



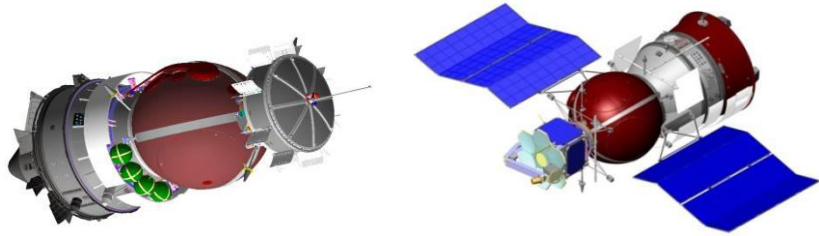
ORGANISATION OF SCIENTIFIC RESEARCH IN INTERNATIONAL SPACE PROJECTS

D.V. Rakov, V.N. Sychev

**United Nations / United Arab Emirates High
level Forum: Space as a Driver for
Socioeconomic Sustainable Development**

Dubai, United Arab Emirates,

6-9 November 2017



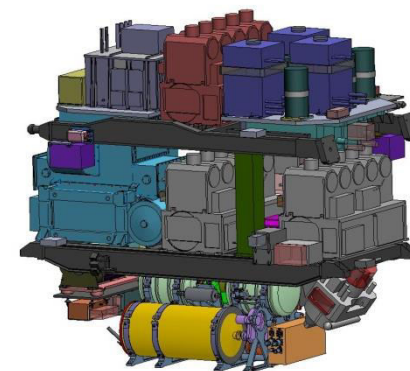
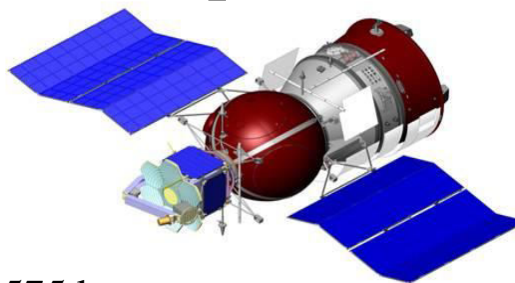
Goals:

1. Investigation of the biological effect of the conditions of aboard the spacecraft (acceleration, weightlessness, isolation, hyperkinesia, artificial habitat).
2. Study of the biological effect of space factors (ionizing radiation, altered magnetic field, UV radiation, vacuum, meteor hazard).
3. Investigation of the possibility of existence of life on other celestial bodies, astrobiological and exobiological research.
4. Studies of human adaptation problems in extreme conditions





BION-M #1 spacecraft



Date of launch – 19.04.2013

Orbit parameters: with the height up 575 km

Inclination – 64,9°

Duration of flights – 30 days

Total weight of spacecraft – 6480 kg

Hardware weight - 650 kg inside

- 250 kg outside

Weight of recovery module – 2300 kg

Temperature at outside space in orbital flight

from -150 up to 125 °C

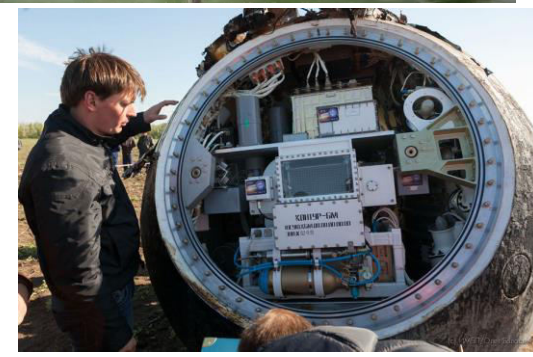
Daily energy supply for hardware 550 w

Rocket – Souz 2

Launching side – Byikonur

Touchdown area – near Orenburg city, RF

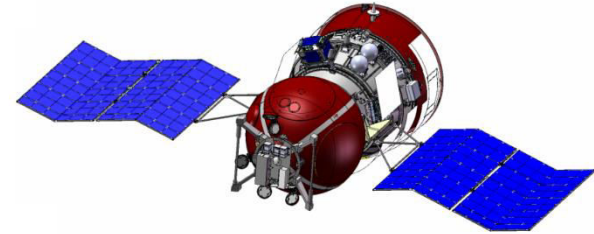
Date of landing – 19.05.2013



BION-M2 PROJECT

Major Goal:

Comprehensive investigation of combined effects of increased radiation doses and microgravity on the whole body and its individual systems at the cellular and molecular levels.

