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"APPROVED FOR RELEASE: 07/13/2001 CIA-RDP86-00513R001341020014-5

31420 (2806, [illegible])

AUTHORS: Vernov, S. N., Savenko, I. A., Shavrin, P. I., Nesterov, V. Ye., and Ilnarenko, N. P.

TITLE: Outer radiation belt of the earth at [illegible] km altitude

SOURCE: Akademiya nauk SSSR. Iskusstvennyye sputniki Zemli. n. [illegible]. Moscow, 1961, 34-39

TEXT: The investigations carried out by means of the 2nd and 3rd Soviet artificial satellites indicated the existence of an outer radiation belt, sharply delimited by the high-latitude region. The scintillation- and Geiger-counters on board the 2nd Soviet Sputnik permitted a detailed study of the outer radiation belt in the vicinity of the earth and its delimitation as a function of longitude. The autonomous memory-device on board the Sputnik yielded continuous data on radiation intensity at altitudes of 306 - 339 km over the entire terrestrial globe for

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[illegible]

[illegible] The [illegible] counter [illegible] cylindrical NaJ Tl, single crystal and of the [illegible] [illegible] The Geiger [illegible] of type [illegible], which is a halide-counter. A figure shows the [illegible] intensity recorded by means of the scintillation counter [illegible] points of the globe. It was proved that the sharp [illegible] in [illegible] rate, which could not be explained by the [illegible] effect, [illegible] the radiation belts of the earth; this [illegible] done by analyzing the connection between the regions of increased intensity in the Northern and Southern Hemispheres, by studying the connection between these regions and the earth's magnetic field, as well as the composition and energy of the radiation. Thus, the zones of increased radiation in the Northern Hemisphere are related to those in the Southern Hemisphere by the lines of force of the geomagnetic field which determines the position of the radiation belt at an altitude of [illegible] km. In order to determine the composition and to estimate the energy

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[illegible]

[illegible] relation was observed between the intensity and the strength of the magnetic field. This is apparently due to the short lifetime of electrons of the outer radiation belt at the altitudes under consideration compared to the drift-time around the earth. An estimate of the lifetime of electrons with E = 300 kev yielded the value of $10^6$ - $10^8$ sec.; hence, the hypothesis of local acceleration of electrons within the geomagnetic field is

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[illegible]

[illegible] May 2[illegible], 1961

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"APPROVED FOR RELEASE: 07/13/2001 CIA-RDP86-00513R001341020014-5

3.2420 (1049, 2806, 1482)

S/560/61/000/010/005/016
D299/D302

AUTHORS: Vernov, S. N., Savenko, I. A., Shavrin, P. I. and Pisarenko, N. F.

TITLE: Observation of inner radiation belt at an altitude of 320 km in the region of the south Atlantic magnetic anomaly

SOURCE: Akademiya nauk SSSR. Iskusstvennyye sputniki Zemli no. 10. Moscow, 1961, 40-44

TEXT: In contradistinction to the other zones of increased radiation-intensity (which form the outer belt), the magnetic anomaly near the Brazilian coast cannot be related to the outer radiation belt owing to its geographical position and to the presence of a large number of penetrating particles in the radiation. A map shows the regions of increased intensity and, in particular, the points at which the intensity exceeded 3.6

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S/560/61/000/010/005/016
D299/D302

Observation of inner.

counts · $cm^{-2}$ · $sec^{-1}$; all these points were concentrated in the southern Atlantic The readings of the Geiger- and scintillation-counters are listed in a table and shown in a figure Conclusions: (1) The increase in radiation intensity, observed at an altitude of 320 km above the Brazilian magnetic anomaly, is due to an inner radiation belt. This belt is not observed to the north of the geomagnetic equator (2) At low geomagnetic latitudes, the proton component of the inner belt prevails (in the region of the anomaly). With higher latitudes, the X-ray intensity increases (arising from electron bremsstrahlung on the space-ship hull), whereas the proton component decreases. (3) At magnetic latitudes higher than 40°S, the outer radiation belt appears (4) A transition region is found between the outer and inner radiation belts, where the intensity of the bremsstrahlung is weaker--by a factor of two and four respectively--than at the maximum of intensity of the internal and external belts (5) The cut between the inner and outer radia-

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33307
S/560/61/000/010/005/016
D299/D302

Observation of inner

tion belts, very clearly observed in the Northern Hemisphere by means of the 3rd Soviet Sputnik, is practically non-existent in the region of the Brazilian anomaly. These facts may shed light on the origin of the outer radiation belt There are 2 figures, 1 table and 7 references: 3 Soviet-bloc and 4 non-Soviet-bloc The references to the English-language publications read as follows: A J Dessler, J Geophys Res , 64, 713, 1959; S Yoshida, G H Ludwig, J A Van Allen, J Geophys Res , 65, 807, 1960; J A Van Allen, L A Frank, Nature, 183, 430, 1959; J A Van Allen, L A Frank, Nature, 184, 219, 1959.

SUBMITTED: May 23, 1961

Card 3/3

APPROVED FOR RELEASE: 07/13/2001 CIA-RDP86-00513R001341020014-5"

"APPROVED FOR RELEASE: 07/13/2001 CIA-RDP86-00513R001341020014-5

3.2410 (2556, 2205, 2705, 2805)

S/560/61/000/010/006/016
D299/D302

AUTHORS: Savenko, I. A., Shavrin, P. I., Nesterov, V. Ye., and Pisarenko, N. F.

TITLE: Cosmic-ray equator from data obtained by means of the 2nd Soviet Sputnik

SOURCE: Akademiya nauk SSSR. Iskusstvennyye sputniki Zemli, no. 10. Moscow, 1961, 45-47

TEXT: The use of artificial satellites for determining the equator of cosmic radiation has the following advantages over terrestrial investigations: (1) many intersections of the equator at various points during a comparatively short period and (2) direct recording of the primary component of cosmic radiation--hence, the possibility of a detailed study of the equator of cosmic radiation at various moments of time, and, in particular, the possibility of studying the effect of various geo-

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D299/D302

Cosmic-ray equator

physical phenomena on its position. Thereby, it is no longer necessary to introduce barometric temperature and temporal-variation corrections. The equipment of the 2nd Soviet Sputnik contained a Geiger counter, an autonomous memory-device, and telemetering apparatus. The memory device permitted measuring the latitude dependence of primary cosmic radiation at each intersection of the equator. In processing the data, the empirical formula describing the latitude dependence was constructed only from experimental points for latitudes below 40°. Twenty two latitude curves, obtained from various intersections of the geographical equator, were used to determine the position of the minima of cosmic-ray intensity (i.e., the equator of cosmic radiation). The obtained equator of cosmic radiation is incompatible with a dipole model of the geomagnetic field. The obtained equator is in good agreement with that calculated by Quenby and Weber as well as with that calculated by Kellogg and Schwartz. There are 1 figure and 8 non-Soviet-bloc

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Cosmic-ray equator

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D299/D302

APPROVED FOR RELEASE: 07/13/2001 CIA-RDP86-00513R001341020014-5"

references. The 4 most recent references to the English-language publications read as follows: J. R. Storey, Phys. Rev., 113, 397, 1959; M. A. Pomerantz, V. R. Potnis, A. E. Sandsrom, J. Geophys. Res., 65, 3539, 1960; J. J. Quenby, W. R. Webber, Phil. Mag., 4, 90, 1959; P. J. Kellogg, M. Schwartz, Nuovo Cimento, 13, 761, 1959.

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"APPROVED FOR RELEASE: 07/13/2001 CIA-RDP86-00513R001341020014-5

SAVENKO, I.A ; NESTEROV, V.Ye. ; SHAVRIN, P.I.; PISARENKO, N.F.

The equator of cosmic rays according to the data of the third Soviet satellite vehicle. Geomag. i aer. 1 no.4:490-493 Jl-Ag '61. (MIRA 14:1)

1. Moskovskiy gosudarstvennyy universitet imeni Lomonosova, Institut yadernoy fiziki.

(Cosmic rays)

APPROVED FOR RELEASE: 07/13/2001 CIA-RDP86-00513R001341020014-5"

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3.2420 (1049,1482)

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[illegible]

Detection of ...

T.V. Kurakina are mentioned. There are [illegible] figures and [illegible] Soviet and [illegible] non-Soviet references. The two English-language [illegible] are: T. Obayashi. J. Geomagn. and Geoelectr., [illegible]; R. [illegible] J. Geophys. Res., [illegible], 65, [illegible].

ASSOCIATION: Moskovskiy gosudarstvennyy [illegible] Institut yadernoy fiziki. [illegible] M.V. [illegible] Institute of N[illegible]

SUBMITTED: September [illegible]

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"APPROVED FOR RELEASE: 07/13/2001 CIA-RDP86-00513R001341020014-5

PISARENKO, N.F.; PETROVA, A.N.

Studies on the transfer of glycosyl residues of meltose in skeletal muscles. Biokhimiia 26 no.2:350-353 Mr-Ap '61. (MIRA 14:5)

1. Institute of Biochemistry, Academy of Sciences of the U.S.S.R., Moscow.
(MUSCLES) (MALTOSE) (TRANSGLYCOSIDASE)

APPROVED FOR RELEASE: 07/13/2001 CIA-RDP86-00513R001341020014-5"

"APPROVED FOR RELEASE: 07/13/2001 CIA-RDP86-00513R001341020014-5

3 9110 [illegible] 482

AUTHORS: Savenko, I. A., Shavrin, [illegible] Nesterov, V. Ye., Pisarenko, N. F.

TITLE: Equator of cosmic rays according to data of the second Soviet spaceship

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 41, no. 3(9), 1961, 985 - 986

TEXT: The use of earth satellites for determining the equator of cosmic rays from which the structure of the geomagnetic field can be determined and which permits the checking of the correctness of the theoretical and empirical approximation of this field offers a series of advantages over the measurements made on the earth. Thus the equator of cosmic rays and especially its effect on the geophysical phenomena can be accurately studied. The second spaceship also contained a gas-discharge counter whose pulses were fed to a rate meter which was automatically interrogated by a diurnal storage system every third minute. Upon command from the earth the information stored by this system was transmitted to the

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[illegible] rays a [illegible]

radar stations on the earth. The [illegible] possible to measure the latitude dependence [illegible] each time the satellite crossed the equator [illegible] latitudes [illegible] passed the radiation [illegible] mental points [illegible] degrees of latitude [illegible] the empirical formula. The equator [illegible] was compared with that calculated by [illegible] Quenby and W. [illegible] Mag., [illegible] taking account [illegible] component of the geomagnetic field and also with the [illegible] by P. J. [illegible] and M. Schwartz Ref. 8: [illegible] in octupole approximation. This comparison showed [illegible] the measurement accuracy limits. The authors thank [illegible] N. L. Grigorov and [illegible] for discussion of the [illegible] figure and 8 references: [illegible] Soviet and [illegible] non-Soviet [illegible] important references to the English-language [illegible] ws: J. R. [illegible] Phys. Rev., [illegible] Phys. Res., [illegible] Phil. Mag., [illegible]

[illegible] June [illegible]

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"APPROVED FOR RELEASE: 07/13/2001 CIA-RDP86-00513R001341020014-5

PETROVA, A.N.; PISARENKO, N.F.

