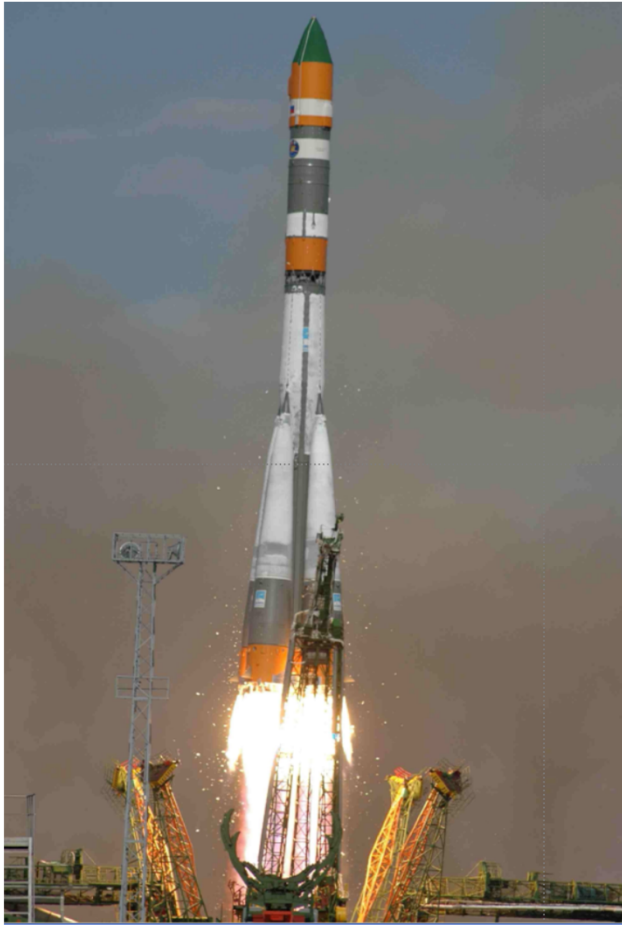
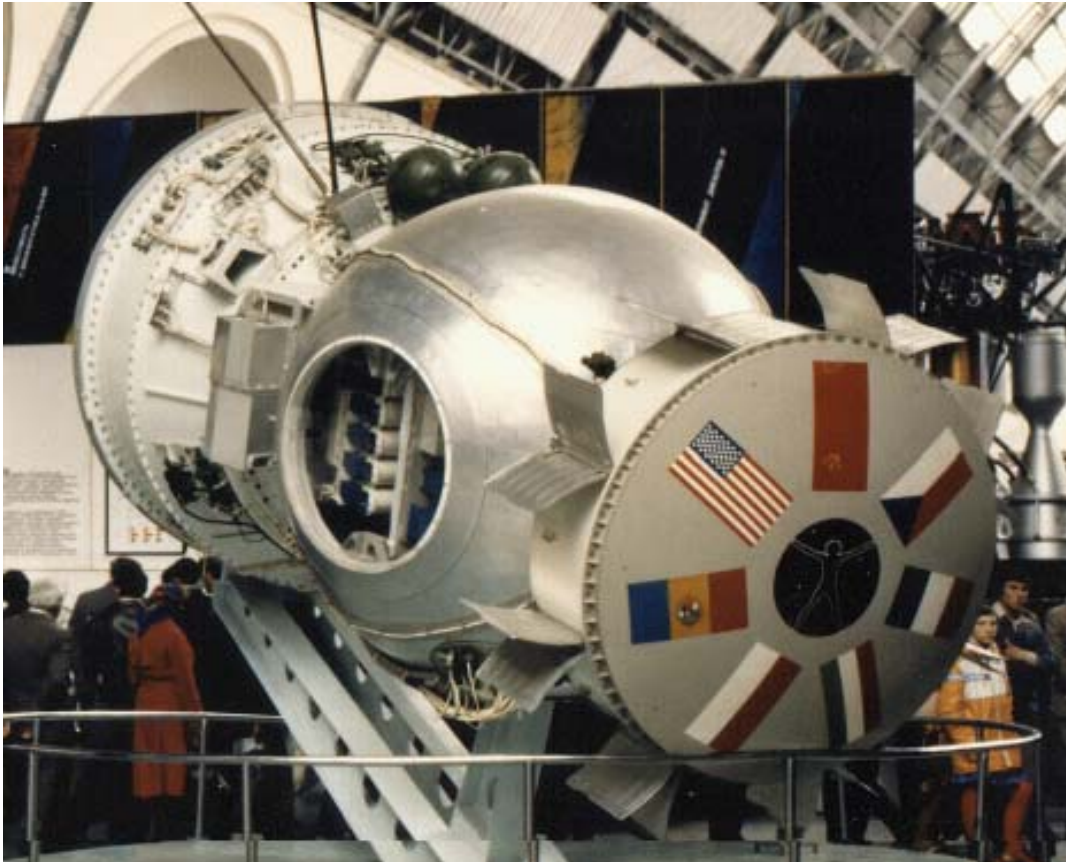