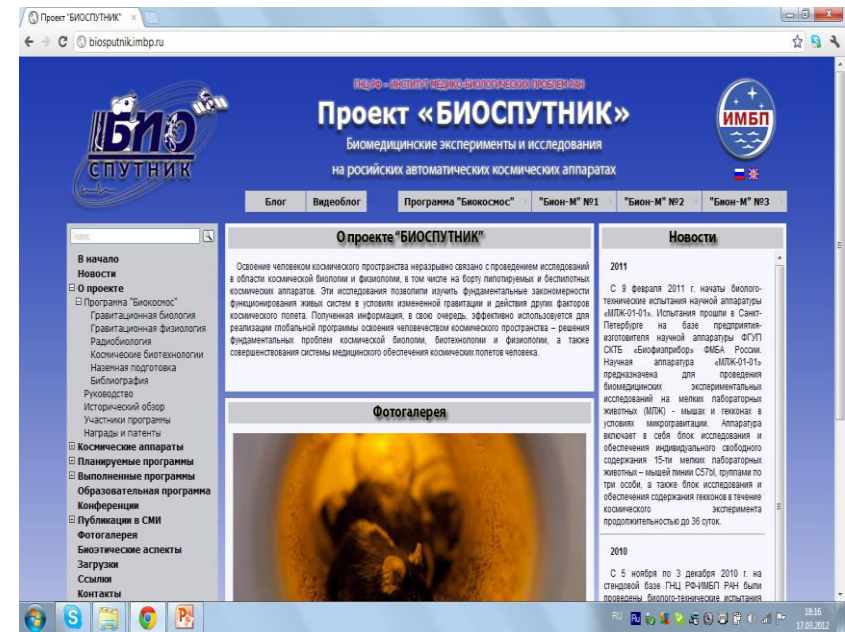


Funding starts in **2015**

Launch (tentative) in **2022**

Flight duration - **30 days**

Orbit altitude - **1000 km**

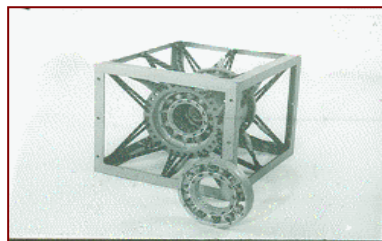
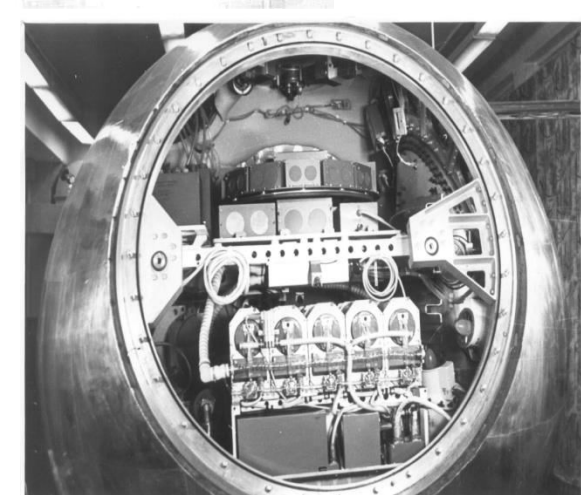
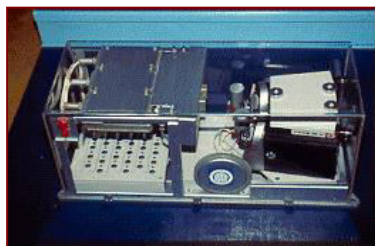
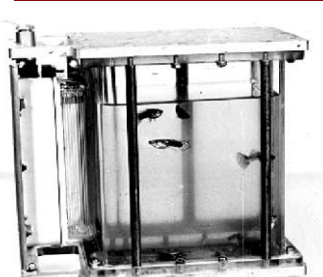
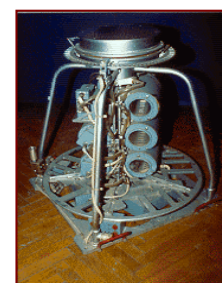
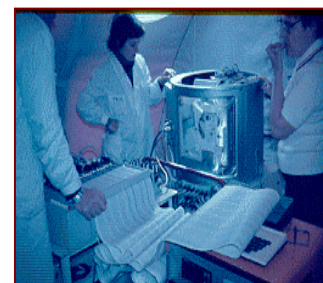
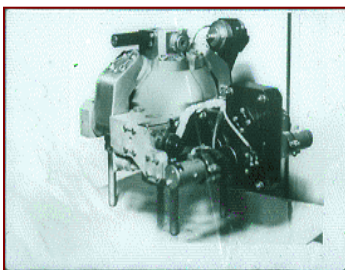
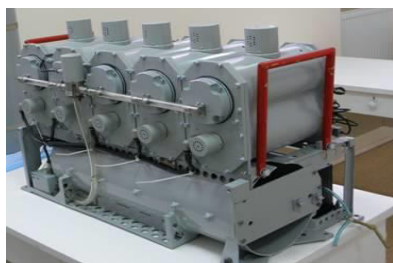


