



Space

INTELLIGENCE NOTES

SPACE SYSTEMS INFORMATION BRANCH, GEORGE C. MARSHALL SPACE FLIGHT CENTER

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FROM THE WORLD PRESS

ATOM RESEARCH PLANNED IN ISRAEL. The American Technion Society and the Israeli Atomic Energy Commission are working jointly to build a nuclear science center and to train nuclear engineers. The center will be located on Technion's Mount Carmel campus.

B. Sumner Gruzen, architect and president of the American Technion Society, reported recently that as part of a recent agreement between the US and the Israeli Atomic Energy Commission, 4 tons of heavy water to be used for nuclear research have arrived in Israel. The water was shipped to the Technion-Israel Institute of Technology at Haifa, which is supported by the American group. The water is valued at tens of thousands of dollars per ton.

Mr. Gruzen stated at the opening session of the Conference on Science and Technology in Israel and the Middle East, "the full utilization of atomic energy would accelerate the development of Israel's Negev Desert and enable the nation to settle its heavy influx of immigrants". (Source: NASA Current News, October 29, 1963)

COSMOS-21 IN FLIGHT. The Soviet news agency Tass has announced that on the 11th of November 1963 the artificial Earth satellite Cosmos-21 was launched successfully.

The satellite carried scientific apparatus in order to continue the study of cosmic space in accordance with the program announced by Tass 16 March 1962.

According to preliminary data, the satellite achieved an orbit close to that calculated and had the following parameters: initial period of rotation--88.5 min, maximum distance from the Earth's surface (in apogee)--229 km, minimum distance (in perigee)--195 km, angle of inclination of the orbit towards the plane of the equator-- $64^{\circ} 50''$.

The satellite carried a radio system for the accurate measurement of the orbital elements and a radio telemetric system for the transmission to Earth of data concerning the functioning of the scientific instrumentation installed on board.

Observation of the satellite and the receipt of telemetric information is being conducted by terrestrial stations of the Command-Computation Complex, distributed on Soviet Union territory. (Source: Pravda (Truth), November 13, 1963)

OBERTH HONORED. On the eve of the 12th annual symposium of the Rocket and Space Society (20-22 September 1963) held at Hamburg, Germany, it was resolved that henceforth the society will be known as the Hermann Oberth Gesellschaft, e.V. in honor of Prof. Dr. Hermann Oberth, for his fundamental achievements in the field of space exploration.

More than 350 scientists, engineers, physicists, and physicians from Germany and abroad participated in the proceedings. (Source: Luftfahrt-technik-Raumfahrttechnik (Review of Aeronautics & Astronautics), October 1963)

FRENCH CAT-IN-SPACE. An Armed Forces Ministry communique reported October 18 that France had successfully sent a cat into space on board a Veronique rocket and brought it back to Earth again.

The rocket was fired from Hammaguir base in the Sahara.

The announcement did not indicate how high the rocket carried the cat, but in 1960 a Super-Veronique carried a mouse up 120 mi.

This experiment is part of France's space biology research program in which three rodents have already been sent aloft. (Source: NASA Current News, October 19, 1963)

SOVIET BLOC REPRESENTATIVES NOT RE-ELECTED. Soviet bloc representation in the International Astronautical Federation suffered a setback during voting at the conclusion of the IAF Congress in Paris, held October 1.