Isolation of glycosidase catalyzing the transfer of glycosyl groups of dextrins in muscles. Dokl. AN SSSR 136 no.4:964-967 F '61. (MIRA 14:1)

1. Institut biokhimii imeni A.N. Bakha Akademii nauk SSSR. Predstavleno akademikom A.I. Oparinym.

(TRANSGLYCOSIDASE) (MUSCLE) (DEXTRIN)

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2,[illegible]

[illegible]

B[illegible]

3 2420 (1049,1442)

AUTHORS: Vern v, S. N., [illegible] Member of the AS USSR, Savenko, [illegible] Yel, and Pisarenko, N. F.

TITLE: [illegible] radiation belt of the Earth at [illegible] km altitude

PERIODICAL: Akademiya nauk SSSR. [illegible] 4, [illegible]

TEXT: The second Soviet satellite [illegible] was at an altitude of [illegible] km had an automatic storage system which enabled it to measure [illegible] the radiation intensity in latitudes of ±65°. The scintillation counter consisted of a ФЭУ-[illegible] photomultiplier and a NaI [illegible] crystal. The energy threshold of this counter was [illegible] kev. An CTC-[illegible] Geiger counter was also used. Measurements showed that the counting rate of the scintillation counter, from the equator to latitudes of ±40 - 50°, increased from [illegible] - 5 puls s/cm²·sec to [illegible] 12 pulses/cm²·sec. In latitudes from ±[illegible] to ±65°, the counting rate increased to 20 - 600 pulses/cm²·sec in most cases. The authors assume that this increase in x-ray intensity is caused by particles of the radiation belt of the Earth. To prove this

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[illegible]

[illegible] the [illegible] intensity [illegible] and [illegible] [illegible] intensity [illegible] [illegible] intensity [illegible] The indication [illegible] and energy [illegible] the enhanced intensity [illegible] due to [illegible] of the outer radiation [illegible] which are [illegible] in the [illegible] the satellite. The [illegible] thank A. Ye. [illegible], [illegible], and V. [illegible] for discussions. There are [illegible] figures, [illegible] table, and [illegible] references: [illegible] Soviet and [illegible] non-Soviet. The three references to English-language publications read as follows: [illegible] Vestine et al., Planet. Space Sci., [illegible] ([illegible]); J. B. Cladis et al., J. Geophys. Res., [illegible], 343 ([illegible]); J. A. Welch et al., J. Geophys. Res., [illegible], [illegible] (1959).

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova (Moscow State University imeni M. V. Lomonosov)

SUBMITTED: June 7, [illegible]

Card [illegible]

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"APPROVED FOR RELEASE: 07/13/2001 CIA-RDP86-00513R001341020014-5

VERNOV, S. N., GORCHAKOV, Ye. V., LOGACHEV, Yu. I., NESTEROV, V. E., PISARENKO, N. F., SAVENKO, I. A. and SHAVRIN, P. I.

"Investigations of Radiation During Flights of Satellites, Space Vehicles and Rockets" +

Report presented at the International Conference on Cosmic Rays and Earth Storm, 4-15 Sep 61, Kyoto, Japan.

+ same title submitted for XII Intl. Astronautical Congress Wash D C 1-7 Oct 61

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29111

3.2420 (1049, 1482)

[illegible] Vernov, [illegible] Corresponding Member AS USSR, [illegible] Chavrin, [illegible], Pisarenko, N. F.

TITLE: Discovery of an inner radiation belt at [illegible] km [illegible] the region of the South-Atlantic magnetic anomaly

PERIODICAL: Akademiya nauk SSSR. Doklady, v. [illegible], no. [illegible]

TEXT: The paper reports on the discovery and investigation of the inner radiation belt by the second Soviet satellite. The radiometric apparatus [illegible] discharge counter СТС-[illegible] and scintillation counter ФЭУ-[illegible] with NaI Tl crystal carried on the satellite recorded increased radiation intensity above the magnetic anomaly in the South Atlantic. The [illegible] counter recorded particles with a threshold of [illegible] kev and the [illegible] release of energy in the crystal. Analysis of the data leads to the following conclusions: The increased radiation intensity revealed [illegible] the flights of the second Soviet satellite at [illegible] above the Brazilian magnetic anomaly is attributable to the inner radiation belt. Since no inner radiation belt has been found north of the [illegible] equator, the reflection points there lie higher than in the [illegible] Card [illegible]

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very far inner radiation

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PISARENKO, N. F., SAVENKO, I. A., CHUDAKOV, A. Ye., SHAVRIN, P. I.
VERNOV, S. N., GORCHAKOV, E. V., LOGACHEV, Yu. I., NESTEROV, V. E.

"Investigations of Radiation During Flights of Satellites, Space Vehicles, and Rockets."

Soviet Papers Presented at Plenary Meetings of Committee on Space Research (COSPAR) and Third International Space Sumponium, Washington, D. C., 23 Apr - 9 May 62.

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"APPROVED FOR RELEASE: 07/13/2001 CIA-RDP86-00513R001341020014-5

S/865/62/002/000/018/042
D405/D301

AUTHORS: Nesterov, V.Ye., Pisarenko, N.F., Savenko, I.A. and Shavrin, P.I.

TITLE: Ionizing radiations at altitudes of 180-340 km and the radiation hazard to manned space flight

SOURCE: Problemy kosmicheskoy biologii. v. 2. Ed. by N. Sisakyan and V. Yazdovskiy. Moscow, Izd-vo AN SSSR, 1962, 170-190

TEXT: The experiments, conducted on the Second and Third Space Ship yielded the following new results: An external radiation belt of the Earth was detected at an altitude of 180-320 km; its boundaries were delimited at all longitudes. The dependence of the intensity on longitude was established for the external radiation belt, the intensity increasing sharply in the South Atlantic and in other regions. A lowering of the internal radiation belt to 230-320 km was observed in the region of the Brazilian magnetic anomaly. The distribution of cosmic radiation around the globe was measured.

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The geographic distribution and the magnitude of absorbed dose-rates were determined. These results were obtained by means of radiometric equipment consisting of scintillation and Geiger counters. This equipment enabled the determination of the nature of the radiation, to estimate the energy of the particles and to measure the absorbed dose-rate; by using memory devices with 24 hour storage capacity it was possible to conduct these measurements around the entire globe. The average absorbed dose-rate was 8.5 and 8.3 mrad/day for the Second and Third Space Ships respectively; the absorbed dose-rate inside the space ships varied between 0.35 and 0.7 mrad, depending on the position of the orbit with respect to the radiation belts. It was found that the proton fluxes of the internal belt in the region of the Brazilian anomaly may give a substantial contribution to the dose-rate. The average dose-rate of 8.5 and 8.3 mrad/day is not dangerous to astronauts. At 320 km the absorbed dose-rate was 40 mrad/day. The presence of primary cosmic radiation at high altitudes may lead to some specific, though rare, biological effects which are not observed at sea level. In the case of flights of not very long duration at altitudes of 200-300 km, only solar cosmic



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D405/D301

Ionizing radiations ...

radiation, produced in chromospheric bursts, can present a radiation hazard. Some data on cosmic-radiation bursts during 1958-1959 are listed. Systematic forecasts of solar bursts accompanied by the emission of cosmic radiation are very important for the prevention of exposure to radiation hazard. Such a method of forecasting could be the recording of gamma radiation on the space ship. If the theory of the origin of cosmic radiation, developed by V.P. Shabanskiy and A.B. Severnyy is true, then any appearance of cosmic radiation at the moment of solar bursts ought to be accompanied by the emission of gamma radiation. Summing up, the absorbed dose-rate is strongly dependent on the inclination of the orbit, the flight altitude and the thickness of the space ship's protection. There are 10 figures and 3 tables.

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"APPROVED FOR RELEASE: 07/13/2001 CIA-RDP86-00513R001341020014-5

S/865/62/002/000/018/042
D405/D301

Ionizing radiations ...

radiation, produced in chromospheric bursts, can present a radiation hazard. Some data on cosmic-radiation bursts during 1958-1959 are listed. Systematic forecasts of solar bursts accompanied by the emission of cosmic radiation are very important for the prevention of exposure to radiation hazard. Such a method of forecasting could be the recording of gamma radiation on the space ship. If the theory of the origin of cosmic radiation, developed by V.P. Shabanskiy and A.B. Severnyy is true, then any appearance of cosmic radiation at the moment of solar bursts ought to be accompanied by the emission of gamma radiation. Summing up, the absorbed dose-rate is strongly dependent on the inclination of the orbit, the flight altitude and the thickness of the space ship's protection. There are 10 figures and 3 tables.

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"APPROVED FOR RELEASE: 07/13/2001 CIA-RDP86-00513R001341020014-5

41906

S/560/62/000/013/002/009
I046/I242

AUTHORS: Vernov, S.N., Savenko, I.A., Shavrin, P.I., Nesterov, V.E., and Pisarenko, N.F.

TITLE: Radiation belts of the earth at altitudes from 180 to 250 km

SOURCE: Akademiya nauk SSSR. Iskusstvennyye sputniki Zemli. no.13. Moscow, 1962, 67-74

TEXT: Assuming identical altitude dependence of the radiation intensity in the northern and the southern hemispheres, it is shown from measurements made on the third orbital space ship on December 1, 1960 (orbital data: perigee 187 km, apogee 265 km, inclination 65°) that the radiation intensity in the outer belt decreases by a factor of 2 between h = 235 km and h = 185 km.

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"APPROVED FOR RELEASE: 07/13/2001 CIA-RDP86-00513R001341020014-5

S/560/62/000/013/003/009
I046/I242

AUTHORS: Savenko, I.A., Shavrin, P.I., and Fis_renko, N.F.

TITLE: Soft corpuscular radiation at an altitude of 320 km in near-equatorial latitudes

SOURCE: Akademiya nauk SSSR. Iskusstvennyye sputniki Zemli. no.13. Moscow, 1962, 75-80

TEXT: The CsI(Tl) counter mounted on the skin of the second Soviet orbital spaceship detected strong corpuscular radiation at altitudes of about 300 km in the near-equatorial latitudes in the 150°E to 150°W zone. This radiation is quite soft, since it was detected by the inner counter situated behind a layer of about 5 g.cm$^{-2}$. The observed properties of the corpuscular radiation can be envisioned as $10^4$ eV electrons moving in a stream of $5.10^9$ particles.cm$^{-2}$.sec$^{-1}$.ster. The origin of the low-energy charged particles in these regions is still unknown. There are 5 figures.

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"APPROVED FOR RELEASE: 07/13/2001 CIA-RDP86-00513R001341020014-5

41908

S/560/62/000/013/004/009
I046/I242

AUTHORS: Savenko, I.A., Kisarenko, N.F., Shavrin, P.I., and Lapkov, G.F.

