M-MS-IS

Space INTELLIGENCE NOTES

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

November 1961 Vol. 2 No. 11

FEATURED ARTICLES *Page*

<u>NASA TRANSLATIONS</u>. The following NASA Translation List No. 3 is the third in an informal series to be issued monthly by the Office of Technical Information and Education Programs (OTIEP). In order to make these lists available to a greater number of persons, SIN will reproduce them each month as they are received.

Persons within MSFC may order these translations by contacting M-MS-IPL, phone 876-8386.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
Office of Technical Information and Educational Programs
Washington

NASA TRANSLATION LIST NO. 3

September 1961

The purpose of this monthly list is twofold: (1) to announce promptly the availability of translations, and (2) to avoid duplication of translation effort. In order that this dual purpose may be achieved NASA centers and contractors are requested to: (a) check with OTIEP before undertaking a translation, (b) notify OTIEP of translations in process, and (c) send to OTIEP one copy of all translations completed.

PART I: Translations Completed

NASA translations are listed in Section A. Translations in the TT F-1 series are published and distributed as NASA Technical Translations. Translations in the TT F-8000 series are available upon request from OTIEP. Requests for translations in the JPL AI/Trans. series should be directed to the Jet Propulsion Laboratory. Non-NASA translations that are provided to OTIEP and are of interest to NASA technical programs are listed in Section B.

A: NASA Translations

Index No.

143. Arushanov, G. S. — NASA TT F-8061
A TWO-PLATE CRYSTAL LIGHT MODULATOR.
Tekh. Kino i Televideniya, No. 12, 32-8(1958).

144. Bayevskiy, P. — NASA TT F-8069
BIOTELEMETRY AND FLIGHT INTO THE COSMOS.
Ekonomicheskaya Gazeta, July 16, 1961.

145. Denisse, J. F. — NASA TT F-72
SOLAR RADIO PHENOMENA AND THEIR PHYSICAL INTERPRETATION. Paper presented at the 13th General Assembly of the Union Radio Scientifique Internationale, London, Sept. 12, 1960. $0.50(OTS)

146. Ferrari, C. — NASA TT F-71
THE LAMINAR BOUNDARY LAYER AT HYPERSONIC SPEEDS.
Aerotecnica 36, No. 2, 68-94(1956). $1.50(OTS)

147. Fialko, E. I. NASA TT F-8072
CERTAIN AND CASUAL DETECTION OF UNSTEADY METEOR TRAILS.
Radiotekhnika 16, No. 6, 24-33(1961).

148. Imyanitov, I. M. NASA TT F-8062
ELECTRIC FIELDS IN POWERFUL CUMULI AND THUNDERCLOUDS, AND UTILIZATION OF DATA ABOUT THEM TO PERMIT AIRCRAFTS TO BY-PASS THUNDERSTORMS.
Trudy Glavnoy Geofiz. Observatorii im. A. I. Voeykova 97, 5-15(1960).

149. Istomin, V. G. NASA TT F-69
MAGNESIUM AND CALCIUM IONS IN THE UPPER EARTH'S ATMOSPHERE.
Doklady Akad. Nauk SSSR 136, No. 5, 1066-8(1961). $0.50(OTS)

Kashcheyev, B. L. NASA TT F-68
RADAR OBSERVATIONS OF METEORS ACCORDING TO THE INTERNATIONAL GEOPHYSICAL YEAR PROGRAM.
Pages 40-53 of INVESTIGATIONS OF IONOSPHERE AND METEORS. IGY Program, Sect. V, No.2.
Moscow, Academy of Sciences, USSR, 1960. $0.50(OTS)

151. Khlyustov, Yu. N. NASA TT F-8071
INFLUENCE OF THE FLIGHT OF BRIGHT METEORS ON RADIO RECEPTION.
Byull. Vsesoyuz. Astron. Geodez. Obshchestva, No. 10, (7). 37-8(1951).

152. Kirenskiy, L. V., Buravikhin, V. A., and Savchenko, M. K., MOTION PICTURE PHOTOGRAPHY OF VARIATION PROCESSES OF THE DOMAIN STRUCTURE OF THIN FERROMAGNETIC FILMS IN A MAGNETIC FIELD. NASA TT F-8071
Fiz. Metal. i Metalloved. 11, No. 4, 529-32(1961).