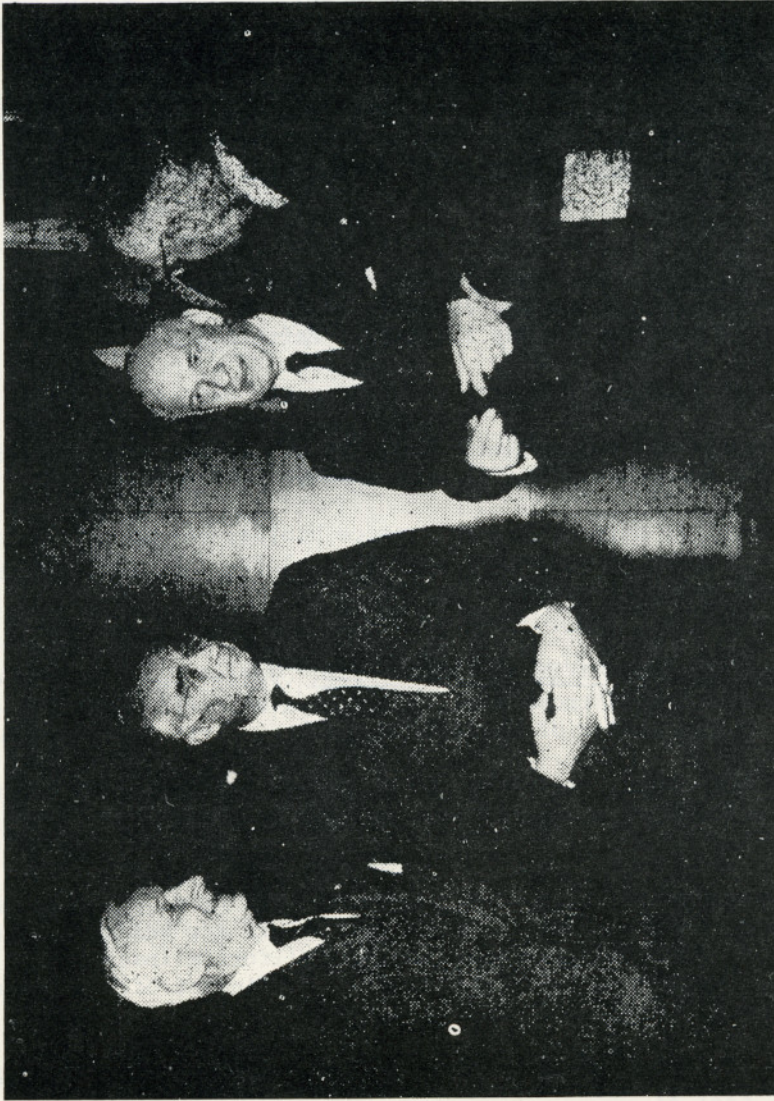
Professor Michel Lunc, president of the Polish Astronautical Society, was the only Soviet bloc participant who was re-elected as a vice-president.

Russia's Leonid Sedov, former IAF president, and Prof. Nicolas Boneff, Bulgaria, were not re-elected. Sedov and Boneff are being replaced by Dr. William H. Pickering, director of the California Institute of Technology's Jet Propulsion Laboratory, and N. N. Nicolet of Belgium as vice-presidents.

Edmund Brun of France was re-elected to the presidency of this organization. (See Fig. 1)

The next Congress is to be held next fall in Warsaw, Poland. (Source: Flugwelt (Aviation World), September 1963)

Fig. 1.



In the group above are (left to right) Prof Georges Fleury, president of the French Astronomical Society; Academician Leonid J. Sedov of the Soviet Academy of Sciences; M Gaston Palewski, French Minister for Scientific Research; and Prof E. A. Brun, president of the IAF.

COSMOS-22 IN FLIGHT. Tass (the Soviet News Agency) announced recently that the artificial Earth satellite, Cosmos-22, was launched in the Soviet Union on November 16, 1963. Scientific instrumentation for the continuance of cosmic study, in accordance with the program announced by Tass on March 16, 1962, was placed on board the satellite.

The satellite was orbited with these parameters: initial orbital period --90.3 min, apogee--394 km, perigee--205 km, angle of orbital inclination to the equatorial plane--64° 56".

In addition to the scientific apparatus, the satellite carried a radio transmitter operating on 19.995 Mc/sec, and a radio telemetric system for the transmission of data to Earth regarding the operation of the devices and scientific apparatus.

The equipment on board the satellite is functioning normally. The Co-ordination-Computation Center is continuing its study of the in-coming data. (Source: Pravda, November 17, 1963)

JAPAN LAUNCHES FIRST MISSILE SHIP. Japan's first missile-equipped warship was launched October 5 at the Mitsubishi shipbuilding yard in southwestern Japan.

The 3500-ton (3800-metric ton) vessel, Amatsukaze (Heavenly Wind), constructed for the Japanese maritime self-defense force, is armed with Japanese-made tartar ship-to-air missiles and anti-submarine weapons.

Amatsukaze, built at a cost of \$22.2 million, is scheduled to be completed next year. (Source: NASA Current News, October 5, 1963)

SPACE TELEPATHY STUDIED. A US space official recently reported that Soviet and Western scientists are studying the possibility of using something like telepathy to establish "mind-to-mind" communication between people on Earth and astronauts on the Moon.