TITLE: Measurement of the absorbed radiation dose on the Soviet orbital spaceship III

SOURCE: Akademiya nauk SSSR. Iskusstvennyye sputniki Zemli. no.13. Moscow, 1962, 81-84

TEXT: The third orbital spaceship launched on December 1, 1961 (perigee 187 km, apogee 265 km, inclination 65°) registered the absorption of radiation doses at altitudes of 180 to 250 km (average of 6.9 rad per 24 hours, or 0.35 to 0.6 rad per orbital loop, depending on the geographical position). These results, combined with the data produced by the second orbital ship for altitudes of 306 to 339 km, show that space flight is virtually safe at altitudes below 350 km, when there are no solar chromospheric flares. There are 2 figures.

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41908

S/560/62/000/013/004/009
I046/I242

AUTHORS: Savenko, I.A., Lisarenko, N.F., Shavrin, P.I., and Lapkov, G.F.

TITLE: Measurement of the absorbed radiation dose on the Soviet orbital spaceship III

SOURCE: Akademiya nauk SSSR. Iskusstvennyye sputniki Zemli. no.13. Moscow, 1962, 81-84

TEXT: The third orbital spaceship launched on December 1, 1961 (perigee 187 km, apogee 265 km, inclination 65°) registered the absorption of radiation doses at altitudes of 180 to 250 km (average of 6.9 rad per 24 hours, or 0.35 to 0.6 rad per orbital loop, depending on the geographical position). These results, combined with the data produced by the second orbital ship for altitudes of 306 to 339 km, show that space flight is virtually safe at altitudes below 350 km, when there are no solar chromospheric flares. There are 2 figures.

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[illegible]

S/203/62/002/001/003/019
I023/I223

AUTHORS: [illegible]ernov, [illegible], [illegible]enko, I.A., Shavrin, P.I., Nesterov, V.Ye. and [illegible]isarenko, [illegible].F.

TITLE: Earth's radiation belts at 180-250km height

SOURCE: Geomagnetizm i Aeronomiya, v.2, no.1, 1962, 41-47

TEXT: The distribution of cosmic rays and radiation belts at the height of [illegible]-330km were obtained by the second Soviet cosmic satellite. The third cosmic space-ship, launched on December 1, 1960 with a perigee of 180km, apogee of 250km and an inclination of 65° measured the intensity and geographical position of the radiation belts in the height range 180-250km. The apparatus consisted of a NaI(Tl) crystal (a cylinder of 14mm height and 30mm diameter) with a photomultiplier and a gas counter. The crystal counted all particles above 25kev and measured the total energy dissipation in it. The counting rates increase from the equator to higher latitudes: of the counter from 0.8 to 3.2 $\frac{\text{counts}}{\text{cm}^2 \cdot \text{sec}}$,

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S/203/62/002/001/003/019
I023/I223

Earth's radiation belts...

of the on tomultiplier from 7 to 12 $\frac{\text{counts}}{\text{cm}^2 \cdot \text{sec}}$, and the energy dissipation increased from $7.5 \times 10^6$ to $3.7 \times 10^7$ $\frac{\text{ev}}{\text{cm}^2 \text{ sec}}$. When passing radiation belts the counting rate increased considerably. Graphs based on data from space-ship 2 and 3 are given. The geographical distribution of the radiation intensity as measured by the scintillation counter is also presented in a graphical form. The radiation intensity in the outer belt as measured by space-ship 2 is on the average 2.[illegible] times higher in the southern hemisphere (average height 33[illegible]km) than in the northern (average height [illegible]km). The same ratio as measured by space-ship 3 is 4.4 (average height in southern hemisphere - [illegible]35km, in the northern - 185km). There were variations in the geographical distribution of the belts between the two flights. The proton flux decreased between the two flights. There are 6 figures and 2 tables.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M.V.

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3.2420

[illegible]

[illegible]

[illegible]

[illegible] This report [illegible] with radiation [illegible] the second [illegible] the third [illegible] launched toward the Venus on February [illegible], and by the third [illegible] earth satellite [illegible] 5, [illegible] spaceships were [illegible] with scintillation counters, gas discharge counters and [illegible] for storing data through [illegible] hours. The northern and southern zones of increased radiation intensity are undoubtedly linked by the lines of force of the geomagnetic field. The increased radiation intensity is due to electrons of the outer radiation belt, slowed down in the jacket of the spaceship. The

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[illegible]

[illegible] was [illegible] of the [illegible] [illegible] A zone [illegible] lower [illegible] [illegible] the inner [illegible] [illegible] of the Brazilian anomaly. [illegible] determined by the second and the third [illegible] [illegible] a sine curve running between 11° of northern and 1[illegible]° of southern latitude.

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"APPROVED FOR RELEASE: 07/13/2001 CIA-RDP86-00513R001341020014-5

S/026/62/000/002/002/004
D036/D113

11 1400

AUTHORS: Savenko, I.A., Pisarenko, N.F.; Shavrin, P.I.

TITLE: Space flights and the radiation hazard

PERIODICAL: Priroda, no 2, 1962, 40-48

TEXT: This popular article deals with radiation hazards in space flights The system of measuring radiation doses in rads, cosmic radiation at the Earth's surface and at low altitudes, the effect of solar radiation on primary cosmic radiation, the radiation belts of the Earth, radiation connecte with solar flares and dosimetric measurements made on board the second and third Soviet satellites in August and December 1960 are discussed The dosimetric measurements are shown in charts and a graph The maximum permissible dose in the USSR for persons working continuously with radioactive materials and ionizing-radiation sources is 0 1 rems per working week A group of scientists led by S N Vernov, Corresponding Member of the

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S/026/62/000/002/002/004
Space flights and the radiation hazard D036/D113

AN SSSR (AS USSR), established the magnitude of the flux of primary particles in interplanetary space on the basis of data obtained by cosmic rockets; in 1959, a period of intense solar activity, the flux was 2 particles/$cm^2$ sec behind a protective screen about 1 $g/cm^2$ thick, giving about 15 mrads per 24 hours Besides the inner and outer radiation belts of the Earth, Soviet scientists also located a third belt 50-60,000 km from the Earth's center; however, the low energy of its particles (a few hundred ev) means that this belt does not constitute a radiation hazard The Soviet dosimetric measurements showed the following: The trajectories of the second and third Soviet spaceship-satellites are safe from the radiation point of view Protection from the outer radiation belt is possible by suitable shielding: during the flights of the first, second and third Soviet cosmic rockets through this belt the total radiation dose behind a 1-2 $g/cm^2$-thick screen did not exceed 0 1 rad In the inner radiation belt a shield several tens of $g/cm^2$ thick would be required, therefore this belt should be avoided

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Space flights and the radiation hazard

S/026/62/000/002/002/004
D036/D113

Other planets may also have radiation belts Radiation resulting from solar flares is the main hazard. Solar flares producing a dose of 10 rad/hr behind a screen several g/cm$^2$-thick occur 3-7 times annually, more intense flares less often For future flights a special well-shielded cabin should be provided for protection during the flare, or else it should be possible to terminate the flight in good time There are 8 figures and 3 references, 1 Soviet and 2 non-Soviet. The two English-language references are: "Journal of the Astronautical Science", 1961, No. 3; "Nucleonics", 1961, No 4 (USA)

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"APPROVED FOR RELEASE: 07/13/2001 CIA-RDP86-00513R001341020014-5

PISARENKO, N.F.; PETROVA, A.N.

Transferases catalyzing the glycosol group transfer. Uspekhi khim. 5:182-215 '63. (MIRA 17:3)

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"APPROVED FOR RELEASE: 07/13/2001 CIA-RDP86-00513R001341020014-5

L 18492-63 EWT(1)/FCC(w)/FS(v)-2/BDS/EEC-2/EED-2/EEO-2/ES(t)-2/ES(v)/ES(a)/ES(j)/ES(c)/ES(k) AEDC/AFFTC/ASD/AFMDC/ESD-3/APGC Pi-4/Po-4/Pe-4/Pq-4 Pb-4 TT/AR/GW/K S/0293/63/001/001/0172/0175

ACCESSION NR: AP3007348

115

AUTHOR: Savenko, I. A.; Shavrin, P. I.; Nesterov, V. Ye.; Pisarenko, N. F.; Tel'tsov, M. V. 110

TITLE: Cosmic radiation conditions on the eve of the flight of spaceships "Vostok 3" and "Vostok 4"

SOURCE: Kosmicheskiye issledovaniya, v. 1, no. 1, 1963, 172-175

TOPIC TAGS: cosmic radiation, space satellite, spaceship, geiger counter, scintillation counter, radiometric measurement, radiometric equipment

ABSTRACT: The following identical equipment was carried on board Soviet satellites Cosmos 4 and Cosmos 7 to measure radiation conditions along the routes of the proposed Vostok 3 and Vostok 4 flights: 1) geiger counters, type STS-5; 2) a scintillation counter consisting of an FEU photomultiplier and a CsI(Tl) sensing crystal, the latter completely surrounded by a retarding layer of more than 3 g/cm$^2$ [material not specified]; 3) another scintillation

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ACCESSION NR: AP3007348

counter of identical type but with the crystal protected by a layer of only 2 mg/cm$^2$ over 30% of its total solid angle and the rest of its surface completely shielded. In both the scintillation counters the crystals were 30 mm in diameter and 20 mm high. The first scintillation counter was placed together with the geiger counters in a common package inside the satellite, and the second was mounted in a package fixed to the external surface. The crystal counters recorded both particle count and cumulative energy levels above a fixed threshold. When gamma quanta played an important role, a comparison of geiger and scintillation counts made analysis of the radiation spectrum possible; the ratio of integral photocurrent to the pulse count gave the average energy yield for one crystal-recorded particle. Both geiger counters operated one common scaler system whose output was continuously telemetered. Data from all counters was also storable in a 100-min capacity memory which was interrogated at 40-sec and 2-min intervals from earth. Preflight calibration was made against a $Cs^{137}$ source. Analysis of the data showed that radiation intensity in the 210- to 370-km region registered by Cosmos 7 in late July 1962 was considerably

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ACCESSION NR: AP3007348

higher than the levels found by the second and third Soviet spaceships and by Cosmos 4 (26-29 April 1962); this difference was attributed to the U.S. thermonuclear test over Johnston Island on 9 July 1962. The mean daily dose as recorded by Cosmos 7 was 45 mrad, which was not considered sufficient justification for postponement of the planned Vostok 3 and 4 flights. "The authors thank S. F. Papkov, A. F. Tupikin, and L. A. Smirnov for their assistance in carrying out the experiment." Orig. art. has: 2 figures.

ASSOCIATION: none

SUBMITTED: 05May63 DATE ACQ: 21Oct63 ENCL: 00

SUB CODE: AS, SD NO REF SOV: 008 OTHER: 000

Card 3/3

APPROVED FOR RELEASE: 07/13/2001 CIA-RDP86-00513R001341020014-5"

"APPROVED FOR RELEASE: 07/13/2001 CIA-RDP86-00513R001341020014-5

SAVENKO, I.A.; PISARENKO, N.F., SHAVRIN, P.I., NESTEROV, V.Ye.