153. Kohlschutter, A. NASA TT F-8066
TABLES FOR GALACTIC RECTANGULAR COORDINATES OF MOTION.
Veroffentlichungen der Universitats-Sternwarte zu Bonn, No. 2, 1930. 7 p.

154. Levin, B. Yu NASA TT F-8065
DISTRIBUTION OF THE TRUE RADIANTS OF METEORIC BODIES UP TO THE LIMIT OF THE MASS.
Pages 54-60 of INVESTIGATIONS OF IONOSPHERE AND METEORS. IGY Program, Sect. V, No. 2.
Moscow, Academy of Sciences, USSR, 1960.

155. Mustel', E. R. NASA TT F-806[illegible]
RESULTS OF A STATISTICAL STUDY OF GEOMAGNETIC DISTURBANCES FOR FIVE CYCLES OF SOLAR ACTIVITY.
Astron. Zhur. 38, No. 1, 28-44(1961).

156. Savitskiy, E. M., Terekhova, V. F. and Naumkin, O. P. ULTRALIGHT LITHIUM ALLOYS. NASA TT F-807[illegible]
Tsvetnyye Metal. 5, 58-61(1961).

157. SOMETHING NEW ON VENUS TEMPERATURE. NASA TT F-806[illegible]
Ekonomicheskaya Gazeta, No. 6, 44, September 11, 1961.

158. Spivak, G. V., Sirotenko, I. G., and Ivanov, P. D. MICROMAGNETIC STRUCTURE OF FILMS OBTAINED BY CATHODE SPRAYING. NASA TT F-8067
Zhur. Tekh. Fiz. 31, No. 6, 754-6(1961)

159. Vaysberg, O. L. NASA TT F-8073
A POSSIBLE MECHANISM OF RETARDATION OF EARTH'S ROTATION.
Astron. Zhur. 38, No. 3, 545-8(1961).

160. Bass, F. G. and Kaner, E. A. AFCRL 709
PHASE AND AMPLITUDE FLUCTUATIONS DURING VERY DISTANT ELECTROMAGNETIC WAVE PROPOGATION OVER THE EARTH'S SURFACE.
Izvest. Vysshikh Ucheb. Zavedeniy, Radiofiz. 4, No. 2, 377-9(1961).

161. Bass, F. G. AFCRL 511
ON THE THEORY OF COMBINATION SCATTERING OF WAVES ON A ROUGH SURFACE.
Izvest. Vysshikh Ucheb. Zavedeniy, Radiofiz. 4, No. 1, 58-66(1961).

162. Borodina, S. V. AFCRL 571
ANALYSIS OF THE SHAPE OF ATMOSPHERICS.
Trudy Nauch. Issledovatel'. Inst. Zemn Magnetizm., Ionosfer. i Rasprostr. Radiovoln, No. 17(27), 3-26(1960).

163. Ginzburg, V. L. AFCRL 533
ON THE CONSERVATION LAW AND EXPRESSION FOR THE ENERGY DENSITY IN THE ELETRODYNAMICS OF ABSORBING AND DISPERSING MEDIA.
Izvest. Vysshikh Ucheb. Zavedeniy, Radiofiz. 4, No. 1, 74-89(1961).

164. Ivanov, V. I. AFCRL 710
APPLICATION OF CONFORMAL MAPPING TO THE SIMPLEST PROBLEMS OF WAVE PROPAGATION IN INHOMOGENEOUS MEDIA.
Zhur. Vychisl. Mat. i Mat. Fiz. 1, No. 2, 246-54(1961)

165. Kaji, I. and Ozawa, Y. AEC-tr-4381
DISPERSION RELATIONS OF PLASMA OSCILLATIONS.
Nihon-Genshiryoku-Gakkai Shi (Journal of the Atomic Energy Society of Japan) 2, 182-9(1960). $0.50(OTS

166. Korshunov, V. A. and Skrotskii, G. V. AFCRL 395
ON THE QUESTION OF THE DOPPLER EFFECT IN THE THEORY OF VAVILOV-CHEREN OV LUMINESCENCE.
Izvest. Vysshikh Ucheb. Zavedeniy, Fiz., No. 4 56-9(1960).

167. Mitiakova, E. E., Mitiakov, N. A., and Rapoport, V. O. AFCRL 568
ON THE QUESTION OF THE MEASUREMENT OF THE ELECTRON CONCENTRATION IN THE IONOSPHERE AND INTERPLANETARY SPACE.
Izvest. Vysshikh Ucheb. Zavedeniy, Radiofiz. 3, No. 6, 949-56(1960).

