the geomagnetic field. Measurement of the geomagnetic disturbances falling into the class of micropulsations ($\omega \approx 0.01$—5 Hz), allows estimation of the plasma density, energy and location of energetic particles, position of the magnetopause, cross-field conductivities of the lower ionosphere and other parameters of the geospace [1, 2]. The micropulsations can be observed with a variety of techniques, however most of these are indirect methods as long as MHD waves in the plasma are concerned. That is, ground-based observations of the ULF (ultra-low frequency) electric or magnetic field variations actually refer to components of the «secondary» electromagnetic response produced by the lower ionosphere under the impact of an incident MHD wave. The MHD waves proper are observable in or above the ionosphere, either with HF/VHF radars or satellite-borne magnetometers [3, 4]. Spatial characteristics of the magnetospheric pulsation signatures (localization near a certain magnetic shell, cross-phases for a few observation points, state of polarization and angular spectrum) can be studied only through multiple point measurements. (The ESA Project Cluster [5] envisaged direct simultaneous observations of geomagnetic field components at a few points in the magnetosphere with provisions for the temporal and spatial resolution, which enabled calling the facility a «wave telescope»). A MHD wave telescope implements the idea of spaced or interferometric reception at pairs of observation points. If an ensemble of such pairs is available, where the baselines differ in length and orientation, it should be possible to restore the amplitude and phase distribution of the wave field and angular spectrum of the signal received. Some of the baselines might not be real but rather synthesized, based on the orbital motion of the satellite carrier.

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«Reliability» Experiment

INFLUENCE OF LOW-FREQUENCY ATMOSPHERIC ELECTRICAL PROCESSES AND NEAR-SPACE ELECTROMAGNETIC SIGNALS ON THE CENTRAL NERVOUS SYSTEM FUNCTIONAL CONDITION OF A MAN MAINTAINING SPACE SYSTEMS

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The natural low-frequency radiation corresponds to «a noise» initiating thunderstorm activity, Earth's emissions, etc. The noise spectrum always possesses the frequencies (8, 14, 20 and 26 Hz), which are attributed to the «Earth-ionosphere» resonance system. Thus, the man on Earth permanently exists in a species of resonator. There is no resonator influence in near space, as no resonances are observed

in the spectrum of electromagnetic radiation, so in this case a man goes through a different electromagnetic environment.

There is no authentic information on the character of influence of natural low-frequency electromagnetic fields on the human organism. On the other hand, the knowledge of particular effects of low-frequency radiation on the central nervous system (CNS) functional condition of people with various individual-typical natures (defining their adaptation capability, etc.) is necessary. It will allow increasing the reliability of «man + space vehicle» and «man + ground control system», as well as other similar systems, since the final goal may be establishment of the criteria to select experts maintaining these systems and to develop methods for optimizing the adaptation process under the above-mentioned conditions.

Our experiment deals with definition of the character and dynamics of the CNS functional condition of people with various individual-typical natures under the effect of low-frequency electromagnetic radiation. To reach this purpose, we set the following objectives:

1) analysis of parameters of the electromagnetic environment;

2) development of an experimental model of parallel recording of parameters of the electromagnetic radiation and the CNS functional condition characteristics with further definition of their correlation;

3) working out the criteria defining the influence of the electromagnetic radiation on the men with various individual-typical nature (in particular on those possessing various adaptation capabilities).

Research methods:

The following equipment has been developed: medical and radio physical equipment, and processing complex. The medical equipment includes the following devices: electroencephalograph, reograph, cardiac contractions rate and arterial pressure recorders. The radio physical part of equipment includes low-frequency receivers, calibration units, computer complex for the data input.

The fulfillment of the «Reliability» experiment envisages the following scheme: a) development of a technique for joint measurements of a frequency-amplitude spectrum of the cerebrum brain bioelectric activity and low-frequency radiation, b) test experimentation, c) full-scale research, d) processing and analysis of the data obtained, e) development of a flight and experiment techniques, f) substantiation of medical recommendations on improving the human adaptation to the changing electromagnetic environment.

The preliminary research has shown [1—2] that the electromagnetic radiation intensity growth correlates with the increase of spectral power of all bioelectric rhythms (alpha, delta and theta), with the power and rate reorganization of rhythms in the alpha-range (in most cases the peak is being formed at the frequency of 10 Hz), as well as with the increase of the left cerebral hemisphere domination on the electroencephalogram. Our methodical approach has shown the effectiveness of these results, and so, it can be recommended for performance of the experiment onboard the OSS.

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