Radiation check during the flight of the spaceships "Vostok-3" and "Vostok-4." Kosm issl. 1 no.1:176-178 Jl-Ag '63. (MIRA 17:4)

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"APPROVED FOR RELEASE: 07/13/2001 CIA-RDP86-00513R001341020014-5

PISARENKO, N. F.; SAVENKO, I. A.; SAVUN, O. I.; SHARVIN, P. I.; SHARVINA, K. N.; VERNOV, S. N.; NESTEROV, V. Ye.;

"A Study of the Earth's radiation belts in the region of the Brazilian magnetic anomaly at altitudes of 235 to 345 kms. (USSR)."

Report submitted for the COSPAR Fifth International Space Science Symposium, Florence, Italy, 8-20 May 1964.

APPROVED FOR RELEASE: 07/13/2001 CIA-RDP86-00513R001341020014-5"

"APPROVED FOR RELEASE: 07/13/2001 CIA-RDP86-00513R001341020014-5

PISARENKO, N. F.; SAVENKO, I. A ; SHAVRIN, P.I.; NESTEROV, V. Ye.;

"Controlling a level of cosmic radiation during the flights of the "Vostok-3", "Vostok-4", "Vostok-5" and "Vostoj-6" space ships. (USSR)

Report submitted for the COSPAR Fifth International Space Science Symposium, Florence, Italy, 8-20 May 1964.

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"APPROVED FOR RELEASE: 07/13/2001 CIA-RDP86-00513R001341020014-5

PISARENKO, N. F., [illegible], P. I., NESTEROV, V. F. and SAVENKO, [illegible] A. Acad. [illegible]

"[illegible] VOSTOK-4, VOSTOK-[illegible], and VOSTOK-[illegible] [illegible]"

[illegible] at the [illegible], [illegible] Symposium, [illegible], [illegible] May [illegible]

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"APPROVED FOR RELEASE: 07/13/2001 CIA-RDP86-00513R001341020014-5

PISARENKO, N. F., BASILOVA, [illegible] M., VERNOV, [illegible] N., SAVENKO, I. A., [illegible]
and NESTEROV, V. F. (Acad. [illegible]

"A [illegible]

[illegible]

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"APPROVED FOR RELEASE: 07/13/2001 CIA-RDP86-00513R001341020014-5

L 23785-65 EWG(j)/EWT(1)/EWP(e)/EPA(s)-2/EWT(m)/EPF(c)/FCS/EWG(v)/FCC/EWP(v)/ Pc-4/Po-4/Pe-5/Pq-4/
EEC-4/EPR/EWP(j)/EEC(t)/EPA(bb)-2/EWP(b)/EWA(h)/EWA(1)
Pr-4/Ps-4/Pae-2/Pt-10/Peb/Pi-4 WW/RM/GW/WH/WS

ACCESSION NR: AT5003296 S/2892/64/000/003/0159/0167

B+1

AUTHOR: Dudkin, V. Ye.; Kovalev, Ye. Ye.; Smirennyy, L.N.; Sychkov, M.A.

TITLE: Basic methodological problems in the design of high energy proton shielding 19

SOURCE: Moscow. Inzhenerno-fizicheskiy institut. Voprosy dozimetrii i zashchity ot izlucheniy, no. 3, 1964, 159-167

TOPIC TAGS: radiation shielding, proton radiation, proton radiation protection, outer space radiation protection, space flight equipment

ABSTRACT: Space flights require that the astronauts be protected against the high energy protons found in outer space. For given initial conditions (trajectory, flight duration, etc.), one must determine the protection requirements (type and thickness of materials, grouping of protective devices, etc.) which, using a minimum of hardware, will protect the astronaut from radiation doses exceeding the permissible level. The first step consists of calculating the radiation levels and total doses on the basis of the known facts about the radiation belts and radiation in general. Next, one proceeds to choose the pertinent materials which will reduce the doses to the acceptable level with the minimum increase in weight. Finally, one carries out control calculations to verify the adequacy

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L 23785-65

ACCESSION NR: AT5003296

of the proposed solutions. The article discusses briefly each of these steps and presents the pertinent theoretical expressions. The calculations show that the maximum value of the mean tissue dose corresponds to a unit 200-250 Mev proton flow. The use of local doses may be justified only in the presence of very energetic protons when the average tissue and local doses become comparable. Orig. art. has: 5 formulas and 3 figures.

ASSOCIATION: none

SUBMITTED: 00 ENCL: 00 SUB CODE: NP, SV

NO REF SOV: 001 OTHER: 007

Card 2/2

APPROVED FOR RELEASE: 07/13/2001 CIA-RDP86-00513R001341020014-5"

"APPROVED FOR RELEASE: 07/13/2001 CIA-RDP86-00513R001341020014-5

L 23783-65 EWG(j)/EWT(1)/EWT(m)/EWG(v)/FCC/EEC-4/EEC(t)/EWA(h) Po-4/Pe-5/
Pq-4/Pae-2/Peb/Pi-4 GW/WS

ACCESSION NR: AT5003297 S/2802/64/000/003/0166/0173

AUTHOR: Dulkin, V. Ye.; Kovalev, Ye. Ye.; Smirennyy, L.N.; Bychkov, M.A. 19

TITLE: Protection against protons from solar flares

SOURCE: Moscow. Inzhenerno-fizicheskiy institut. Voprosy dozimetrii i zashchity ot izlucheniy, no. 3, 1964, 166-173

TOPIC TAGS: shielding, proton radiation, proton radiation protection, outer space radiation protection, space flight equipment, solar flare, aluminum shielding

ABSTRACT: The calculation of astronaut protection against protons from solar flares has been carried out using a method developed by the authors (Voprosy dozimetrii i zashchity ot izlucheniy, no. 3, 1964, p. 159) for the case of the flares of 12 November 1960 and 23 February 1956. They represent flare types A and B, respectively and are otherwise well known. The satellite cabin was assumed to be spherical and made of aluminum (see A.J. Beck, E.L. Divita, ARS Journal, November, 1668-1676, 1963). The angular distribution of solar flare protons was assumed to be isotropic. The results of the calculations are shown in Fig. 1 of the Enclosure. The article also presents the calculated absorbed tissue doses for the same flares as a function of tissue depth for various thicknesses of aluminum. However, the authors are quick to point out that the

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ACCESSION NR: AT5003297

existing information about solar flares is quite insufficient for any correct evaluation of the real hazards. Further studies are needed together with the development of methods for reliable long-range flare forecasting. Orig. art. has: 2 figures and 1 table.

ASSOCIATION: none

SUBMITTED: 00 ENCL: 01 SUB CODE: NP, AA

NO REF SOV: 001 OTHER: 009

Card 2/3

APPROVED FOR RELEASE: 07/13/2001 CIA-RDP86-00513R001341020014-5"

"APPROVED FOR RELEASE: 07/13/2001 CIA-RDP86-00513R001341020014-5

L 23784-65 EWG(j)/EWT(1)/EWT(m)/EWG(v)/FCC/EEC-4/EEC(t)/EWA(h) Po-4/Pe-5/
Pq-4/Pae-2/Peb/Pi-4 GW/WS

ACCESSION NR: AT5003298 S/2892/64/000/003/0174/0184

AUTHOR: Dudkin, V.Ye.; Kovalev, Ye. Ye.; Smirennyy, L.N.; Sychkov, M.A.

B+

TITLE: Protection against primary cosmic radiation and the protons in the earth's inner radiation belt

SOURCE: Moscow. Inzhenerno-fizicheskiy institut. Voprosy dozimetrii i zashchity ot izlucheniy, no. 3, 1964, 174-184

TOPIC TAGS: shielding, proton radiation, proton radiation protection, outer space radiation protection, space flight equipment, primary cosmic radiation, inner radiation belt

ABSTRACT: On the basis of data from 15 Soviet and Western references, the authors tabulate the composition of the primary cosmic radiation (PCR) and calculate the magnitude of the average tissue dose for various PCR components with and without protective layers. On the basis of data from 18 additional references, they present, for the inner radiation belt, the integral neutron flux ($E_p$ > 30 Mev) as a function of altitude and

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L 23784-65

ACCESSION NR: AT5003298

geographic latitude, the proton spectra, the magnitude of the doses due to primary and secondary radiation as a function of shielding thickness, internal tissue doses as a function of shielding thickness, and the average tissue doses for astronauts in the vicinity of Earth, in mber/day. Orig. art. has: 1 formula, 6 figures, and 4 tables.

ASSOCIATION: none

SUBMITTED: 00 ENCL: 00 SUB CODE: NP, SV

NO REF SOV: 010 OTHER: 023

Card 2/2

APPROVED FOR RELEASE: 07/13/2001 CIA-RDP86-00513R001341020014-5"

"APPROVED FOR RELEASE: 07/13/2001 CIA-RDP86-00513R001341020014-5

L 11290-65 EWG(j)/EWT(d)/EWT(1)/EWP(e)/EPA(s)-2/EWT(m)/EPF(c)/EEC(k)-2/EPF(n)-2/EEC-4/EPR/EPA(w)-2/EWP(b)/EWA(h) Po-4/Pab-10/Pq-4/Pr-4/Pu-4/Ps-4/Pt-10/Peb/Pu-4/Pk-4/Pl-4 WW/GG/WH

ACCESSION NR: AP4043257 S/0203/64/004/004/0781/0784

AUTHOR: Antonova, I. A.; Pisarenko, N. F.; Savenko, I. A.; Shumshurov, V. I.

TITLE: High-sensitivity electrostatic relay

SOURCE: Geomagnetism i aeronomiya, v. 4, no. 4, 1964, 781-784

TOPIC TAGS: weak current measurement, ionization chamber measurement, electrostatic relay, gold graphite contact, electrostatic relay, sensitive relay

ABSTRACT: A miniature high-sensitivity electrostatic relay designed for recording weak currents (up to $10^{-15}$ amp) in automatic ionization chambers is described. It represents a system of normally open contacts, one of which is made from a gold-plated quartz fiber and another of which acts as a collector. The system is mounted on a high-quality amber insulator. The collector is directly connected to the internal electrode of an ionization chamber. The spot on the collector surface where the contact with the fiber takes place is coated with graphite. The distance between the fiber and collector can be adjusted by a

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L 11290-65
ACCESSION NR: AP4043257

special regulator. Various materials for contacts were tried, but the most long-lived and stable in operation is the gold-graphite contact ($10^6$ operations). Experiments show that the relay can be utilized for recording direct currents from $10^{-7}$ to $10^{-15}$ amp. The lower limit of the measured currents is determined by the quality of the insulating materials. The total current leakage does not exceed $2 \cdot 10^{-16}$ amp. The electrostatic relay represents a system based on the attractive or repulsive action of an accumulated charge. Direct results of the measurements in the form of standard pulses can be obtained by using a reading (recording) device. The pulse repetition frequency is proportional to the magnitude of measured current. Orig. art. has: 2 figures.

