. Dixon suggested the mid-seventies flight initiation date for nuclear rockets after conferring with other members of the panel (SPACE Daily, Nov. 17).

Dixon praised the potential of nuclear rockets for future missions, backing the high thrust NERVA II with a cluster of nuclear rockets (See above). He said savings with nuclear rockets can pay back R&D costs in five missions going past the Moon.

While supporting increasing R&D funds for the AEC-NASA nuclear program, he pointed out that "must" uses of the nuclear rocket are "not apparent now," and that development funding would require specific missions where the nuclear rocket would be proven clearly advantageous.

Congress Said To Have Short R&D Mind

He added that even if we can now envision the need for the nuclear rocket in a 10-14

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ASTRONUCLEAR NEAR-FUTURE NOT PROMISING - Contd.

year period, it is impossible to get ten- or even five-year funding plans approved.

This point was strongly seconded by Welsh, executive secretary of the National Space Council, and moderator of the panel, who lamented what he called, "short range thinking in regard to research development." Welsh asserted that the greatest problem in development programs is people thinking year-by-year. We need long range thinking in R&D, he said. R&D work never becomes obsolete. Nonetheless, he pointed out that Congress "just won't pay bills in advance."

He said space planners must define specific programs and approve them now, emphasizing that "approved programs get money." He agreed with Finger that we must get technological hardware ready by the time mission planners and developers are ready to make hardware commitments.

Finger pointed out that successful continuance of a nuclear rocket program will become most difficult "when we get to the hardware development stage and have to become selective (because of budget limitations)."

Speaking for the Defense Department, Brig. Gen. Edward B. Giller, director of science and technology, in the Office of the Deputy Chief of Staff for Research and Development, Department of the Air Force, said: "The near future does not look too bright" for the nuclear rocket program.

MARTIN TO STUDY ONBOARD CHECKOUT OF AA EXPERIMENTS

NASA-Houston has contracted with Martin-Denver for a \$270,000 study of the best method of making onboard checkouts of the experiments to be carried in the **APOLLO** Service and Lunar Excursion Modules on **AA (APOLLO Applications)** missions.

Anticipating that onboard monitoring will prove more useful and feasible than remote checking, Houston has asked the company: 1) to study the "11 most problematical" of the 80-odd proposed experiments in order to determine "the range of test requirements," 2) to evaluate various checkout systems and recommend the best one, 3) to draw up the best one's preliminary design specifications, and 4) to fabricate a mockup.

Martin-Denver's program manager for the study is Eugene Wood, past program manager for Denver's work on aerospace ground equipment for **TITAN III** launch systems.

SOLRAD IX TO BE EXPLORER XXX

The ninth in the Naval Research Lab's **SOLRAD** satellite series, set for launch yesterday (SPACE Daily, Nov. 12) between 10:19 and 11:34 PM EST, is now **EXPLORER XXX--** or **SOLAR EXPLORER** (SPACE Daily, Sept. 20 and Nov. 15)--if it achieved orbit last night. It was intended to ride a **SCOUT** from Wallops Island into a 430/630-mile path around the Earth to monitor and measure x-ray emissions from the Sun as part of the American contribution to the International Quiet Sun Year project.

This was the second time a **SOLRAD** rode a **SCOUT**, and NASA and the Navy are currently discussing future trips for the satellite aboard that vehicle. Plans for **SOLRAD X** are still formative, but its launch is presently envisioned for next September, although results of last night's flight may move the date into the summer or push it back into the winter.

NORD TO SUPPLY DRONES FOR NATO CRETE RANGE

NATO's proposed training site on Crete for surface-to-air missiles will use Nord Aviation **CT-20** target drones. The contract for several hundred of the drones is now being negotiated and is expected to be signed before Christmas. Among the contenders for the contract were North American and Northrop.

JINDIVIK DRONE SHOWS RELIABILITY

Britain's **JINDIVIK** target drone, made by the Royal Aircraft Establishment at Llanbedr in North Wales, has made 200 consecutive flights without technical mishap. This brings the number of its missile-range launches since 1960 to over 1000. It has a Bristol Siddeley **VIPER** engine.

ARABIA DEMONSTRATES BRITISH VIGILANT

The British Aircraft Corporation's **VIGILANT** anti-tank missile was recently demonstrated for Prince Abdullah, commander of the Saudi Arabian National Guard. With targets set at 400 to 1200 yards, 22 rounds were fired, with 14 hits, 7 misses (two hitting the ground), and 1 technical failure. For some of the Guard personnel, this was the first firing of live **VIGILANT**s. The missile is 3 feet long, 32 pounds in weight, wire-guided, solid-fueled, and now operational in several foreign countries besides Saudi Arabia.

NERVA "BREADBOARD" TESTS DUE IN DEC.

Next month a series of tests will begin of a "breadboard" **NERVA** (Nuclear Engine for Rocket Vehicle Application) at the AEC-NASA site at Jackass Flats, Nev. The tests will use a "self-contained, self-sustaining, bootstrap-starting engine test system." They will be the first tests of such an integrated system.

SPERRY RAND ESTABLISHES RADAR SCIENCES GROUP

The Sperry Rand Research Center has established a radar sciences group for the purpose of increasing technical support of advanced radar development in the company's operating divisions. The group also will offer direct support to government agencies in such areas as phased array radars, broad band radar systems, high resolution radars, radar waveform design and radar signal processing techniques.

Dr. Robert Price, formerly with MIT's Lincoln Laboratory, will head the new unit. Members of his staff will include Dr. Gerald F. Ross, formerly radar research section head at Sperry Gyroscope; Richard H. T. Bates, who worked on radar systems design at the Mitre Corp.; and Dr. Louis Maisel, formerly with Aerospace Corp., who joined Sperry Rand earlier this year.