Space hardware will be similar to that used on Bion-M1 but modified in view of its

Bion-M1 performance

Experimental specimens – C57Bl mice, snails, plants, insects, cell cultures, microorganisms

Scientific equipment on Bion –M project





Set of Russian and foreign institutions – participants of the program of fundamental and applied experiments and researches (52)



**1. Russian Federation(32), including:
institutes of RAS (20), universities and academies (12).**



Russia



2. Ukraine (1)



Ukraine

3. Germany (4)



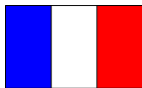
Germany

4. USA (12)



United States

5. France (3)



France

6. Republic of Korea(1)



7. Japan (1)





MARS-500 PROJECT

Duration of experiment: 520 days

Dates of experiment: June 3, 2010 – November 4, 2011

Goals:

- study the human adaptation to simulated peculiarities of future manned mission to Mars.
- study the biomedical requirements for support of extra prolonged orbital manned and interplanetary missions

Crew: 6 males in age 25-38 years old from different countries

Provided conditions:

- isolation in fully hermetical medico-engineering complex consisting of 5 segments with total volume 550 m³
- autonomous function of complex and crew

Scientific program included:

- 106 – EXPERIMENTS
- 28 - PSYCHOLOGICAL AND PSYCHOPHYSIOLOGICAL INVESTIGATIONS
- 34 - CLINICAL AND DIAGNOSTIC LABORATORY INVESTIGATIONS
- 26 - PHYSIOLOGICAL INVESTIGATION
- 8 - SANITATION, HYGIENE AND MICROBIOLOGICAL INVESTIGATIONS
- 10 - TECHNOLOGICAL AND OPERATIONAL INVESTIGATIONS





MARS-500 INTERNATIONAL COOPERATION



15 ESA

5 DLR

3 China

2 Italy

2 South Korea

2 Malaysia

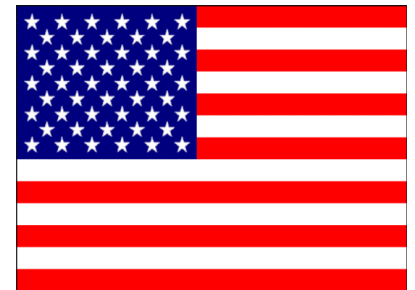
2 Czech Republic

1 Belorussia

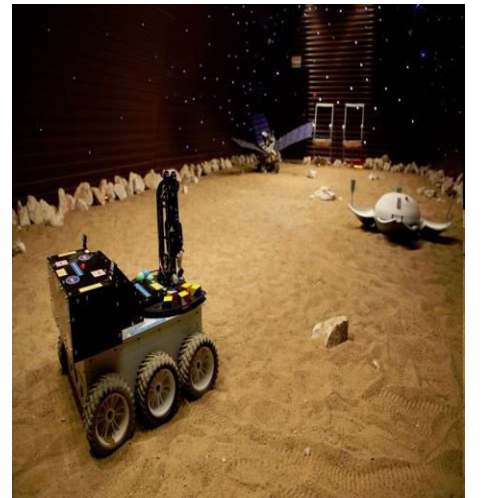
1 Canada

1 Spain

1 USA



LUNAR CREW



MOON-2015

“Comprehensive assessment of the women's crew psycho-physiological state during the short isolation inside a hermetically closed object, in the frame of Lunar mission simulation”

