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ExoMars-2020 Surface Platform scientific investigation

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Abstract

ESA and Roscosmos have signed a cooperation agreement to work in partnership to develop and launch two ExoMars missions—in 2016 and 2020. The first mission is currently in progress, aiming to study Mars' atmospheric composition in unprecedented detail.

ExoMars-2020 mission will deliver the ExoMars Rover and a Landing Platform to the surface of Mars. The ExoMars Rover will carry a comprehensive suite of instruments dedicated to exobiology and geology research named after Louis Pasteur. The Rover will search for signs of life, past and present. It will have the capability to drill to depths of 2 m to collect and analyze samples that have been shielded from the harsh conditions prevailing on the surface, where radiation and oxidants can destroy organic materials [1].

The Landing Platform (LP) will be equipped with instruments to study the Martian environment. After the Rover egress the Landing Platform will serve as long-lived stationary platform (expected lifetime is two Earth years) to study surface environment with suite of scientific instruments [2]. The scientific objectives of the Landing Platform are:

- Context imaging.
- Long-term climate monitoring and atmospheric investigations.
- Studies of subsurface water distribution at the landing site.
- Atmosphere/surface volatile exchange.
- Monitoring of the radiation environment.
- Geophysical investigations of Mars' internal structure.

To address these objectives scientific payload has been selected and is currently in development. Payload currently consists of 13 instruments with total mass of 45 kg. (including harness):

Instrument	Short description
BIP	Block of interfaces and memory. Commands the science payload of LP
TSPP	Set of 4 cameras to create surface panoramas and assist Rover egress
ADRON-EM	Neutron gamma-spectrometer and dosimeter
MGAK	Gas Analytical package
PK (Dust Suite)	Dust dynamics near the surfaces
MTK (Meteo Suite)	Set of meteo sensors (temperature, humidity, wind velocity, pressure, solar irradiance, dust). Magnetic sensor. EDL measurements.
SEM	Small seismometer.
MAIGRET	Magnetometer.
RAT-M	Passive radiometer.
FAST	Fourier IR spectrometer.
M-DLS	Martian Multichannel Diode Laser Spectrometer.
LARA	Lander Radio science.
HABIT	Habitability, Brine Irradiation and Temperature.

Landing Platform scientific payload is being developed by Space Research Institute (Moscow) with contribution from ESA (LARA, HABIT, sensors in MTK and MAIGRET).

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References

[1] Vago, J., Westall, F. et al..: Habitability on Early Mars and the Search for Biosignatures with the ExoMars Rover, Astrobiology Vol. 17, No. 6-7, 2017.

[2] Zelenyi L., Korablev O., Rodionov D. et al: Scientific objectives of the scientific equipment of the landing platform of the ExoMars-2018 mission, Sol Syst Res (2015)