Russian Space Science Program

current status and nearest milestones

ROSCOSMOS
Ministry of Science and Higher Education of Russia
Russian Academy of Sciences
Science in the Federal space program 2016-2025

moon, planets, minor bodies of the Solar system

space astronomy

space plasma and solar physics

basic problems of space biology and medicine
Lunar program

LUNA-25
(old name LUNA-Glob)
technology of polar soft landing,
study of lunar south pole region

LUNA-26
(LUNA-Resource-Orbiter)
global orbital studies of the Moon

LUNA-27
(LUNA-Resource-Lander)
studies of south pole regolith and exosphere

landing area for LUNA-25

2021

2024

2025
The 2016 ExoMars Trace Gas Orbiter is the first in a series of Mars missions to be undertaken jointly by the two space agencies, ESA and Roscosmos.

Goals:
- Search for signs of past and present life on Mars
- Investigate how the water and geochemical environment varies
- Investigate Martian atmospheric trace gases and their source
The 2020 mission of the ExoMars programme will deliver a European rover and a Russian surface platform to the surface of Mars. A Proton rocket will be used to launch (in July 2020) the mission, which will arrive to Mars after a nine-month journey.

The ExoMars rover will travel across the Martian surface to search for signs of life. It will collect samples with a drill and analyse them with next-generation instruments.

**Roscosmos:** 00:15, Jan 25, 2020
“Scientific instruments for the Russian-European ExoMars-2020 mission are already ready.”
The world largest interferometer Radio Astron (or “Spektr-R”) which was launched in June 2011 has successfully completed its work in the begin of 2019. A number of important discoveries were made.
Major event in 2019 – successful launch of «Spectrum-Xray-Gamma» (SRG) Observatory and start of observation.

Principal Science Schedule
- All-sky survey – 4 years
- 2.5 years of pointed observations

Primary science instruments
- eRosita telescope (Germany)
- ART-XC telescope (Russia)

Major cooperation
- Roscosmos + DLR

Scientific head of the mission: acad. Rashid Sunyaev;
PI of for the ART-XC: Dr. Mikhail Pavlinsky;
PI of the eROSITA: Dr. Peter Predel.
eRosita and ART-XC

On-axis effective area of eROSITA and ART-XC

- eROSITA: 0.1 – 10 keV
- ART-XC: 5 – 30 keV
July 13, 2019, launch to the orbit

Flight to L2 point

Calibration and verification observations were carried out for few first months. All-sky survey started 08/12/2019. At mid-January 1/6 part of the sky is covered.
Combination of the large FoV and effective area will make possible probing record volume of the Universe.

Principal science goals of the SRG

- Total inventory of clusters of galaxies (up to 100 000) and cosmology
- Supermassive black holes (~ 3 000 000)
- Complete samples of galactic compact objects (~ 100 000)
- Stars (~ 2 000 000)
- Diffuse ISM and SNR
- Objects in the Solar system
Observation of Galactic center with ART-XC

More than a hundred of hard X-ray sources observed.
Diffuse emission from the hot gas with temperatures a few million degrees. More compact nebulous structures are mainly supernova remnants. The most prominent one, **SN1987A**, is the bright source close to the centre. Other sources: accreting binary systems, massive young stars, foreground stars from our home Galaxy or distant Active Galactic Nuclei.
A Russia led (with participation of Spain) project of a multipurpose space observatory for UV spectral range (>115-320 nm). The WSO-UV is equipped with a 170 cm telescope T-170M and scientific instruments: UV– imagers and 3 spectrographs (resolving power 1000 - 55000). Launch is scheduled for 2025.

Science goals
- The Cosmic Web (history of reionization, search for baryons, chemical evolution of Universe)
- Physics of astrophysical engines
- Formation and the evolution of the young planetary systems
- Astrochemistry in UV field and life origin
The program BION-M continues

The BION-M2 spacecraft is designed for studies of influence of hostile space environment on biological materials and living species in space (flight duration up to 45 days). Bion-M2 is scheduled to launch in 2023 on a Soyuz-2.1a rocket to an altitude of 800 km. The orbiter will carry 75 mice, insects, plants, cell cultures, microorganisms. Studies will focus on how they are affected at molecular level by space radiation.
Thanks a lot for your attention!