ASSOCIATION: Institut yadernoy fiziki Moskovskogo gosudarstvennogo universitet (Institute of Atomic Physics, Moscow State University)

SUBMITTED: 20Apr64 ATD PRESS: 3101 ENCL: 00

SUB CODE: EC, EM NO REF SOV: 004 OTHER: 002

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"APPROVED FOR RELEASE: 07/13/2001 CIA-RDP86-00513R001341020014-5

ACCESSION NR: AP4026240

S/0293/64/002/001/0136/0146

AUTHOR: Vernov, S. N.; Savenko, I. A.; Shavrin, P. I.; Nesterov, V. Ye.; Pisarenko, N. F.; Tel'tsov, M. V.; Pervaya, T. I.; Yerofeyeva, V. N.

TITLE: Some results of radiometric measurements at heights of 200—400 km during 1960-1963

SOURCE: Kosmicheskiye Issledovaniya, v. 2, no. 1, 1964, 136-146

TOPIC TAGS: artificial satellite, radiation dose, radiation belt, cosmic radiation, cosmic ray, solar activity cycle, artificial radiation belt, space flight, astronaut

ABSTRACT: Measurements made by 15 satellites and spaceships (the second and third spaceships, satellites of the "Cosmos" series, and "Vostok" spaceships [illegible]) in the period from August 1960 through June 1963 at heights of 175-405 km were [illegible] determine the daily values of the radiation dose for various [illegible]; these doses were 10-55 mrad/day and are not dangerous for astronauts [illegible] the shielding of the ship is denser than 3-5 g/cm$^2$. At the time of [illegible] April 1962 and June 1963 it was found that there was an increase [illegible] in the intensity of cosmic radiation in the high latitudes where the [illegible] rigidity does not exceed 5.4 Bev. There was no increase of intensity in the equatorial

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"APPROVED FOR RELEASE: 07/13/2001 CIA-RDP86-00513R001341020014-5

ACCESSION NR: AP4026240

SUBMITTED: 29Jul63 ATD PRESS: 3053 ENCL: 00

SUB CODE: AA NO REF SOV: 011 OTHER: 002

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"APPROVED FOR RELEASE: 07/13/2001 CIA-RDP86-00513R001341020014-5

ACCESSION NR: AP4026241 S/0293/64/002/001/0147/0149

AUTHOR: Savenko, I. A.; Pisarenko, N. F.; Shavrin, P. I.; Nesterov, V. Ye.

TITLE: Measurement of total radiation dose aboard Vostok-5 and Vostok-6

SOURCE: Kosmicheskiye issledovaniya, v. 2, no. 1, 1964, 147-149

TOPIC TAGS: radiation monitoring, radiation dosimetry, onboard dosimeter, absorbed dose, RBE dose, Vostok-5, Vostok-6

ABSTRACT: Data from onboard radiation meters (gas-discharge type) indicate that the total absorbed radiation dose was 50 mrad for By*kovskiy (Vostok-5, 119-hr flight) and 30 mrad for Tereshkova (Vostok-6, 71-hr flight). Flight data for the two spaceships were as follows:

| | Vostok-5 | Vostok-6 |
|---|---|---|
| Orbit time | 88.27 min | 88.3 min |
| Apogee | 222 km | 231 km |
| Perigee | 175 km | 181 km |

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"APPROVED FOR RELEASE: 07/13/2001 CIA-RDP86-00513R001341020014-5

ACCESSION NR: AP4026241

Primary cosmic radiation, radiation belt particles, and cosmic rays originating with solar chromospheric flares were the types of hard radiation monitored. Heliomagnetic and geomagnetic conditions were comparatively quiet during the period of the flights; a few flares not exceeding 2 points on the scale in intensity occurred, but were not accompanied by any significant corpuscular streams in the space near the Earth. Fig. 1 of Enclosure shows radiation data during a 70-hr segment of the flights. Although the dose rate on Vostok-3 and Vostok-4 was higher on orbits passing through the Brazilian and South Atlantic anomalies than for other orbits, the dose registered on Vostok-5 and Vostok-6 was linearly dependent on the time of flight for all orbits, indicating that radiation belts added little to the total dose during the latter flights. Values for both Vostok-5 and Vostok-6 fall in a single straight line, indicating a measured dose rate of 8 mrad per diem, or 0.33 mrad/hr. Comparison with the dose rate measured for Vostok-3 and Vostok-4 (14 mrad per diem) in August 1962 shows a decrease in radiation intensity at altitudes in the neighborhood of 200 km. This is most likely due to decay (at least at lower altitudes of the artificial radiation belt created by upper atmosphere nuclear tests in 1962. Orig. art. has: 1 figure.

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ACCESSION NR: AP4026241

ASSOCIATION: none

SUBMITTED: 10Sep63 DATE ACQ: 16Apr64 ENCL: 01

SUB CODE: AM NO REF SOV: 004 OTHER: 000

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APPROVED FOR RELEASE: 07/13/2001 CIA-RDP86-00513R001341020014-5"

"APPROVED FOR RELEASE: 07/13/2001 CIA-RDP86-00513R001341020014-5

ACCESSION NR: AP4026242 S/0293/64/002/001/0150/0153

AUTHOR: Savenko, I. A.; Shavrin, P. I.; Pisarenko, N. F.; Nesterov, V. Ye.; Tel'tsov, M. V.; Yerofeyeva, V. N.

TITLE: Measurement of soft radiation in the equatorial latitudes from the "Cosmos-4" satellite

SOURCE: Kosmicheskiye issledovaniya, v. 2, no. 1, 1964, 150-153

TOPIC TAGS: radiation measurement, radiation belt, cosmic ray equator, sputnik, satellite radiation measurement, Cosmos-4, soft radiation, count rate, energy release, corpuscular radiation

ABSTRACT: The second Soviet sputnik (19-20 August 1960) carried a scintillometer for recording intense, sporadic streams of corpuscular radiation in equatorial latitudes. Since this detector was designed to measure total flux energy of the particles and energy release within the crystal, the number of impulses was not directly recorded, and particle flux had to be determined from energy release in the scintillometer on the basis of various assumptions as to the nature of the particles involved and their average energy. To check conclusions

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ACCESSION NR: AP4026242

drawn from the data obtained by the 1960 satellite, Cosmos-4, launched 26 April 1962, carried an external scintillometer capable of measuring not only total energy release, but also the counting rate of particles with energies greater than 100 kev. Table 1 of Enclosure gives the counting rate N (particle/$cm^2$/sec), the energy release E (Mev/$cm^2$/sec), and the ratio E/N (kev), representing the average energy release per single registered particle. Values in the table are averaged over the flight segment falling within 10° of the cosmic ray equator for 13 crossings of the equator. As can be seen, the E/N values are of the order of 100 kev. However, if E/N actually represents readings caused by the simultaneous striking of the counter by two or more electrons with subthreshold (<100 kev) energies, then the count obtained may actually reflect a flux of $10^4$/$cm^2$/sec with energies of $6 \times 10^4$ ev, a flux of $10^5$/$cm^2$/sec with energies of $3 \times 10^4$ ev, or a flux of $10^6$/$cm^2$/sec with energies of $1 \times 10^4$ ev. Since large fluxes with energies of 10 kev were not observed stationarily, the energy of the recorded electrons must exceed $3 \times 10^4$ ev. The occurrence of such electrons may possibly be related to seepage from radiation belts or electrical processes in the ionosphere. The results confirm the presence, apparently constant, of low-intensity ($10^2$ to $10^5$ particle/$cm^2$/sec/steradian) electron streams with energies greater than

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ACCESSION NR: AP4026242

30 kev at an altitude of 300 km over the equatorial zone. No regular dependence of intensity and average energy on time was observed. Orig. art. has: 1 table and 1 figure.

ASSOCIATION: none

SUBMITTED: 20Sep63 DATE ACQ: 16Apr64 ENCL: 01

SUB CODE: AS NO REF SOV: 009 OTHER: 000

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APPROVED FOR RELEASE: 07/13/2001 CIA-RDP86-00513R001341020014-5"

"APPROVED FOR RELEASE: 07/13/2001 CIA-RDP86-00513R001341020014-5

ACCESSION NR: AP4034800 S/0293/64/002/002/0280/0288

AUTHOR: Basilova, R. N.; Vernon, S. N.; Nesterov, V. Ye.; Pisarenko, N. F.; Savenko, I. A.; Shavrin, P. I.

TITLE: Investigation of cosmic radiation at heights of 200-350 km by the satellites "Kosmos 4" and "Kosmos 7"

SOURCE: Kosmicheskiye issledovaniya, v. 2, no. 2, 1964, 280-288

TOPIC TAGS: artificial satellite, cosmic radiation, cosmic ray equator, cosmic rays, radiation counter, inner radiation belt, radiation belt

ABSTRACT: As the result of an analysis of the counting rate of STS-5 counters carried aboard the satellites "Kosmos 4" and "Kosmos 7", it was possible to find 13 additional points on the cosmic ray equator. A study of the geographic distribution of the counting rate of the STS-5 counters also made it possible to discover a relationship between the radiation registered by these counters and primary cosmic rays. The regular longitude variation of the STS-5 counting rates in the neighborhood of the equator, the relationship of the counting rate to the magnetic rigidity cutoff of the point of measurement and the reasonable latitude variation are all properties of the radiation registered by these counters which can be related to



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ACCESSION NR: AP4034800

primary cosmic rays. It would be difficult to explain these facts by assuming that the registered particles had diffused from the inner radiation belt. Fig. 1 of the Enclosure shows the geographic position of the points of minimum radiation registered by the counters. "The authors wish to thank Ye. A. Voronina, L. V. Drozdova and N. M. Trishkina for computation and drafting work". Orig. art. has: 5 formulas, 5 figures and 2 tables.

ASSOCIATION: None

SUBMITTED: 19Nov63 DATE ACQ: 20May64 ENCL: 01

SUB CODE: AA, SV NO REF SOV: 005 OTHER: 006

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"APPROVED FOR RELEASE: 07/13/2001 CIA-RDP86-00513R001341020014-5

ACCESSION NR: ACCESSION NR: AP4034800

ENCLOSURE: 01

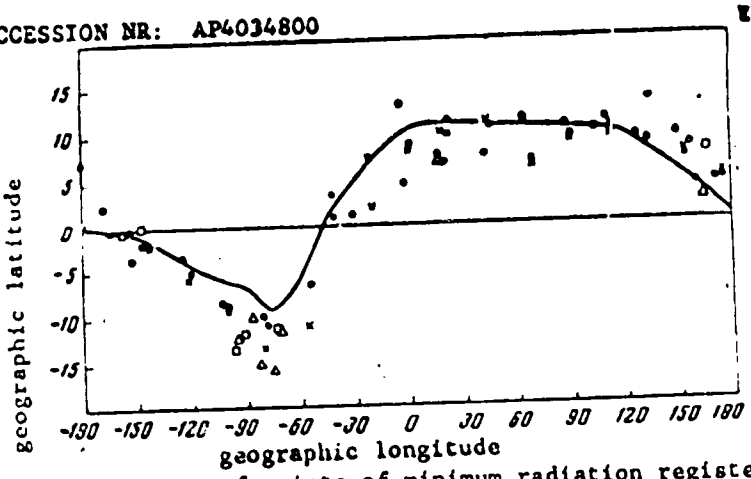


Fig. 1. Geographic positions of points of minimum radiation registered by the STS-5 radiation counters. Open circules denote the minimum counting rate of the STS-5 counter according to data from the second satellite-ship; the crosses denote the minimum counting rate of the STS-5 counter according to data from the third satellite-ship; the filled circles denote the minimum photomultiplier current according to data from the third satellite-ship; the triangles denote the minimum counting rate of the STS-5 counter counting rate according to data from the satellite "Kosmos-4"; the squares denote the minimum counting rate of the STS-5 counter according to data from the satellite "Kosmos-7"; the solid line is the cosmic ray equator as fixed by Kellogg.