BIOTECHNOLOGICAL STUDIES ON AUTOMATIC BIOLOGICAL  
SATELLITE BION M2

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# Biosatellite Bion-M 2

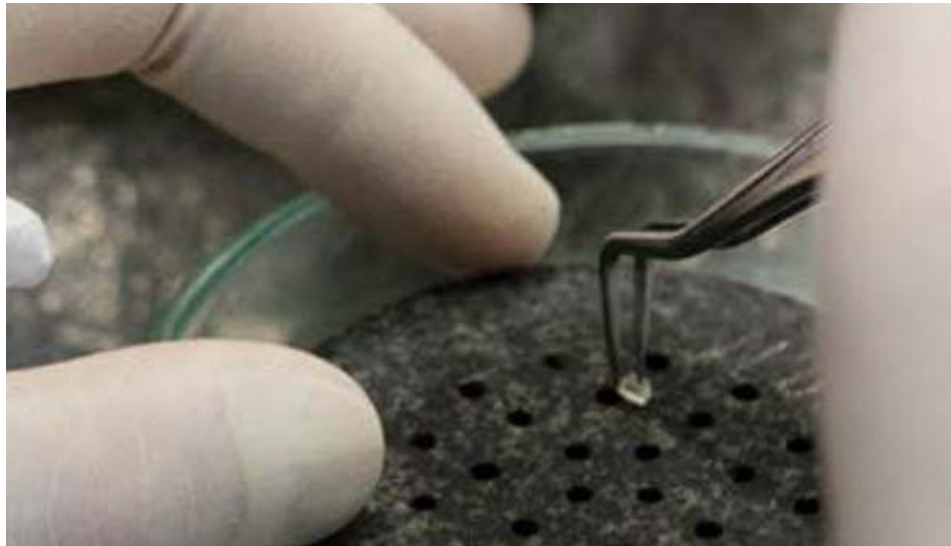


Altitude of orbital flight – 1000 km

Duration of flight 30 days

Expected time of launch - Spring 2022

# Inoculation of “Meteorite”



# Experiment “Meteorite” on Bion-M Retrieval of samples



# Experiment “Meteorite” on Bion-M



| Species                                | Characteristic   | Results                     |                 |                |
|--|--|-----------------------------|-----------------|----------------|
|  |  | Experiment                  | Orbital Control | Ground control |
| <i>Bacillus pumilis</i>                | Sporoforming grampositive aerobe, isolated from ISS habitat  | <b>Growth in one sample</b> | Growth          | Growth         |
| <i>Thermoanaerobacter siderophilus</i> | <i>Thermoanaerobacter siderophilus</i> is a dissimilatory <b>Fe(III)</b> -reducing, anaerobic, <b>thermophilic</b> bacterium.<br><br>It is <b>spore</b> -forming | <b>Growth in one sample</b> | Growth          | Growth         |

Isolation of thermophilic microbes  
on Kamchatka



# Experiment “Abiogenesis” on Bion-M

Prepared samples are attached to the plateau that is installed on the outer container.