The subject of "information transfer" without discernible means of physical support was touched upon in a paper by Dr. Eugene B. Konecci at a meeting of the International Astronautics Federation (IAF) in Paris on September 26. (Source: NASA Current News, October 1, 1963)

FROM THE SEMITECHNICAL LITERATURE

NEW CONTRIBUTION TO SPACEFLIGHT, by M. V. Keldysh. Reporters for the newspapers Pravda, Izvestiya, and for the Tass News Agency appealed to M. V. Keldysh, the president of the Academy of Sciences USSR, for information concerning the significance of the launch of Polyot-1 in the further development of cosmic flight and in the study of space.

Question: "How do you evaluate the significance of the launch of the cosmic device Polyot-1?"

Answer: "The successful launch of the world's first maneuverable cosmic device Polyot-1 is a considerable jump in the systematic mastery of cosmic space by Soviet science. The new outstanding victory of the Soviet scientists, constructors, engineers, technicians, and workers once again testifies to the leadership of the Soviet Union in areas of the utmost difficulty and complexity in scientific advancement.

"This new technical achievement has a very great significance for the development of cosmology and cosmic study."

Question: "What significance does the launch of the cosmic device Polyot-1 have for the scientific observation of the cosmos?"

Answer: "The successful maneuvers of the cosmic device significantly enlarge the capability for the investigation of matter in cosmic space.

"The accomplishment of flight maneuvers permits a change in the angle of inclination of the orbit of the satellite to the equator. Then, aided by scientific devices placed on such a maneuverable satellite, it would be possible to make measurements in various zones of the cosmic expanse. During this process orbits could be changed according to an earlier established program, or the cosmic device could be directed from Earth by radio commands.

"After flight attitudes have changed, it would be possible to obtain information about high altitude changes in matter in circum-terrestrial cosmic space.

"Orbital maneuvers may prove to be desirable for the utilization of satellites for meteorological aims."

Question: "What significance does the launch of the cosmic device Polyot-1 have on the development of manned flight on ship-satellites?"

Answer: "The launch of the cosmic device Polyot-1 demonstrates the transition from a flight basically in a pre-determined orbit to a flight with a wide maneuver.

"The launch of such a device is a significant stride toward the creation of ship-satellites capable of in-flight guidance. On such cosmic ships man will have the capability to travel in space according to his own discretion. Thus, cosmic ships will become even more obedient to the will of mankind.

"Maneuverable cosmic ships will permit landing from any orbit at a given cosmodrome, will accomplish rendezvous of spaceships that are flying along various orbits, and will enable cosmonauts to choose the most suitable landing site.

"A maneuvering capability for ships allows the creation of heavy orbital scientific-experimental stations in the cosmos with replacement of crews, changes in scientific equipment, and maintenance of uninterrupted supply of necessities for that station."

Question: "What significance does the launch of the cosmic device Polyot-1 have for distant cosmic flights?"

Answer: "The significance of the launch for distant cosmic flights is that a flight of cosmic automatic devices and interplanetary manned ships to the Moon and planets of the Solar System is practically impossible

without the maneuvering of these crafts in their flight trajectories and in the vicinity of the planets.

"In addition, one of the methods for building heavy cosmic ships for manned flight to the Moon, Mars, and Venus appears to be their assemblage in sections on an orbit of an Earth satellite. Individual sections of such cosmic ships can be visualized as maneuverable cosmic devices.

"Launched interplanetary manned ships toward the Moon and planets of the Solar System may be considerably lightened, if constantly operating heavy orbital stations are created in orbits, and if the relief of crews and re-supply can be accomplished through the use of maneuverable cosmic devices.

"The landing of cosmic ships on a given area of the Earth on their return from flights to the Moon, Mars, or Venus cannot be accomplished unless the ships complete complex maneuvers.

"Thus, the creation and launch of the maneuverable cosmic device Polyot-1 is a new step toward the solution of intricate problems involving distant cosmic flights.

"The given examples for the employment of maneuverable devices only begin to illustrate the complexity of tasks that may be solved by their use. The scientists, constructors, engineers, technicians, and workers who created the cosmic device Polyot-1 have made a valuable contribution to the study of cosmic space and the development of cosmic flight." (Source: Pravda, November 2, 1963)

A TERRESTRIAL PROJECTOR ILLUMINATED THE MOON, The first Soviet experiment of a "Cosmic Application" for quantum generators was conducted by a group of co-workers at the Lebedev Institute of Physics at the Crimean Astro-Physical Observatory.