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"APPROVED FOR RELEASE: 07/13/2001 CIA-RDP86-00513R001341020014-5

L 52204-65 EWT(1)/EWG(v)/FCC/EEC-4/EEC(t)/EWA(h) Po-4/Pe-5/Pq-4/Pae-2/Peb/Pi-4
GW

ACCESSION NR: AP5017047 UR/0048/64/028/012/2045/2048

51
B

AUTHOR: Vernov, S. N.; Savenko, I. A.; Shavrin, P. I.; Nesterov, V. Ye.; Pisarenko, N. F.; Basilova, R. N.

TITLE: Study of cosmic rays at high altitudes [Report of the All-Union Conference for the Physics of Cosmic Rays, held in Moscow, 4-10 October, 1963]

SOURCE: AN SSSR. Izvestiya. Seriya fizicheskaya, v. 28, no. 12, 1964, 2045-2048

TOPIC TAGS: cosmic ray, astrophysics, satellite data analysis

ABSTRACT: Measurements of the intensity of charged particles that were conducted beyong the limits of atmosphere yielded values for the intensity which exceeded many times the intensity of the parimary cosmic rays. Two hypotheses for the nature of this "excess" energy are examined on the basis of changes in the counting rate of the STS-5 counter on the Kosmos-4, Vostok-3 and Vostok-6 satellites during the period from August 1960 to June 1963. The variation and geographic distribution of the intensity were recorded at altitudes of 200-300 kilometers, and analysis of the counting rate showed that the change in the counting rate is the same as that observed in cosmic rays in the atmosphere.

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"APPROVED FOR RELEASE: 07/13/2001 CIA-RDP86-00513R001341020014-5

L 32204-65

ACCESSION NR: AP5017047

Examination of the geographic distribution of the counting rate of the STS-5 showed a unique relationship between the counting rate and the threshold magnetic hardness of the point of measurement.

Orig. art. has: 3 graphs, 2 tables

ASSOCIATION: none

SUBMITTED: 00 ENCL: 00 SUB CODE: AA, NP

NO REF SOV: 004 OTHER: 002 JPRS

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"APPROVED FOR RELEASE: 07/13/2001 CIA-RDP86-00513R001341020014-5

L 3226-66 EWT(1)/EWT(m)/FCC/EWA(h) DIAAP GS/GW UR/0000/65/000/000/0448/0454

ACCESSION NR: AT5023617

AUTHORS: Nesterov, V. Ye.; Pisarenko, N. F.; Savenko, I. A.; Tel'tsov, M. V.; Shavrin, P. I.; Sharvina, K. N.

50
B+1
19

TITLE: Investigation of the inner Van Allen belt and the artificial radiation belt of the earth at low altitudes during 1960-1964

SOURCE: Vsesoyuznaya konferentsiya po fizike kosmicheskogo prostranstva, Moscow, 1965. Issledovaniya kosmicheskogo prostranstva (Space research); trudy konferentsii. Moscow, Izd-vo Nauka, 1965, 448-454

TOPIC TAGS: radiation belt, Van Allen belt, magnetic anomaly, atmosphere

12

ABSTRACT: Investigations carried out during 1960-1964 of the inner Van Allen and artificial radiation belts of the earth at low altitudes are discussed with emphasis on the South Atlantic magnetic anomaly off the coast of Brazil. Most of the measurements of particle fluxes were made on five satellites of the "Kosmos" series and the second and third cosmic ships. It was found that in the magnetic shells $1.2 \leq L \leq 1.4$ the intensity of particles toward the east from the anomaly was greater than that toward the west from the anomaly, and for

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L 3226-66
ACCESSION NR: AT5023617

1.5 ≤ L ≤ 2.1 the reverse was true. Thus, the main component of the flux of particles in the first case was protons and in the second case—electrons. It is also concluded from measurements of the change in electron intensity with altitude that the magnitude of the standard atmosphere is significantly greater than that obtained by D. G. King-Hele and M. Janice (Proc. Roy, Soc., A270, N 1343, 562, 1962). The lifetime of electrons in the artificial radiation belt created by a high-altitude thermonuclear explosion on July 9, 1962 was found to range from 170 days for L=1.3 down to about 70 days for larger L up to 2.0. Orig. art. has: 9 figures and 1 table. [04]

ASSOCIATION: [illegible] Moscow (All-Union Conference on [illegible])

SUBMITTED: 02Sep65 ENCL: 00 SUB CODE: ES, SV

NO REF SOV: 007 OTHER: 007 ATD PRESS: 4106

Card 2/2

APPROVED FOR RELEASE: 07/13/2001 CIA-RDP86-00513R001341020014-5"

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"APPROVED FOR RELEASE: 07/13/2001 CIA-RDP86-00513R001341020014-5

ACCESSION NR: AP4041572 S/0293/64/002/003/0492/0497

AUTHOR: Vernov, S. N.; Nesterov, V. Ye.; Pisarenko, N. F.; Savenko, I. A.; Savun, O. I.; Shavrin, P. I.; Sharvina, K. N.

TITLE: Investigation of terrestrial radiation belts in the region of the Brazilian magnetic anomaly at heights of 235 to 345 km

SOURCE: Kosmicheskiye issledovaniya, v. 2, no. 3, 1964, 492-497

TOPIC TAGS: magnetic anomaly, anomaly region, inner radiation belt, magnetic level, Geiger counter, electron lifetime, artificial radiation belt

ABSTRACT: A large region of high radiation intensity at the height of 300 km was detected by the second space probe at the Brazilian great negative geomagnetic anomaly. The intense radiation is caused by the sinking inner radiation belt at that height in the anomaly region; the intensity of the magnetic field at the height mentioned is less than 0.22 gs. The comparison of the counter speeds of Cosmos 4 with those of the second probe showed a more rapid decrease in the intensity of the magnetic field when the measurements were



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ACCESSION NR: AP4041572

carried out by Cosmos 4 at magnetic levels 1.2, 1.3, and 1.45. This comparison shows an increase of protons of the energy 25 Mev in the period between the launching of these space probes. Four times more particles were counted during the Cosmos-4 flight in 1962 than in 1960 during the flight of the second space probe. The lifetime of electrons in the artificial radiation belt is different for individual levels and the intensity of the magnetic field. Orig. art. has: 3 figures and 1 table.

ASSOCIATION: none

SUBMITTED: 14Jan64 ATD PRESS: 3064 ENCL: 00

SUB CODE: AA NO REF SOV: 004 OTHER: 008

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APPROVED FOR RELEASE: 07/13/2001 CIA-RDP86-00513R001341020014-5"

"APPROVED FOR RELEASE: 07/13/2001 CIA-RDP86-00513R001341020014-5

L 20227-65 EWT(1)/EWG(v)/FCC/EEC-4/EEC(t)/EWA(h) Po-4/Pe-5/Pq-4/Pae-2/Peb/Pi-4/Pb-4 AEDC(a)/SSD(c)/SSD/AFWL/ASD(a)-5/AS(mp)-2/ASD(p)-3/AFMD(c)/AFETR/ESD(gs)/ESD(si)/ESD(t) GW/WS

ACCESSION NR: AP5002105 S/0048/64/028/012/2049/2057

AUTHOR: Vernov, S. N.; Savenko, I. A.; Shavrin, P. I.; Nestorov, V. Ye.; Pisarenko, N. F.; Sharvina, K. N.

TITLE: Data on the earth's radiation belts obtained during the Cosmos flights at altitudes of 200—400 km. [Report presented at the Vsesoyuzhoye soveshchaniye po fizike kosmicheskikh luchey (All-Union Conference on Cosmic Ray Physics), held at Moscow, 4-10 October 1963]

SOURCE: AN SSSR. Izvestiya. Seriya fizicheskaya, v. 28, no. 12, 1964, 2049-2057

TOPIC TAGS: satellite, radiation density, electron density, solar activity, radiation belt, cosmic ray

ABSTRACT: Some data on the earth's radiation belts collected during the Cosmos series in 1960-1963 at altitudes below 400 km are presented. Data obtained from Cosmos-4 indicate a maximum density shift within the outer radiation belt over a broad interval of longitude during magnetically quiet days. At the same time, an increase of average density was also noted within the radiation belts. From data of

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L 20227-65
ACCESSION NR: AP5002105

Cosmos-7 and Cosmos-15 the geographical distribution of electron density in the Brazilian anomaly at an altitude of approx 300 km was determined. This distribution roughly coincided with electron distribution in the inner radiation belt measured by Discoverer-31. The existence of electrons with energies exceeding 2 Mev within the inner radiation belt are indirectly indicated. During the flight of Cosmos-4 in April 1962, the counting rate of the Geiger counter showed a fourfold increase over satellite measurements made in August 1960. The rate of increase coincided with the proton-density change within the inner belt during the period of the transition to minimum solar activity (and decreased atmospheric density). Orig. art. has: 6 figures.

ASSOCIATION: none

SUBMITTED: 00 ENCL: 00 SUB CODE: AA, ES

NO REF SOV: 007 OTHER: 010 ATD PRESS: 3162

Card 2/2

APPROVED FOR RELEASE: 07/13/2001 CIA-RDP86-00513R001341020014-5"

"APPROVED FOR RELEASE: 07/13/2001 CIA-RDP86-00513R001341020014-5

L 2322-66 EWT(d)/FSS-2/EWT(1)/FS(v)-3/EEC(k)-2/FCC/EWA(h) TT/AST/GS/GW

ACCESSION NR: AT5023616 UR/0000/65/000/000/0434/0448

AUTHORS: Vernov, S. N.; Nesterov, V. Ye.; Pisarenko, N. F.; Savenko, I. A.; Tverskaya, L. V.; Shavrin, P. I.