168. Natanson, I. P. AEC-tr-4503
CONSTRUCTIVE THEORY OF FUNCTIONS.
Moscow, Leningrad, State Publishing House of Technical-Theoretical Literature, 1949. $6.50(OTS)

169. Pisareva, V. V. AFCRL 708
ON THE QUESTION OF THE LIMITS OF APPLICABILITY OF THE SMOOTH PERTURBATIONS METHOD IN THE PROBLEM OF RADIATION PROPAGATION THROUGH A MEDIUM WITH INHOMOGENEITIES.
Izvest. Vysshikh Ucheb. Zavedeniy, Radiofiz. 4, No. 2, 376-7(1961).

170. Vsekhsviatskaya, I. S. and Tsedilina, E. C. AFCRL 570
CORRELATION FUNCTION OF THE AMPLITUDES OF SIGNALS SCATTERED FROM AN ABSOLUTELY ROUGH SCREEN.
Trudy Nauch. Issledovatel'. Inst. Zemn. Magnetizm., Ionosfer. i Rasprostr. Radiovoln, No. 17(27), 287-91(1960).

171. Zinichev, V. A., Ryzkov, Yu. A., and Yudin, O. I. AFCRL 396
METHOD OF INVESTIGATING RADIOWAVES IN THE TROPOSPHERE UNDER LARGE ANGLES.
Izvest. Vysshikh Ucheb. Zavedeniy, Radiofiz. 4, No. 1, 177-8(1961).

172. Zubov, V. I. AEC-tr-4494
MATHEMATICAL METHODS OF INVESTIGATING AUTOMATIC REGULATION SYSTEMS.
Leningrad, State Publishing House for the Ship-building Industry, 1959. $4.00(OTS)

PART II. TRANSLATION IN PROCESS

Translations "in process" will be listed in Part I upon completion. Requests for these translations should be made only after they are announced in Part I.

173. Alimov, Yu. I.
ON THE PROBLEM OF STABILITY OF RELAY SYSTEMS FOR AUTOMATIC CONTROL.
Izvest. Vysshikh Ucheb. Zavedeniy, Mat., No. 1, 3-10(1960).

174. Byutner, E. K.
SETTLING TIME OF A FIXED AMOUNT OF OXYGEN IN THE ATMOSPHERES OF PLANETS CONTAINING WATER VAPOR.
Doklady Akad. Nauk SSSR 138, No. 5, 1050-3(1961).

175. DEVELOPMENT OF SOUNDING ROCKETS IN JAPAN
Seisan-Kenkyu (Production Research) 12, No. 12, 459-523(1960).

176. Dobretsov, L. N NASA TT F-73
ELECTRON AND ION EMISSION.
Moscow-Leningrad, State Publishing House for Technical-Theoretical Literature, 1952. 311 p.

177. Gurevich, A. V.
PERTURBATIONS IN THE IONOSPHERE CAUSED BY A MOVING BODY.
Trudy Nauch. Issledovatel'. Inst. Zemn. Magnetizm., Ionosfer. i Rasprostr. Radiovoln, No. 17(27), 173-86(1960).

178. IGY World Data Center B 1, USSR. BIBLIOGRAPHY, No. 4, Part 1. Moscow, Institute of Aeroclimatology, 1960.
(Translation of Russian references)

179. Kirenskiy, L. V., Buravikhin, V. A., Kan, S. B., and Degtyarev, I. F.
DOMAIN STRUCTURE OF THIN FERROMAGNETIC FILMS.
Izvest. Sibir. Otdel. Akad. Nauk SSSR, No. 5, 3-9(1961).

180. Krasnushin, P. E.
BOUNDARY PROBLEM OF ELECTROMAGNETIC WAVE PROPAGATION IN SPHERICALLY STRATIFIED ANISOTROPIC DISSIPATIVE MEDIUM.
Doklady Akad. Nauk SSSR 138, No. 4, 813-16(1961).

181. Pontryagin, L., Andronov, A., and Vutt, A.
ON STATISTICAL INVESTIGATION OF DYNAMIC SYSTEMS.
Zhur. Eksptl' i Teoret. Fiz. 3, 165-80(1933).

Severnyy, A. B.
INVESTIGATION OF DEUTERIUM IN THE SUN.
Izvest. Krymsk. Astrofiz. Observ. 16, 12-44(1956).