A laser, placed within the focus of a 2.6-m telescope at the Crimean Observatory--the largest reflector in the Eastern hemisphere--transmitted powerful light impulses in the direction of the Moon. A special receiver with extremely sensitive photo-multipliers placed within the focus of the telescope received the impulses reflected from a small zone of that region of the "new" Moon that was receiving solar rays. In order to obtain reliable results, it was necessary to repeat the experiment several times. The intensity of the received pulses were 10^{19} times weaker than those transmitted.

"The photographic detection of the Moon," said A. B. Severny, director of the Crimean Observatory and corresponding member of the Academy of Sciences USSR, "has a tremendous significance for astronomy and cosmology. Now we have the capability of determining the lunar configuration and the distances to various areas of the lunar surface, and an accuracy of at least a hundred times better than any other presently known method."

Newton once said that his head ached from the theory of lunar movement, and this situation has changed very little up to the present. Photographic detection will permit the establishment of an accurate picture of the movement of the Moon around the general center of the mass of the Earth-Moon system. It is possible that some solutions will be found for the origination of the Earth's satellite. (Source: Izvestiya, November 6, 1963)

FROM THE TECHNICAL LITERATURE

BIOLOGICAL SCIENCES

NEW DRUGS FOR RADIATION PROTECTION. Soviet scientists and members of the USSR Academy of Medical Sciences reported at the International Astronautical Federation, Bioastronautics sessions in Rome, Italy, that good results were achieved in developing several drugs for radiation protection. Scientists P. P. Saksonov, V. V. Antipov, V. S. Shashkov, B. L. Razgorov, and G. F. Murin stated that a number of compounds injected into the peritoneum (abdominal lining) of mice for 15-30 min before irradiation are showing promising results.

The compounds used in tests were cystamine dichlorhydrate, dihydrobromide aminoethyl-isotiuronium (AET), serotonincreatin-sulfate, 5-methoxytryptamine chlorhydrate, tryptamine chlorhydrate, and 5-oxytryptophan.

As early as 1959, Soviet space physicians were successfully testing chemicals that could reduce the degree of radiation damage to living organisms. Antiradiation drugs may never be a substitute for effective radiation shielding, but they may be able to reduce radiation damage by about one-half.

The case history of a 33-yr-old female patient is reported by the Soviet Ophthalmological Branch of Medicine in its June 1963 publication. The patient, who was accidentally exposed to general external gamma radiation from Co⁶⁰ with an activity of 40 Kg equivalent of Ra, is described. The radiation dose equaled 500 R (roentgen) on the head, 650 R on the chest and abdomen, 4000 R on the wrist, and 300 R on the feet.

Symptoms of acute radiation sickness (pain in stomach, burning in the left wrist, dizziness, vomiting) appeared within a few minutes.

Treatment consisted of severe blood letting (750 to 550 ml) and of blood transfusions of the same type of blood plus 10 ml serotonin. A total of 10 hemotransfusions, transfusion of leucoerythro-thromobocyte mass, plasma, blood substitutes, and 0.5% novocain solution were made. Two bone marrow transplants were administered (the first consisted of 2,225,650,000 cells in 170 ml plasma, administered on the 6th day; the second consisted of 2,235,130,000 cells in 225 ml plasma, administered on the 14th day). In addition, the patient received antibiotics of broad spectrum-vitamin therapy, desensitizing agents, vicasol, kefir, and fruit juices. Major changes were noted in the form of marked and prolonged fall of diastolic pressure in the central retinal artery and enlarged caliber of retinal arteries and veins. After 35 days, the patient began a period of convalescence, and by the 65th day the leucocyte number had risen to 4400, at which time the patient was discharged.

The question arises: what processes actually occur within a cell protected against radiation? Free radicals are trapped by lack of oxygen produced by these chemical compounds. Formation of free radicals is inhibited. Proteins are shielded because their energy is syphoned off by combination with the drugs. Proteins are shielded because of a change in the metabolic activity, resulting from the combination with chemicals.

The Russian Military Medical Journal (Voenno Med. Zhur.) reported in 1960 that good results were obtained with a combination of cysteine and potassium cyanide. It was found that the resistance of animals to radiation sickness increases markedly after acclimation to hypoxia. The resistance of such acclimated animals (mice and rats) to radiation could be further increased by injecting cysteamine or cystamine in them before irradiation. Cysteine was successfully injected into rats that had received citrine for 30 days previously. These animals proved to be more resistant to radiation than rats that received only cysteine.