Installation of glass was carried out before the launch biocompanion, and after installing the container is closed.

After reaching orbit outer container lid opens automatically and the samples were exposed to all kinds of radiation present in space.



- Abiotic (outside the living organism) synthesis of natural products is possible under the conditions of outer space.
- Mineral olivine, pyroxene, and silicon are not inert with respect to biologically significant molecules.
- One can consider this experimental system as a primitive model of the surface of a small cosmic body, which is the process of formation of primary organic molecules.

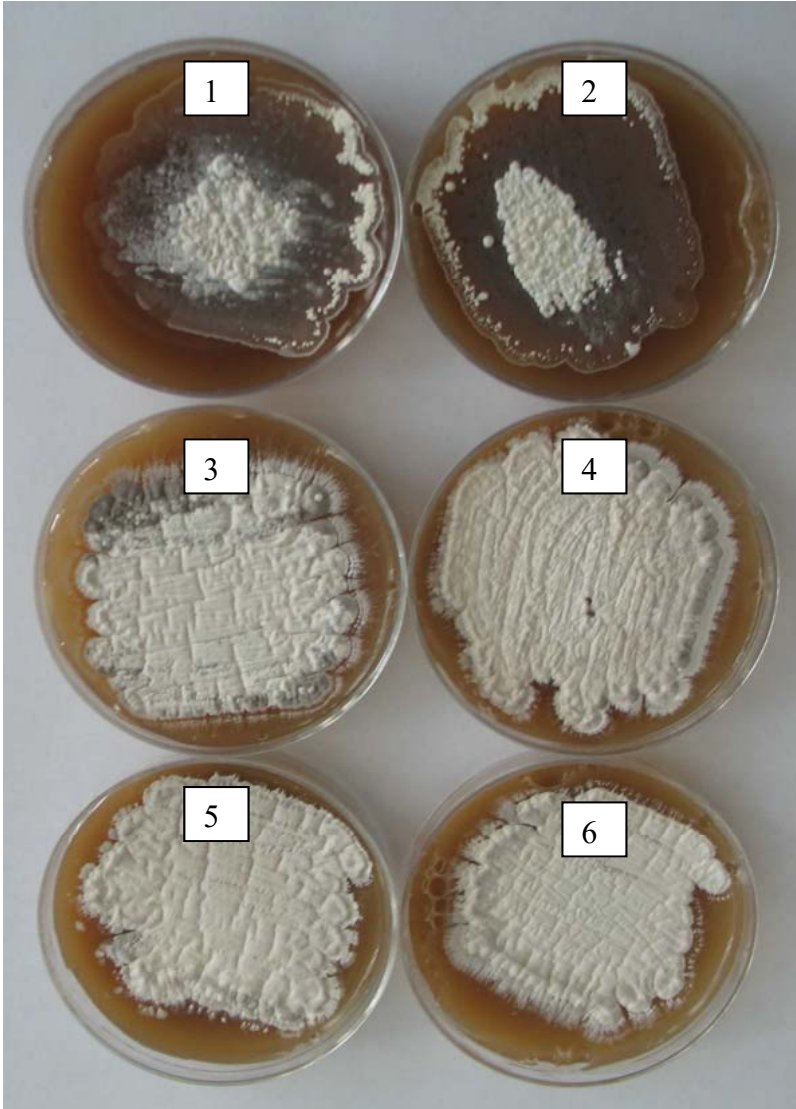


# Hardware for experiments on biosatellite "Bion M#2"



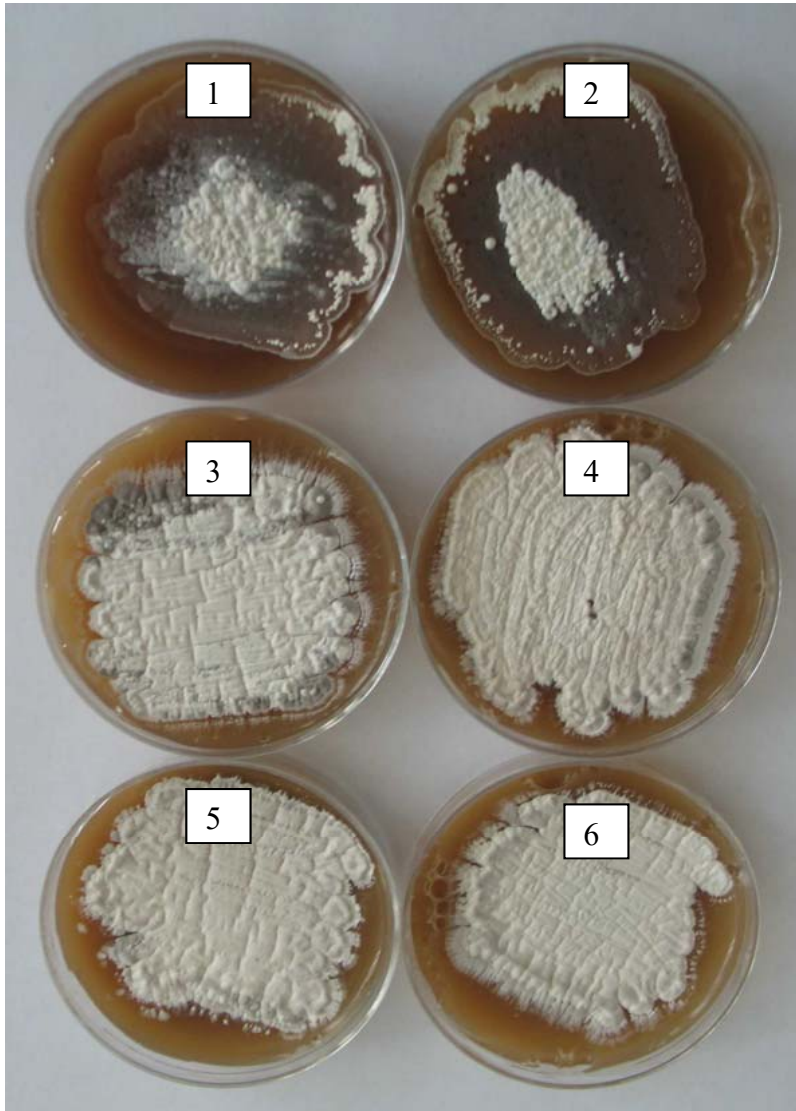