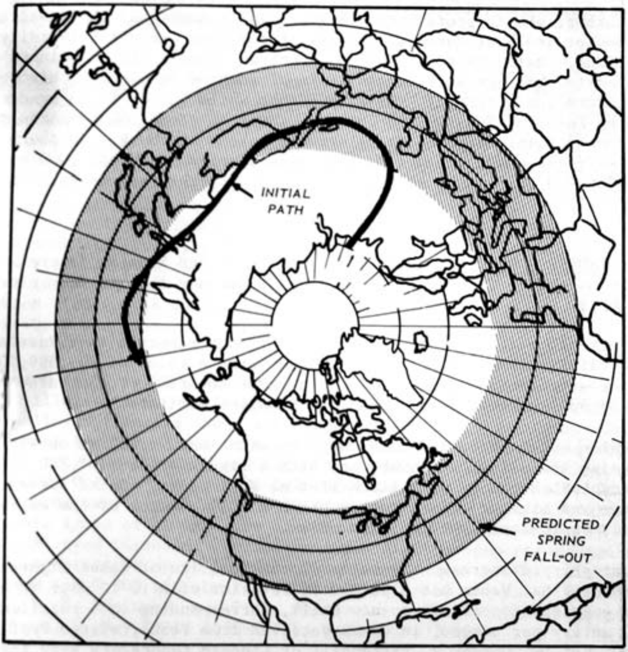
ten Bruggencate, P., Gollnow, H., Gunther, H., and Strohmeier, W.
DIE MITTE-RAND-VARIATION DER BALMERLINIEN (H - H) AUF DER SONNENSCHEIBE.
Z. Astrophys. 26, 51-78(1949).

Voigt, H. H.
DAMPFUNG UND MITTE-RAND-VARIATION DER FLUGEL DER Mg-SERIE 3^1P-n^1D AUF DER SONNE.
Z. Astrophys. 26, 51-78(1949).

AUTHOR INDEX

SOVIET NUCLEAR TESTS. Through the end of October The Soviet Union had detonated 28 nuclear devices, 27 in the air and one underwater. On 23 and 30 October huge bombs in the 30 to 60 megaton range were exploded, by far the largest ever created by man. The bombs were fired on the island of Novaya Zemlya in the Artic wastes.

There was some speculation that the 30 megaton of 23 October exploded at an altitude of only 12,000 ft, which was very low for such a powerful device. If this occurred, the fireball may have reached the surface and actually sucked up materials into the radioactive debris of the explosion. According to the New York Times (27 October 1961), the Soviets may have either miscalculated the force of the explosion, or the bomb exploded at a lower than planned altitude. The map below, from U. S. Weather Bureau data, shows the initial path of the radioactive particles and the predicted spring fall-out zone.



Whatever military and political reasons the Soviets may have had for developing their superbombs, one result was certain. Psychologically, average men from all corners of the Earth had to cope with the fact that not only had the Russians the largest and most powerful operational rockets but that they possessed the most terrifying weapons as well. (Source: New York Times, October 27, 1961)

SOVIET PRIMARY EDUCATION. Much has been written of the quantity and quality of higher Soviet education in science and technology but relatively little has been publicized on the subject of the early years of a child's academic training. In a review of a book entitled "What Ivan Knows That Johnny Doesn't" (Random House) by Dr. Arthur S. Trace, Jr., it is learned that Russian fourth grade youngsters regularly read books requiring a vocabulary of about 10,000 words whereas American pupils in the same grade are limited to reading books with fewer than 1,800 word vocabularies.

The author, who is professor of English and a member of the Institute for Soviet and East European studies at the John Carroll University in Cleveland, states that not only do American schools lag in science and mathematics but are at least as seriously behind in reading, history, literature and geography. He writes that while Soviet fifth graders are reading Pushkin, Tolstoy and Chekhov, their American counterparts are given only simple stories by relatively unknown authors. Furthermore, Russian first grade primers contain vocabularies of about 2,000 words, at least 200 words more than typical U. S. fourth grade works. (Source: New York Times, October 27, 1961)

U. S., RUSSIAN VENUS MEASUREMENTS. The U. S. and Russian determinations of the magnitude of the astronomical unit are now in extremely close agreement.

Dr. Kotelnikov of the USSR Academy of Sciences reported that Russian radar returns from the planet Venus indicated a value of 149,599,500 km for the astronomical unit. This is a major revision of the value of 149,469,500 km first released by the Russians earlier.