Arnold R. LaForce, president and a director of Central Securities Corp., and Phillip LeBoutillier Jr., a former Deputy Assistant Secretary of Defense (Supply and Logistics), have been elected to the board of directors of General Precision Equipment Corp.

DOD PRIMES TO LABOR SURPLUS AREAS INCREASE TO 17.2%

The Department of Defense awarded 17.2 per cent of the total \$24.3 billion awarded in contract actions over \$10,000 or \$4.2 billion in prime contracts to labor surplus areas in FY '65. This is up from the preliminary estimate of 16 per cent or \$3.8 billion (SPACE Daily, Nov. 2). In conducting programs for labor surplus areas, the Navy awarded \$1.4 billion in contracts, the Air Force \$1.3 billion, the Army \$867 million and the Defense Supply Agency \$456 million, with other Defense agencies and civil functions awarding the remainder.

The number of "major" substantial and persistent labor surplus areas declined from 44 in FY '63 to 38 in '64 and to 29 in '65. The overall number of substantial labor surplus areas also declined, from 758 in FY 1964 to 614 in FY 1965. These decreases were attributed by the DOD to the upsurge in the economy during the year.

RAYNES ELECTED ROHR CHIEF EXECUTIVE OFFICER

In its first meeting since the death of Fred H. Rohr, founder, chairman, and chief executive officer of Rohr Corp., the company's board of directors elected Burt F. Raynes, president and a member of the board, to succeed Rohr as chief executive officer. F. E. McCreery, senior vice president, was elected to fill the vacancy on the board and was promoted to executive vice president.

The board also agreed to adjourn the December 13 annual stockholders' meeting until January 10, 1966, at which time a proposal to increase the number of members on the board from its present five to seven will be submitted to the shareholders for approval. Proxy statements will be mailed to the stockholders within the next few days and will contain two names, in addition to the five present members, to be submitted as management nominees for board membership. They are Fred H. Rohr Jr., vice president, and Herbert F. Sturdy, senior partner in the Los Angeles law firm of Gibson, Dunn and Crutcher. The present board members are Raynes; McCreery; Guy M. Harrington, treasurer; I. M. Laddon; and B. P. Lester.

AEL ACQUIRES EMTECH IN FIRST WESTERN MOVE

American Electronic Laboratories of Colmar, Pa., has acquired Electromagnetic Technology Corp. (Emtech) of Palo Alto, Calif., in its first move to the West Coast. The acquisition was in the form of cash purchases of the major part of Emtech's stock.

AEL is a producer of specialized communications equipment, including antennae and microwave components, while Emtech manufactures high-powered microwave filters and other devices for radar, communications and reconnaissance systems. Emtech president Dr. William A. Edson will continue to direct its operations.

FAIRCHILD SPACE SYSTEMS APPOINTS DIRECTOR/MANAGER

Harry Dornbrand has been named director of engineering, and John S. Kerr has been appointed manager of marketing for Fairchild Hiller's Space Systems Division. Dornbrand had been manager of the former Republic Aviation's Space Systems Division, and Kerr was previously manager of Systems Engineering for the Fairchild division.

LA HEARING ON SPACE TECHNOLOGY METHODS IN URBAN AFFAIRS

The newly established Senate Subcommittee on the Utilization of Scientific Manpower is holding a hearing in Los Angeles today on how to apply space-age technology to social and economic problems.

Chairman Gaylord Nelson (D-Wis.) is conducting the hearing, which will deal specifically with his bill to provide \$125 million in grants to states and the Federal Government for the application of modern scientific techniques to domestic problems. Specific techniques being investigated are those used in space exploration and in developing modern weapons systems. The first witness is Governor Pat Brown whose state has already awarded four research and development contracts to space-oriented firms for studies on waste management, transportation, crime prevention, and information handling.

ONE BALANCE OF PAYMENTS FAVORABLE/THE OTHER ADVERSE

The balance of international payments, as measured by changes in United States official reserve assets and in liquid liabilities to all foreigners, was adverse by \$485 million in the third quarter of 1965 after showing a favorable balance of \$247 million for the second quarter. At the same time reserve assets were reduced by only \$40 million in the third quarter, following a \$68 million dip in the second. Liquid liabilities increased \$445 million, compared to a \$315 million reduction for the second quarter.

On the other hand, the balance of international payments, as measured by changes in United States official reserve assets and in liquid and certain nonliquid liabilities to foreign official agencies only, was favorable by \$260 million in the third quarter, showing a moderate improvement over the corresponding second quarter figure of \$210 million. The difference between the above versions was attributed to a sharp increase in this country's liquid liabilities to foreign private accounts.

It was decided to begin to publish two calculations of the U. S. international payments balance after a committee chaired by the Bureau of the Budget had evaluated the recommendations for a change made by the Review Committee on Balance of Payments Statistics. The main difference between the two balances is the exclusion from the latter of changes in United States liquid liabilities to foreign private holders and non-monetary international organizations. The other difference is changes in certain nonliquid liabilities to foreign official organizations, which are included in the second balance but not in the first one.

FIRST POLARIS LAUNCHERS DELIVERED TO BRITAIN

Westinghouse has delivered the first 16 POLARIS missile launchers to their shipyard destinations in Britain. Under the U. S. -U. K. agreement, 64 launchers and weapon systems, minus warheads, are to be delivered to the U. K. for installation in British nuclear submarines.

Irving Freedman, formerly environmental and reliability test engineer at Litton Systems, has been named the head of the Washington, D. C., office of Tenney Engineering. Freedman succeeds Robert Gagnon, who has returned to the company's Union, N. J., headquarters to become manager of Relialab products.