- "BIOKONT" 6 units
- Dimensions of each biocontainer D150x250
- Inner temperature 37°C, 28°C and ambient temperature
- Payload: 36 tubes Corning with inner volume and 12 petri dishes of 6 cm in diameter

## Experiment “Microbe” on Bion-M 1



**Sample of Petri  
dishes with  
lysogenic culture  
Streptomyces  
coelicolor 66 ( $\phi$ S31)  
1.2 - flight samples;  
3.4 - synchronous  
samples;  
5.6 - laboratory  
samples**

# Experiment "Lysogenesis." Study of the effect of the PCF on the processes of spontaneous induction of phage fS31 strains *Streptomyces lividans* 66



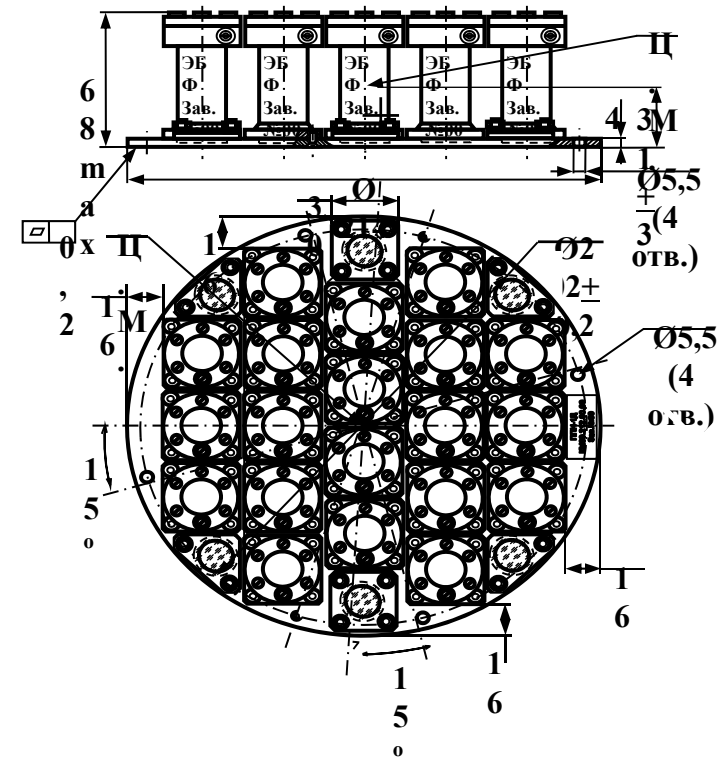
Sample of Petri dishes with lysogenic culture *S. coelicolor* 66 ( $\phi$ S31)