The value obtained by the USSR compares with 149,598,820 km obtained by JPL using the Goldstone radar, and with a figure of 149,597,850 km obtained by Lincoln Laboratory with its Millstone Hill radar. Total spread between maximum and minimum values is now about 0.001%. Value of the astronomical unit is approximately 93 million miles.

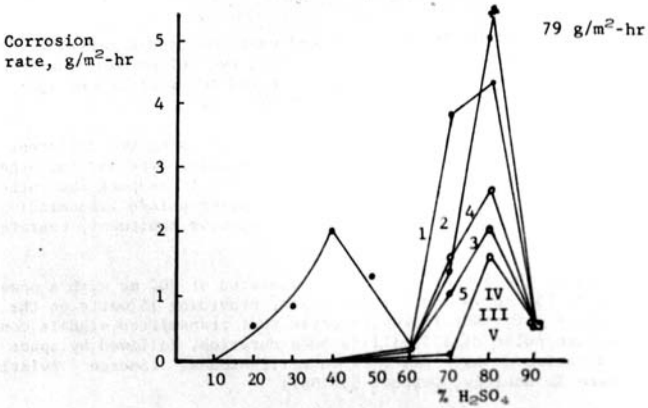
However sharp disagreement remains on the rotation of Venus figures. The hypothesis that Venus has a period of rotation of 9 to 11 days is based on an apparent doppler frequency shift, corresponding to a rotational veloc of 40 meters per second, in echos received from Venus, stated Prof. Kotelnikov. But Dr. Gordon H. Pettengill of Lincoln Laboratory said that its radar contacts with Venus in many repeated experiments had failed to show any such doppler shift. Analysis of tape recordings made during a previous Venus radar contact in 1959 also failed to disclose any such doppler shift. (See SIN, Vol. 2, Nos. 6 & 7)

The fact that the U. S. experiments were conducted using two different radars, operating at different frequencies, one pulse type and the other continuous-wave, with such close correlation tends to support the anti-rotation view. The Lincoln Laboratory radar, using pulsed transmissions, operated at 440 mc; the JPL radar, a continuous-wave equipment, operated at 2,388 mc.

The radar used in the Soviet experiments operated at 700 mc with a power flux density of 250 megawatts per steradian, providing 15 watts on the surface of Venus. Dr. Kotelnikov reported that transmitted signals consisted of square pulse of 128 milliseconds duration, followed by space of similar duration or by a pulse of 64 milliseconds. (Source: Aviation Week and Space Technology, October 9, 1961)

CORROSION BEHAVIOR OF TITANIUM-PLATINUM AND TITANIUM-PALLADIUM ALLOYS. The Institute of Physical Chemistry, Academy of Sciences USSR, has studied the electrochemical and corrosion behavior of titanium and titanium-platinum (1 and 2%) and titanium-palladium (1 and 2%) alloys in sulfuric and hydrochloric acids of various concentrations and temperatures using the potentiostatic method. It was found that an increase in acid concentration or temperature shifts the potential of full passivation of unalloyed titanium toward more positive values (makes passivation more difficult), e.g., from 0.1 v in 40% sulfuric acid at 25°C to 0.6 v in 92% sulfuric acid. Alloying with platinum or palladium shifts the stationary potential of titanium toward more positive values, at which titanium is fully or partially passive, thus facilitating passivation and improving corrosion resistance.

Corrosion rates in 20°C sulfuric acid of various concentrations are shown in the illustration. While the acid concentration/corrosion rate curve for unalloyed titanium shows two maxima at 40 and 80% concentrations, the curves for the alloys have only one maximum at 80% concentration. At 50°C titanium-platinum and titanium-palladium alloys show a corrosion rate below 0.1 g/m^2-hr only in 10% sulfuric acid; in 20% sulfuric acid these rates vary from 0.14 to 0.18 g/m^2-hr. At 100°C in 10% sulfuric acid both types of alloys show considerably higher corrosion resistance than unalloyed titanium. Corrosion rates at room temperature and an acid concentration up to 25% do not exceed 0.1 g/m^2-hr for titanium-platinum and 0.008 g/m^2-hr for titanium-palladium alloys. (Tomashov, N. D., G. P. Chernova, and P. M. Al'tovskiy. Zhurnal fizicheskoy khimii, v. 35, no. 5, May 1961, 1068-1077) S/076/61/035/055



