



Electromagnetic waves on the surface of Mars: wave analyzer module for ExoMars 2020

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The ExoMars 2020 Surface Platform will conduct environmental and geophysical measurements with the aim to study the Martian surface and subsurface environment at the landing site. As a part of the scientific goals of the project, we will investigate electromagnetic waves in a broad range of frequencies. The scientific questions which we plan to address have never been answered by direct measurements on the surface of the planet.

The Surface Platform instrumentation will include the Wave analyzer module (WAM), consisting of an assembly of magnetic and electric antennae and dedicated analyzer electronics, as a part of the Martian ground electromagnetic tool (MAIGRET) instrument. The module is dedicated to the measurement of electromagnetic field fluctuations in the frequency band from 100 Hz to 8 MHz.

We plan to analyze emissions of atmospheric origin and possible wave activity originated in electrical discharges in dust storms. The wave activity linked to the interactions of interplanetary plasma medium with Martian ionosphere and Martian magnetic anomalies and interactions related to space weather effects will be also investigated.

The immediate questions to be answered are: i) Can we observe electromagnetic radiation propagating from the interplanetary space down to the surface of the planet? ii) Can we observe electromagnetic radiation from electric discharges in the Martian dust storms?