1.2 - flight samples;

3.4 - synchronous samples;

5.6 - laboratory samples

# Experiment “Exobiofrost”



Exobiofrost locations in outer container with preventive lid  
Weight of equipped unit – up to 15 kg.

# Hardware for experiments on biosatellite “Bion M#2”

bioreactor "FRAGMENTER"

2 units.

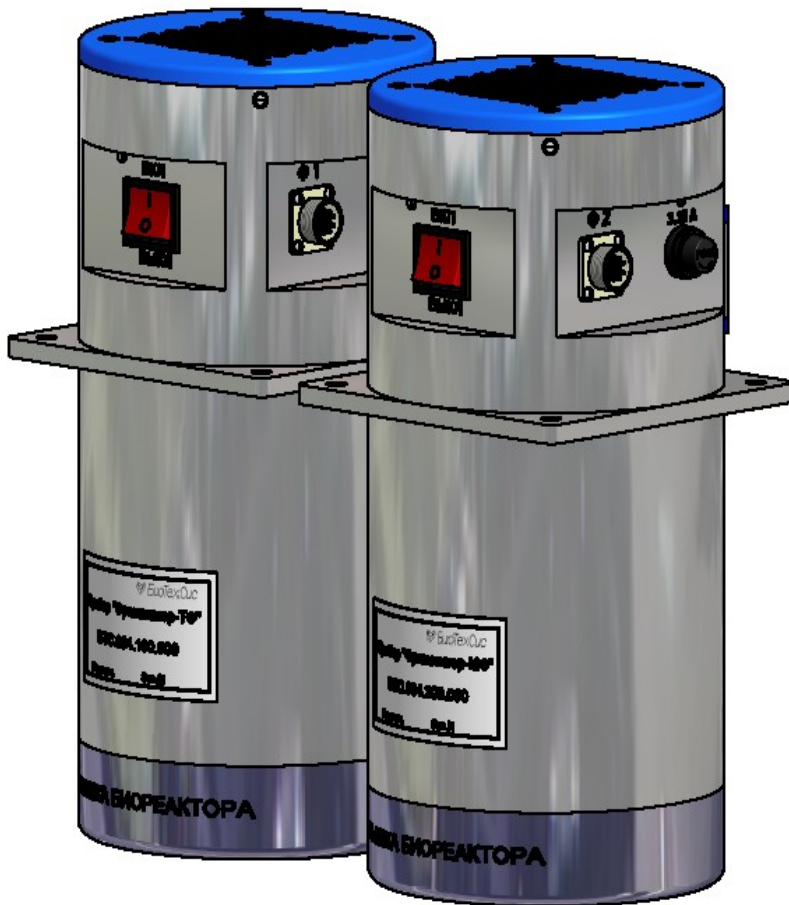
Weight of refueling equipment up to 6 kg

The dimensions of each fermenter are  
D150x250

Inner volume 500 ml.

Extra pressure – 0,5 ATA.

Inner temperature: 37 and 55 °C



# Experiment “Microbial fuel cell”



2 MFC units

Inner volume of anode and cathode chamber – up to 0,5 l