Corrosion rates at room temperature in 100-hr test in sulfuric acid of various concentrations (Arabic numerals) and 164-hr test in 80% sulfuric acid (Roman numerals) 1 and I - unalloyed titanium; 2 and II - 1% platinum alloy; 3 and III - 2% platinum alloy; 4 and IV - 1% palladium alloy; 5 and V - 2% palladium alloy.
(Source: Abstract from Office of Technical Services, Dept. of Commerce)

POLISH STUDY NONLINEAR PRESSURE OSCILLATIONS DURING COMBUSTION. Analysis of the longitudinal, nonlinear pressure oscillations which accompany combustion in a viscous gas flow in a pipe of variable cross section is noted as being important for qualitative study of flow stability and for explaining pressure oscillation phenomena in jet engine combustion chambers. An equation describing the pressure oscillations (acoustic vibrations) is derived and the influence of various factors on the stability of the flow is analyzed. The order of magnitude of individual terms determining this influence is also evaluated. The following conclusions are reached: (1) Combustion processes are accompanied by pressure disturbances (acoustic waves) which may change into strong pressure oscillations. (2) Combustion stability can be evaluated for certain cases of flow by determining the order of individual terms of the equation. (3) Variations in the function $\varphi(\omega, P)$, where ω = mass of combustion gases and P = pressure in g/cm sec^2, have a significant effect on the excitation of low-frequency pressure oscillations and determine the mutual effect of oscillations and the combustion process on the one hand and stability on the other. (Kowalewicz, A. Archiwum budowy maszyn, v. 3, no. 3, 1961, 263-271) P/032/61/003/003 (Source: Abstract from Office of Technical Services, Dept. of Commerce)

DEVICE FOR REGISTERING COSMIC RAYS. The Institute of Terrestrial Magnetism, Ionosphere, and Propagation of Radio Waves, Academy of Sciences USSR, has developed a transistorized device for continuous registration of cosmic rays. The device consists of the following: an input stage; an amplification stage; a single-short multivibrator; a counting circuit; an output stage; and a high-voltage rectifier. The input stage, which uses a 6ZIP vacuum tube, and the rectifier are the only stages that are not transistorized. Although the device is intended for indoor operation, rigid stability requirements with regard to temperature fluctuations are imposed on its amplifiers. Because of these requirements the amplification stage uses P 103 silicon transistors whose inverse collector current is less than 1 μ a. The multivibrator stage, as well as the counting circuit, uses P 15 transistors; the cutoff voltage of the multivibrator is approximately 10-12 mv. The only disadvantage of the device is the use of a vacuum-tube in the input stage, which requires much more power than the rest of the circuit. (Leonov, V. Kh. Geomagnetizm i aeronomiya, v. 1, no. 3, 1961, 444-445) (Source: Abstract from Office of Technical Services, Dept. of Commerce)

SOVIET GENERAL SPECULATES ON FUTURE SPACE ACHIEVEMENTS. G. I. Pokrovskiy, writing in the Vestnik Vozdushnogo Flota (Air Force Herald), authoritatively reviews the problems of space flight and makes the following representative observations:

The most complex problem of space flight is the protection of cosmonauts from injury by streams of high-energy particles and shortwave radiation.... To afford protection equivalent to that offered by the Earth's atmosphere would require the spaceship to weigh 100 tons. This is impossible with the present capabilities of rocket-carriers, so manned space vehicles must travel only in those areas of space which are relatively safe. This requires the mapping of such zones and corridors; these areas vary from year to year, depending on solar activity.

Manned flights will first be limited to the area below the belt of high-energy particles. The height of the apogee should not exceed 500 to 600 km and the perigee should be no less than 140 to 150 km; an exception is the area of Australia, where the apogee may be as great as 1,000 to 1,500 km. Thereafter, flights may be made through a corridor along the Earth's axis, by-passing the belt of high-energy particles. The third phase of manned flight will carry the vehicle out 7 earth radii.

A manned spaceship landing on the surface of any celestial body (except small asteroids) is presently impossible because the trip back to the Earth would require a greater supply of fuel than the ship can carry. Landings on planets with belts of high-energy particles will have to be made through the polar corridors. This probably includes any planet whose diameter is over 6,000 km--smaller planets should not have a magnetic field. It should be possible to fly very low above the surfaces of the small planets because they have no atmospheres; on the other hand, this eliminates the possibility of employing aerodynamic braking when landing. A rocket engine would have to be used, and this requires much additional fuel.

