**EPSC** The study of Terrestrial microorganisms in space conditions and search for Extraterrestrial microorganisms on space bodies. 2020 G.K. Garipov<sup>1\*</sup>, M. I. Panasyuk<sup>1,2</sup>, S.I.Svertilov<sup>1,2</sup>, I.V.Konyukhov<sup>3</sup>, S.I.Pogosyan<sup>3</sup>, A.B.Rubin<sup>3</sup>, D.E.Andreev<sup>4</sup>. - Skobeltsyn Institute of Nuclear Physics, Moscow State University, 2. - Physics Department, Moscow State University, 3. - Biological Department, Moscow State University, 4.- Belozersky Institute of Physics-Chemical Biology, Moscow State University.

\*- e-mail:

The aim of the research is detecting and exploration of microorganisms of Terrestrial and Cosmic origin.(1) For search, it is proposed to use the properties of microorganisms to emit a fluorescent glow when they irradiated with fashes of light causing their fluorescence.





Main parameters of the scientific part of microsatellite for remote sensing of space objects or for micro laboratory Power < 3W Dimension < 1.5U Weight < 1kg



The second task is a micro laboratory inside of microsatellite for studying of the terrestrial microorganisms located in space conditions in near-earth space. (3) Matrix area ~60×60mm<sup>2</sup>





flashes of

is used as microorganisms incubator, pressure and temperature sensors, water and reagent sources etc.

Communication matrix for the sealing and organizing connections between the microcapsules including several incubators with different habitat and

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References

The detection of microorganisms on the cosmic bodies of the Solar System is a great importance for understanding the problem of the origin of life. At present, it is difficult to create specialized laboratories conducting the search of living microorganisms on the surface of planets or other space bodies, as formed in the Solar System as captured by the Sun attraction from interstellar space. Existing experiments on descent vehicles, as well as planetary on rovers allow conducting the search of living microorganisms on the surface of planets and their satellites, but in a limited area near the landing site. Given the fact that rare forms of life, as a rule, form colonies that exist in a limited space in hard-toreach places, the task of finding microorganisms is even more complicated.

In this presentation, the method of remote sensing of the space object surface by flashes of light is considered for the search of biological objects in near- earth space. A signpost of the existence of bioactivity is the detection of specific fluorescence of microorganisms when the object of study is illuminated by the light inducing the fluorescence emission. It is shown that such studies can be carried out directly from outer space, as on the flight paths of a spacecraft near a space object, as from its satellite orbit, or on the surface of a space body after landing the descent vehicle as well as inside of space craft. It is shown that colonies of microorganisms can be detected at distances of hundreds of kilometers from the surface of the space body, and at distances of hundreds of microorganisms can be detected.

The task of researches is not only to detect microorganisms on space objects, but also to investigate their origin. One of the sources of occurrence of microorganisms can be panspermia, which suggested occurring of microorganisms on the Earth from outer space. In this work, we propose to study the inverse problem, where we propose to search for microorganisms on space bodies in near-earth space that could have appeared in space from Earth. In this case, the source of panspermia is the Earth. In this connection, the question about the survival of terrestrial microorganisms in space conditions arises. To solve this problem, in this presentation is proposed to study the dynamics of survival of microorganisms placed in microcapsules with a changing environment, it is proposed also to use the properties of fluorescence of microorganisms when exposed to light flashes. In this presentation discusses the structure diagram of a micro laboratory for such studies.