TITLE: Investigation of the upper Van Allen radiation belt at low altitudes during the flights of the satellite ships and artificial earth satellites "Kosmos" from 1960 to 1963

SOURCE: Vsesoyuznaya konferentsiya po fizike kosmicheskogo prostranstva. Moscow, 1965. Issledovaniya kosmicheskogo prostranstva (Space research); trudy konferentsii. Moscow, Izd-vo Nauka, 1965, 434-448

TOPIC TAGS: sputnik, artificial earth satellite, Van Allen belt, radiometry, geomagnetic field

ABSTRACT: The results of radiometric measurements of the Van Allen radiation belt from several "sputnik" and "Kosmos" satellites are discussed. The radiometers consisted of inner and outer scintillation counters and gas discharge counters. The internal scintillation counters recorded electron energies between 50 to 300 kev. Among the various recorded measurements was the variation of radiation intensity with longitude, which was quite apparent in the outer belt and which could be explained clearly by the structure of the actual geomagnetic field. Several

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L 2322-66

ACCESSION NR: AT5023616

altitude versus longitude particle drift trajectory curves were obtained to explain the various geomagnetic anomalies observed. Next, data were obtained to determine the location of maxima in the outer Van Allen belt. Over a period of four years this varied within the limits $4 \leq L \leq 6$, and this variation could be associated with geomagnetic disturbances. As a third observation, an electron energy gap was discovered between the outer and inner radiation belts on $2 \leq L \leq 3$. The special profile of the outer Van Allen belt is shown to be characterized by the location of a maximum, a maximum radiation intensity $I_{max}$, and a half-width corresponding to $0.5\ I_{max}$. Intensity measurements and geomagnetic line-of-force cross section estimates gave the following values for the electron lifetimes in the outer belt: for electron energies > 100 kev, $T = 5 \times 10^5$ sec, for energies > 600 kev, $T = 5 \times 10^7$ sec. Orig. art. has: 13 figures and 1 formula. [04]

ASSOCIATION: none

SUBMITTED: 02Sep65 ENCL: 00 SUB CODE: AA,SV

NO REF SOV: 015 OTHER: 012 ATD PRESS: 4107

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APPROVED FOR RELEASE: 07/13/2001 CIA-RDP86-00513R001341020014-5"

"APPROVED FOR RELEASE: 07/13/2001 CIA-RDP86-00513R001341020014-5

L 1539-66 FSS-2/EWT(1)/FS(v)-3/FCC/EWA(d)/EWA(h) WT/GS/GW

ACCESSION NR: AT5023629 UR/0000/65/000/000/0506/0509

AUTHOR: Basilova, R. N.; Nesterov, V. Ye.; Pisarenko, N. F.; Savenko, I. A.; Shavrin, P.I.

TITLE: Satellite cosmic ray investigations

SOURCE: Vsesoyuznaya konferentsiya po fizike kosmicheskogo prostranstva. Moscow, 1965. Issledovaniya kosmicheskogo prostranstva (Space research); trudy konferentsii. Moscow, Izd-vo Nauka, 1965, 506-509

TOPIC TAGS: cosmic ray, cosmic radiation, spacecraft

ABSTRACT: Data are presented on time variations of cosmic radiation as recorded by a number of artificial earth satellites during the period between 19 August 1960 and 27 April 1963. STS-5 gas discharge counters were used as measuring instruments. The orbit parameters and times of measurement are summarized in Table 1 of the Enclosure. The recordings of the counters in each satellite were adjusted to the data of Kosmos-4 on the basis of measurements obtained within the stability period of radiation intensity during the solar activity. The data are adjusted to an altitude of 300 km. The radiation intensity changes with time, relative to

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L 1539-66

ACCESSION NR: AT5023629

the intensity during the August—December 1960 period on the high-latitude plateau, are charted together with the recordings of "Explorer 7" and stratospheric recordings by Charakhch'yan (Geomagnetizm i aeronomiya, 3, 1963, 304; Doklad na Vses. sov. po kosmicheskim lucham. Apatity, 1964) to show a general increase of intensity by roughly 25 percent during 1961 and the first quarter of 1962. This increase is attributed to the appearance of low-momentum particles, whose integral spectrum is deduced by plotting the differentials of the increase between Kosmos-4 and Kosmos-17 and Explorer-7, and between stratospheric data and the differential spectrum of the increase according to the aforementioned satellites and Kosmos-4. The data of the Kosmos and Explorer satellites are in fair agreement but differ from those of the stratospheric measurements. It is concluded that gas-discharge counters can be used advantageously in artificial earth satellites for investigations of cosmic radiation. Orig. art. has: 3 figures. [FP]

ASSOCIATION: none

SUBMITTED: 02Sep65 ENCL: 01 SUB CODE: AA, SV

NO REF SOV: 003 OTHER: 003 ATD PRESS: 4094

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APPROVED FOR RELEASE: 07/13/2001 CIA-RDP86-00513R001341020014-5"

"APPROVED FOR RELEASE: 07/13/2001 CIA-RDP86-00513R001341020014-5

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ACCESSION NR: AT5023629

ENCLOSURE: 01

Table 1. Orbit parameters and times of measurement

| Satellite | Perigee, km | Apogee, km | Line of measurement | Count speed pulse/cm$^2$/sec |
|---|---|---|---|---|
| Second Sputnik | 306 | 339 | 19 August 1960 | 3.25 ± 0.15 |
| Third Sputnik | 187 | 256 | 1 December 1960 | 3.25 ± 0.15 |
| Kosmos-4 | 298 | 330 | 26-29 April 1962 | 4.44 ± 0.05 |
| Kosmos-9 | 301 | 358 | 27 September-1 October 1962 | 4.44 ± 0.17 |
| Kosmos-12 | 211 | 405 | 22-30 December 1962 | 4.08 ± 0.25 |
| Kosmos-15 | 117 | 371 | 22-27 April 1963 | 4.26 ± 0.14 |

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"APPROVED FOR RELEASE: 07/13/2001 CIA-RDP86-00513R001341020014-5

L 2403-66 FSS-2/EWT(1)/EWT(m)/FS(v)-3/FCC/EWA(d)/EWA(h) TT/DD/GS/GW

ACCESSION NR: AT5023639 UR/0000/65/000/000/0568/0572

AUTHORS: Nesterov, V. Ye.; Pisarenko, N. F.; Savenko, I. A.; Shavrin, P. I.

30
B+1

TITLE: Radiation safety problems of space flights

SOURCE: Vsesoyuznaya konferentsiya po fizike kosmicheskogo prostranstva. Moscow, 1965. Issledovaniya kosmicheskogo prostranstva (Space research); trudy konferentsii. Moscow, Izd-vo Nauka, 1965, 568-572

TOPIC TAGS: radiation hazard, radiation protection, Van Allen belt, cosmic ray, astronaut, solar activity

ABSTRACT: Three types of radiation hazards encountered by astronauts and space vehicles during different space missions are discussed. First are the primary cosmic rays recorded by various Soviet space probes during the 11-year solar cycle. These data show that, depending on the solar activity, the radiation dose due to cosmic rays can vary between 10 and 25 rad/year, or 40 to 100 rem/year. About 92% of this biological dose is found to be due to the heavy-particle component of the cosmic rays ($Z \geq 10$). The second radiation hazard comes from the energetic protons and hard electron radiation from the Van Allen belts. Detailed Soviet satellite observations over the years 1960-1964 indicate that a significant contribution to

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"APPROVED FOR RELEASE: 07/13/2001 CIA-RDP86-00513R001341020014-5

L 2403-66

ACCESSION NR: AT5023639

Van Allen belt radiation hazards comes from the radiation belt artificially created by the 1962 upper atmospheric nuclear explosions. The Voskhod-2 manned flight measured a 60 millirad dose on the astronauts Belyayev and Leonov. Furthermore, heavy damage to the space suits of astronauts may be caused by regions of soft radiation in the Van Allen belt. The third radiation hazard is the sudden, large scale, solar photospheric bursts which can generate 100-1000 rad/cm$^2$ radiation doses. The important protection factor here is an accurate prediction of such bursts and subsequent scheduling of space flights. Furthermore, a more accurate knowledge of solar burst physics and cosmic rays is necessary, especially an accurate knowledge of radiation spectra for high Z components, an accurate knowledge of energy and charge spectra of corpuscular radiation from solar bursts, and the time-resolution of solar bursts. Orig. art. has: 1 table. [04]

ASSOCIATION: none

SUBMITTED: 02Sep65 ENCL: 00 SUB CODE: SV, AA

NO REF SOV: 003 OTHER: 000 ATD PRESS: 4107

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APPROVED FOR RELEASE: 07/13/2001 CIA-RDP86-00513R001341020014-5"

"APPROVED FOR RELEASE: 07/13/2001 CIA-RDP86-00513R001341020014-5

SAVENKO, I.A.; [illegible], N.[illegible]; SHAVRIN, [illegible]; NESTEROV, V.Ya.

Monitoring the [illegible] during the flight of the space ships "Vostok-3", "Vostok-4", "Vostok-5", and "Vostok-6." Vest.Mosk.un. Ser.3 Fiz., astron. 20 no.2:40-43 Mr-Ap '65. (MIRA 18:5)

1. Laboratory [illegible] Institut yadernoy fiziki Moskovskogo universiteta.

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L 58391-65 EEO-2/EWG(j)/FSS-2/EWG(r)/EWT(1)/EWT(m)/FS(v)-3/EEC(k)-2/EPF(n)-2/EWG(v)/EWG(m)/FCC/EWA(d)/EEC-4/EEC(t)/EWG(a)-2/EWG(c)/EWA(h) Po-4/Pe-5/Pq-4/Pac-4/Pae-2/Peb/Pi-4/Pu-4 TT/GW

ACCESSION NR: AP5011501 UR/0188/65/000/002/0040/0043

AUTHORS: Savenko, I. A.; Pisarenko, N. F.; Shavrin, P. I.; Nesterov, V. Ye.

TITLE: Monitoring the cosmic radiation level during the time of flight of the space ships Vostok-3, Vostok-4, Vostok-5, and Vostok-6

SOURCE: Moscow. Universitet. Vestnik. Seriya 3. Fizika, astronomiya, no. 2, 1965, 40-43

TOPIC TAGS: space radiation, radiation shielding, space capsule, astronaut protection/Vostok

ABSTRACT: The space capsules in question were provided with a dosimetric apparatus consisting of a transmitter (gas-discharge counter of nuclear radiation) and a memory circuit, and was connected by telemetry to a scientific coordination center, which received data from various points concerning the solar activity and the radiation level in space. In spite of the occurrence of certain high intensity solar flares and in spite of the artificial radiation belt produced

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ACCESSION NR: AP5011501

by the thermonuclear explosion in the region of the Johnston Island in the Pacific (2 July 1962), it is concluded on the basis of the accumulated data that the astronauts were not exposed to dangerous radiation during the flights of all these capsules. Original article has: 2 figures

ASSOCIATION: NIIYaF (Nuclear Physics Institute, Moscow State University)

SUBMITTED: 25Feb64 ENCL: 00 SUB CODE: SV, LS

NR REF SOV: 005 OTHER: 000

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"APPROVED FOR RELEASE: 07/13/2001 CIA-RDP86-00513R001341020014-5

L 02978-67 FSS-2/EWT(1)/FCC TT/GW

ACC NR: AP6032855 SOURCE CODE: UR/0020/66/170/003/0567/0569

AUTHOR: Grigorov, N. L.; Maduyev, V. L.; Mandel'shtam, S. L.; Pisarenko, N. F.; Savenko, I. A.; Tindo, I. P.