Pokrovskiy concludes by stating that this is the period of the "quiet sun" and is therefore favorable for space flights. (Abstract: "Manned Space Flight," by Major General G. I. Pokrovskiy; Moscow, Vestnik Vozdushnogo Flota, No. 4, 1961, pp. 59-62) (Source: Abstract from Office of Technical Services, Dept. of Commerce)

BOUNDARY-LAYER STUDIES. To facilitate the study of a turbulent boundary layer with a downstream pressure gradient in subsonic flows, an attempt has been made to develop a technique for increasing the length of a constant-velocity core in a free turbulent flow produced by the nozzle. This effort is part of an experimental research project initiated in 1958 at the Kiyev Polytechnic Institute imeni Lenin, aimed at developing effective methods for boundary-layer control. In a series of experiments in which the boundary-layer velocity profiles and the turbulence spectra were studied, the error in measuring the mean velocity of the flow was 0.5% and that in determining the amplitudes of velocity fluctuations, 5-10%. The results, which were found to be in good agreement with published data, indicate that the length of a constant-velocity core in a free turbulent flow does not exceed the value of the nozzle diameter by more than twice and that the transition zone starts at a point two diameters away from the nozzle and extends to a distance of six diameters. To increase the length of the constant-velocity core the initial portion of the turbulent flow was bounded by three plates forming a prismatic trough, the use of which reduced energy losses and increased the length of the constant-velocity core to the equivalent of 10 nozzle diameters. (Mkhitaryan, A. M., V. S. Maksimov, V. Ya. Fridland, and S. D. Labinov. Inzhenerno-fiziche-skiy zhurnal, v. 4, no. 9, 1961, 12-16) S/170/61/004/009 (Source: Abstract from Office of Technical Services, Dept. of Commerce)

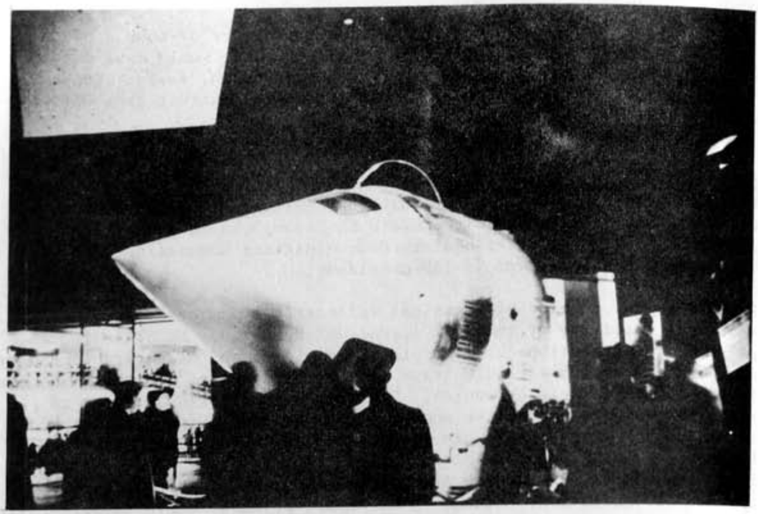
MHD POWER PRODUCTION. Lenin Prize winner A. Ye. Sheyndlin describes a method of producing electricity directly from the combustion of ordinary fuel, such as mazut. The gaseous combustion products are heated to 3000-4000°C, a small quantity of potassium is added, and the resulting weakly ionized plasma is fed from the combustion chamber into an MHD generator where it is accelerated to velocities on the order of 1000 m/sec and passed through a magnetic field, cutting the magnetic lines of force. This produces a current which is tapped by electrodes in the plasma. The exhaust gas, which still retains a temperature of over 2000°C, is injected into an ordinary gas power unit, producing half the total electric output of the system. The efficiency of such a system is said to be about 60%, and a 1-2 million-kw plant would save 0.5-1 million tons of petroleum fuel per year. (Sheyndlin, A. Ye. Krasnaya Zvezda, 13 October 1961, 3 cols. 1-2) (Source: Abstract from Office of Technical Services, Dept. of Commerce)

