



The Mars Microphone onboard Supercam for the Mars 2020 rover

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The Mars Microphone is implemented as an add-on of the Supercam instrument onboard Mars 2020 rover, whose design is similar to the ChemCam instrument currently operating at the surface of Mars, onboard the Curiosity rover. It is the result of a collaboration between ISAE-SUPAERO, IRAP and LANL, under the supervision of CNES.

The Mars microphone will be located on the mast of the Mars 2020 rover, close to the SuperCam laser head. It has several scientific objectives. Its primary goal is to support the Laser LIBS investigation to enhance its capability of determining properties of Mars rocks and soils through their coupling with the laser beam. In addition, it will contribute to basic atmospheric science, by providing wind speed statistics, convective vortices, dust devil studies at close distance or when interacting with the rover. Finally it will record the unique signature of many artificial sounds: operations of the robotic arm and mast, sounds of the wheels on the ground when driving and other noise coming from the rover.

In order to satisfy its requirements, the Mars Microphone is able to record audio signals from 100 Hz to 10 kHz on the surface of Mars, with a sensitivity sufficient to monitor a LIBS impact at distances up to 4 m. To meet these requirements, a condenser microphone has been selected and the amplification gains and dynamics of the instrument have been carefully chosen. The microphone has passed its qualification and performance tests, including end-to-end tests in Martian environment, and has been delivered to IRAP for integration on the SuperCam instrument. The delivery of the Supercam instrument (and therefore of the Mars microphone) to the Jet Propulsion laboratory is expected at the end of 2018.