ORG: Institute of Physics im. P. N. Lebedev, Academy of Sciences, SSSR (Fizicheskiy institut Akademii nauk SSSR)

TITLE: Investigation of corpuscular radiation by the Luna-10 artificial satellite

SOURCE: AN SSSR. Doklady, v. 170, no. 3, 1966, 567-569

TOPIC TAGS: solar corpuscular radiation, lunar orbit, lunar satellite, GAS DISCHARGE COUNTER, SATELLITE DATA ANALYSIS

ABSTRACT: Gas-discharge counters (types SBT-9 and SF) were carried on the surface of Luna-10 (see Fig. 1). The SBT-9 had a window 0.2 $cm^2$ in area made of a 1.2 $mg/cm^2$ layer of mica covered by 0.3 $mg/cm^2$ gold sheet to decrease its registration effectiveness for solar x-rays with wavelengths shorter than 10 Å. This counter registered electrons and protons with energies greater than 40 kev and 0.5 Mev, respectively. The SF counter windows were aluminum sheets 2.7 $mg/cm^2$ thick and 0.5 $cm^2$ in area. These registered x-rays with wavelengths shorter than 14 Å, and electrons and protons with energies greater than 50 kev and 800 kev, respectively. The pulses from all counters were registered on logarithmic scales. The SF counter data were registered by independent logarithmic integrators. The telemetry system sampled the channels once every two minutes. The SBT-9 counter rate output increased in the

Card 1/3 UDC: 537.491—>523.165

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ACC NR: AP6032899

sterad for the SF counters. This activity is assumed to be due to unidirectionally moving electrons in the magnetosphere region whose energies exceed 40 kev. The data indicate that the Earth's magnetospheric tail is 60° wide and that the magnetic field does not form closed lines around the moon. Orig. art. has: 2 figures.

SUB CODE: 03,22/ SUBM DATE: 28Jun66/ ATD PRESS: 5099

APPROVED FOR RELEASE: 07/13/2001 CIA-RDP86-00513R001341020014-5"

"APPROVED FOR RELEASE: 07/13/2001 CIA-RDP86-00513R001341020014-5

L 02974-67 FSS-2/EWT(1)/FCC TT/GW

ACC NR: AP6032854 SOURCE CODE: UR/0020/66/170/003/0565/0566

AUTHOR: Grigorov, N. L.; Maduyev, V. [illegible]; [illegible], N. F.; Savenko, I. A.

ORG: Institute of Physics im. P. N. Lebedev, Academy of Sciences, SSSR (Fizicheskiy institut Akademii [illegible])

TITLE: Investigation of cosmic radiation by the Luna-10 artificial satellite

SOURCE: AN SSSR. Doklady, v. 170, [illegible], 565-566

TOPIC TAGS: ARTIFICIAL SATELLITE, cosmic radiation, lunar orbit, lunar satellite, RADIATION COUNTER/LUNA-10 ARTIFICIAL SATELLITE

ABSTRACT: Protons with energies exceeding 5[illegible] Mev and electrons with energies greater than 5 Mev were recorded by an end-window gas discharge counter carried on Luna-10. This counter was protected by a 2.5 g/cm$^2$ copper shield. The soft radiation (protons with energies >0.5 Mev and electrons with energies >40 kev) was registered by another counter of the same type which was also shielded by copper but had, in addition, a 1.2 mg + 0.3 mg/cm$^2$ mica and gold sheet forming a small window 0.5 cm in diameter. The total geometry factor of the counters for the isotropic hard radiation was 2.6 ± 0.2 cm$^2$. The counting rate was recorded on a logarithmic scale. The error in transmission of the radiation count data did not exceed 3%. The average count rate of hard radiation recorded between 31 March and 3 April 1966 was 12.2 ± 0.1 particles/sec, which corresponds to a flux of 4.7 ± 0.4 particles/cm$^2$·sec. The data indicate that the intensity of primary cosmic radiation is characteristic

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L 02974-67

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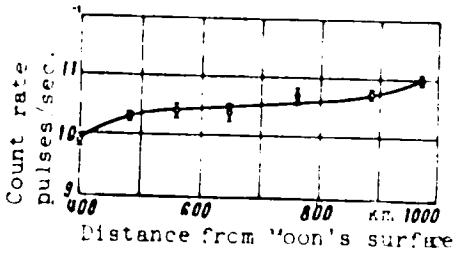


Fig. 1. Radiation counting rate as a function of distance from the Moon.

for the minimum solar activity cycle. Luna-10 was placed in a selenocentric orbit on 3 April 1966 with an apogee of 1000 km, a perigee of 350 km, and an angle of inclination of 72° with respect to the Moon's axis. The counting rate is plotted as a function of altitude in Fig. 1. Orig. art. has: 1 figure.

SUB CODE: 04,22,18 SUBM DATE: 04Jul66 ORIG REF: 017 ATD PRESS: 5099

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"APPROVED FOR RELEASE: 07/13/2001 CIA-RDP86-00513R001341020014-5

L 03775-67 FSS-2/EWT(1)/EWT(m)/ELC(k)-2/FCC SCTB II/DL/RD/GW

ACC NR: AP6028342 SOURCE CODE: UR/0293/66/004/004/0630/0633

AUTHOR: Volynkin, Yu. M.; Antipov, V. V.; Davydov, B. I.; Dobrov, N. N.; Nikitin, M. D.; Pisarenko, N. F.; Saksonov, P. P.

ORG: none

TITLE: Assurance of radiation safety during the Voskhod-1 and Voskhod-2 flights

SOURCE: Kosmicheskiye issledovaniya, v. 4, no. 4, 1966, 630-633

TOPIC TAGS: space radiation, ~~radiation safety~~ spacecraft, solar flare ~~radiation~~, radiation shielding, radiation dosimetry, nuclear emulsion, radiation ~~sensor~~ detector, EVA, lysogenic bacteria/Voskhod-1 spacecraft, Voskhod-2 spacecraft

ABSTRACT: The Voskhod-1 and Voskhod-2 flights were characterized by extremely high orbits (apogee 495 km). It was calculated that Voskhod-2 would have a far higher radiation exposure due largely to the proton component in the area of the Brazilian anomaly, where in the course of 20 min the spaceship would acquire about 80% of the daily dose. The extravehicular surface dose of electrons during 20 min could amount to 1 rad. In order to reduce this to zero a protective layer of 100 mg/cm$^2$ is required. Leonov's spacesuit fulfilled this shielding requirement. Since exposure to radiation may reach dangerous proportions during solar flares the following radiation protection measures were taken during the Voskhod-1 and Voskhod-2 flights. A preliminary study was made of radiation conditions on the proposed orbit. Forecasts

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ACC NR: AP6028342

of the possibility of solar flares were made. The radiation dose was reduced by spacecraft shielding. Changes in the level of radiation in the upper atmosphere were checked by means of ballon sondes. Integral doses and dose rates were measured by on-board radiation meters. Individual dosimeters of the ILK, IKS, and IFKN types and nuclear emulsions were used to measure the total doses acquired by each cosmonaut. Living organisms were carried on board as biodosimeters. Radioprotective drugs were carried for emergency use by the cosmonauts. In order to determine the effect of low-energy electrons during Leonov's EVA the two cosmonauts carried identical sets of dosimeters (on the chest under the spacesuit and in external hip pockets), which were capable of working in high-vacuum conditions. However, Leonov's dose did not exceed Belyayev's. Individual and on-board dosimeters indicated that the total dose received on Voskhod-2 was 70 ± 5 mrad, while that on Voskhod-1 was 30 ± 5 mrad. Analysis of the spectral composition of radiation made by nuclear emulsions indicated the presence of particles with linear energy losses comparable to ions of He, B, O, and Ar. The radiation dose, taking RBE into account, did not exceed several dozen ber. Biological objects carried on Voskhod-1 and Voskhod-2 showed increases in non-disjunction of chromosomes and increases in frequency of dominant lethal mutations in Drosophila, and disruption of the mitotic mechanism in microspores of Tradescantia; these increases, however, were small. Lysogenic bacteria carried on the two Voskhod flights did not show any effect of radiation or other spaceflight factors. Experiments performed by B. B. Yegorov have indicated that various stages of mitosis in Tradescantia microspores possess varying sensitivity to the effects of spaceflight factors. These findings confirmed Yegorov's hypothesis that the chief cause of

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ACC NR: AP6028342

disruption of the mitotic mechanism is weightlessness and that chromosome reconstructions are due largely to combined factors related to spaceflight takeoff and reentry. Orig. art. has: 2 tables. [BM]

SUB CODE: 06/ SUBM DATE: 21Aug66/ ORIG REF: 006/ ATD PRESS: 5064

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"APPROVED FOR RELEASE: 07/13/2001 CIA-RDP86-00513R001341020014-5

ACC NR: AP7007507 SOURCE CODE: UR/0293/66/004/006/0842/0850

AUTHOR: Gr[illegible]ov, N. L.; Medvyev, V. L.; Pisarenko, N. F.
ORG: none

TITLE: Study of corpuscular radiation on the space craft "Luna-10"

SOURCE: Kosmicheskiye issledovaniya, v. 4, no. 6, 1966, 842-850
TOPIC TAGS: lunar satellite, cosmic radiation, gas discharge counter, artificial [illegible]lite orbit / Luna-10 lunar satellite
SUB CODE: 22,03,18

ABSTRACT: [illegible] are presented on measurements of cosmic radiation on the artificial lunar satellite "Luna-10." The radiation was recorded using two end-window gas-discharge counters. The authors have determined the intensity of cosmic radiation in interplanetary space. In the artificial lunar satellite orbit measurements were made of the albedo for primary radiation in relation to the lunar surface. Finally, data are given on the fluxes of soft corpuscular radiation in the region of the "tail" of the earth's magnetosphere. The measurements made it possible to establish quite reliably the boundary of intensity of fluxes of electrons with $\geq$ 40 keV. Much of the time from 27 April to 2 May and from 11 to 15 May the unshielded counter counted an average of 11.2 pulses/sec. Since the relative effective geometric factor to penetrating radiation for the unshielded counter was 0.95 ± 0.05 of the geometric factor of the shielded counter, [illegible] counting rate of which was 10.5 $sec^{-1}$ near the moon, for this period of measurements the upper limit of intensity of the fluxes is

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ACC NR: AP7007597

$$\frac{[illegible] \cdot 10,5\ sec^{-1}}{0.4\ cm^{2} \cdot sterad} \approx 3\ cm^{-2} \cdot sterad^{-1} \cdot sec^{-1}.$$

where 0.4 $cm^{2}$·sterad is the geometric factor of the unshielded counter for soft radiation. Thus, if there is radiation which is constantly trapped by the lunar magnetic field at altitudes from 350 to 1,000 km from the lunar surface, the fluxes of electrons with energies of 40 keV in it do not exceed 3 $cm^{-3}$·$sterad^{-1}$·$sec^{-1}$. Orig. art. has: 2 tables, 3 figures and 1 formula. [JPRS: 39,7[illegible]]

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PISARENKO, N. L.

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PISARENKO, N. L.

...Effect in Semi-Conductors and Metals
...Nauk S.S.S.R., 1941, (Fiz.) 5, ...
...that the magnitude and the sign of ...
...and metals can be explained by the dependence of ...
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...the hard com...
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