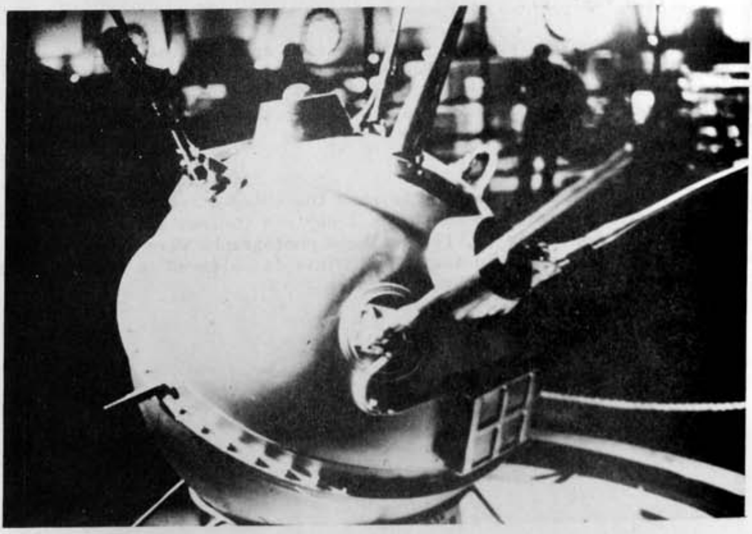
SOVIET DELEGATION TO THE INTERNATIONAL ASTRONAUTICAL CONGRESS. The USSR delegation to the 12th International Astronautical Congress was headed as usual by Academician Leonid I. Sedov, who is head of the USSR Academy of Sciences Interplanetary Communications Commission, and who completed his second term as IAF president.

K. I. Gringauz, doctor of technical science is a member of the Radiotechnical Institute of the USSR Academy of Sciences. He presented a paper on investigations of interplanetary plasma and planetary ionospheres by means of charged particle traps carried by rockets. Gringauz' general field of work is in electronics. Vladimir A. Kotelnikov, doctor of technical science and active member of the Academy presented a paper on radar contact with Venus. His field is radio engineering. Valeryan I. Krassovsky, an astronomer and astrophysicist, is also a member of the Institute for Physics of the Atmosphere. He read a paper on hard solar corpuscular radiation. Madame T. N. Nazarova, whose field is meteoritics, presented a report on investigations of meteoric dust by means of rockets and satellite vehicles.

Vladimir I. Yazdovsky, colonel in the Russian Army Medical Service and an associate of the Academy of Medical Sciences of the USSR, presented a paper written jointly with Lt. Col. Oleg G. Gazenko on some of the physiological results of space flight. (Source: Aviation Week and Space Technology, October 9, 1961)

LUNIK 2. The following photographs show the third stage of the Lunik 2 carrier vehicle (above) and the Lunik 2 payload (below) which impacted on the Moon on September 14, 1959. These photographs were taken at a Soviet exhibition in London last July. This is believed to be the first time the Lunik 2 was viewed by Westerners.





The article accompanying the above photograph describes a training exercise conducted at a missile site near the Soviet frontier. In less than 10 minutes the training target was picked up by the radar and, despite evasive action, was shot down by one of the missiles shown. A missile of this type is said to have brought down the US U-2 aircraft on May 1, 1960. (Komsomol'skaya pravda, 23 September 1961, 4, cols. 1-6; Krasnaya zvezda, 23 September 1961, 1, cols. 3-6) (Source: Abstract from Office of Technical Services, Dept. of Commerce)

SOVIET LITERATURE REVIEW. Abstracts of several articles which have appeared in Soviet scientific and technical journals have been received from the Air Information Division, Library of Congress. The following is a list of the subjects treated. Interested persons may receive copies of these abstracts by contacting the Science and Technology Section, Space Systems Information Branch.

TRACKING OF MISSILES AND SPACE VEHICLES

- Ion Clouds and Ionospheric Pertubations
- Radio Astronomy and Associated Equipment
- Effect of Propagation on Arctic Communication

SOVIET NUCLEAR INSTRUMENTATION AND CONTROL FOR PROPULSION

- Electronic Equipment
- Detectors
- Hydraulic Control Components
- Miscellaneous Related Subjects

PHENOMENA IN THE UPPER ATMOSPHERE

- Ionospheric Electron Concentration
- Solar Radiation and the Ionosphere
- The Van Allen Belts and Cosmic Rays
- Earth Currents
- Atmospheric Electricity

ATMOSPHERE OF VENUS

- Dimensions, Orbit, Detection of Atmosphere, and Distance From the Sun
- Photometric and Spectroscopic Investigations of the Venusian Surface

ION CLOUDS AND PLASMA PHENOMENA