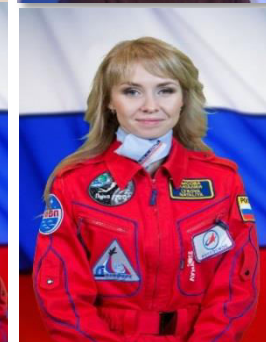
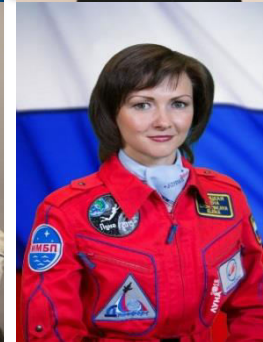
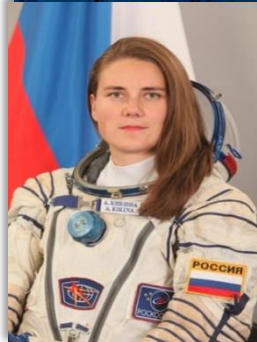
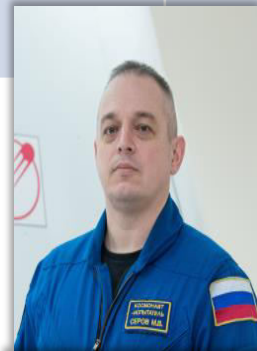


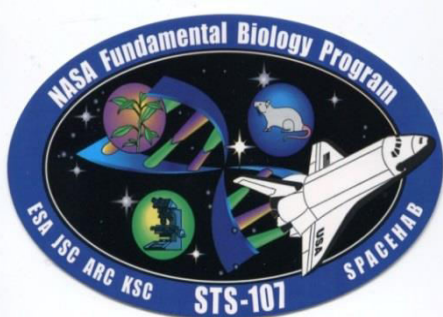
PLANNED ISOLATION EXPERIMENTS AT GROUND-BASED EXPERIMENTAL FACILITY OF IBMP

Moon	Through ISS to other planets					
2015	2016	2017	2018	2019	2020	2021
9 days	Partners searching, scientific program preparation, facility preparation, contracts signing.	14 -21 days	14 - 21 days	4 months	8 months	12 months
		1 or 2 experiments				

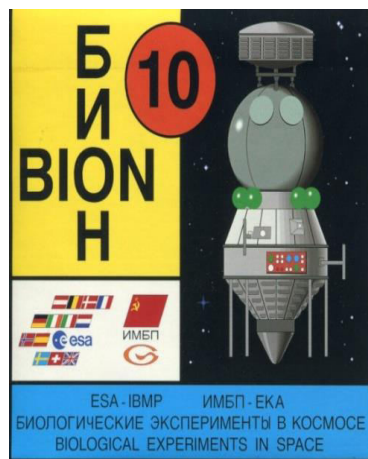
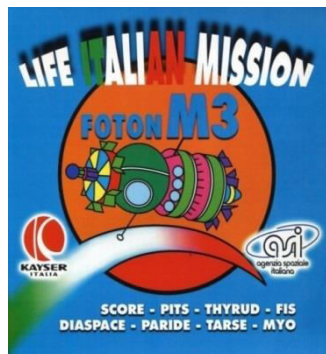


- Mark V. Serov – crew commander**
(RSC “Energia”, 23.05.1974)
- Anna Y. Kikina – flight engineer**
(FSO "Gagarin Research&Test Cosmonaut Training Center", 27.08.1984)
- Viktor Fetter – flight engineer**
(Airbus DS, 23.11.1983)
- Ilya V. Rukavishnikov – flight doctor**
(SSC RF – IBMP RAS, 23.01.1984)
- Elena S. Luchitskaya – researcher**
(SSC RF – IBMP RAS, 01.11.1980)
- Natalya Y. Lysova – researcher**
(SSC RF – IBMP RAS, 17.02.1990)





**MARS
500**



Gazenko, Oleg G.
(12.12.1918 – 17.11.2007)

Russian Soviet physiologist,
academician, one of the
founders of space medicine

SRC of RF-IBMP of RAS organize
international conference "Space
biology and aviation medicine"
Moscow,10-12/12/18. Conference
dedicate to 100 anniversary of
O. Gazenko.





GENERAL CONTACT INFORMATION

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