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RUSSIAN ACADEMY OF SCIENCES

MEDIA RELEASE

Russian DAN neutron detector successfully switched on upon Martian surface

Russian DAN instrument onboard NASA's *Curiosity* rover (*Mars Science Laboratory* project) was successfully switched on in Gale crater on August 17, 2012, 14:30 Moscow time, on the 11th sol (martian day), 13:00 local Martian time. The instrument works normally, having transmitted first scientific and service data.

DAN has worked normally for one hour and then was switched off at the command. The instrument's temperature at switching on was +20 degrees Celsius. Pulsed neutron generator did the first high-energy neutron probing of Martian surface, providing first scientific data on the surface composition and radiation background in the landing site. Scientific and service telemetry data confirms that instrument's components work normally.

Curiosity projects aimed to test the hypothesis, whether primitive life forms could exist in early or current Martian environment. Russian DAN instrument is dedicated to measure water and hydrogen-bearing compounds content along the path of the rover and to estimate neutron part of radiation background on the surface of Mars, thus revealing peculiarities of water distribution in the shallow layer of Martian surface and pointing to the most interesting sites with high water abundance in soil.

DAN consists of two main modules. The first one is pulsed neutron generator DAN-PNG to probe the shallow layer of the surface with high-energy neutrons. These particles penetrate the surface to the depth up to 1 m, then, after being moderated, form secondary neutron flux, coming out from beneath the surface. The second module, namely DAN-DE, registers neutron flux from the surface, operates the instrument in its whole, and contacts with the service systems of the rover. DAN instrument was developed and tested in Space Research Institute of the Russian Academy of Sciences (principal investigator — Dr. Igor Mitrofanov). Neutron generator was developed in N.L. Dukhov All-Russia Research Institute of Automatics. A.A. Blagonravov Institute for Engineering Science of the Russian Academy of Sciences (Moscow) and Joint Institute for Nuclear Research (Dubna) also participated in development and testing.

Russian participation in *Mars Science Laboratory* project is stipulated by Implementing Agreement between the United States National Aeronautics and Space Administration and the Federal Space Agency of the Russian Federation, which is the funding agency for DAN instrument. DAN experiment onboard *Curiosity* rover is led by scientists from Space Research Institute of the RAS, V.I. Vernadsky Institute of Geochemistry and Analytical Chemistry of the RAS (Moscow), Joint Institute for Nuclear Research with participating scientists from NASA's Jet Propulsion Laboratory and the US universities.

See also:

DAN at IKI <http://1503.iki.rssi.ru/DAN.html>

Mars Science Laboratory at NASA http://www.nasa.gov/mission_pages/msl/index.html

Mars Science Laboratory at JPL <http://marsprogram.jpl.nasa.gov/msl/>