

Specialised system for examination of the neuro-regulating changes in the human body on Earth and in space conditions

Identificativo proposta: TOBG20191122001 **RICHIEDI MAGGIORI INFORMAZIONI**

A Bulgarian research unit with experience in the R&D of space technologies and products has developed a highly specialised system designed for examination of the neuro-regulating changes in people on Earth and in space conditions measuring a wide range of parameters. The research team is looking for commercial agreements with technical assistance with industrial partners from the aerospace or medical sectors.

The research team is the leading one in Bulgaria in the R&D field of aerospace technologies, medico-biological studies related to space biotechnologies, heliobiology and telemedicine. The proposed system addresses a critical issue: complex real-time examination of highly skilled and trained people working in extremely harsh conditions. The technological product is new generation medical measurement device designed for examination of the neuro-regulating changes in personnel on Earth and in space conditions. It is a system for intellectual digital processing of bio signals for performing of express analysis and evaluation in real time, correlated with different functional systems of the human body. The scientific object of the examinations performed with this system is the research of the neuro-regulating processes in human body by divided recording of the influence of weightlessness factors and of the vegetative emotional reactions. The following parameters are measured with the system: - Electroencephalogram (EEG) - Electrooculogram (EOG) - Evocated potentials on the basis of EEG and EOG - Electrocardiogram (ECG) - Electromiogram (EMG) - Skin temperature - Arterial blood pressure - Breathing rate - Frequency of the basic tone of the speech - Spreading of the attention by following the pupil of the eye - Skin resistance - Mechanical power (dynamometer) During the different examination phases audio visual and somato sensor stimulations are performed. The flight configuration of the system includes 48 channels combined on module principle (4 specialised channels in each module). The system has a unique internal analog-digital interface for communication, supporting the management and the registration of information from the analog amplifiers modules. The module structure allows the exchange ability of the modules and assemblies and their combination as well by the solving of different problems connected with a measurement of the psychophysiological parameters of man. In order to secure the enough channels for registration of physiological information the devices are designed so that their number can increase up to 128. The software of the signal processor for proceeding of physiological signals allows a fast and flexible configuration of the system. During the experiment a variation of the number and the parameters of the channels (sample rate, amplification and filter type) are possible. Significant importance for the improvement of the leaded signals is that digital filtration is possible. Up to 64 different types of digital filters are set, which can be individually chosen for every channel. Proceeding of speech is developed on a specialised electronic chip. With the help of this module a process of identification of fixed number of speech commands (which are used by the management of the system) is possible. In this way the introduced bio feedback is securing a high effectiveness of the functions and high information value of the data received from the experiment. The research team is seeking commercial agreements with technical assistance with industrial partners operating in the field of aerospace technologies and medical technologies and equipment for joint activities and providing support and know-how for adaptation to their needs.

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