

IAF SPACE EXPLORATION SYMPOSIUM (A3)  
Late breaking abstracts (LBA)

Author: Mr. Anand Kumar Singh  
Universite Paul Sabatier Toulouse III, France, anandsingh.and45@gmail.com

Dr. Sylvestre Maurice  
Institut de Recherche en Astrophysique et Planétologie (IRAP), France, sylvestre.maurice@cesr.fr  
Mr. Baptiste Chide  
ISAE-Supaero University of Toulouse, France, baptiste.chide@supaero.isae.fr

## MICROPHONES FOR FUTURE MARS MISSIONS AND BEYOND.

**Abstract**

Sound on Mars! The SuperCam microphone onboard the NASA Perseverance rover has provided the first acoustic samples ever recorded on the red planet (Nature, May 26, 2022). The recordings of atmosphere, laser-ablation, and Ingenuity flights have helped realize critical properties of the Martian atmosphere: the attenuation of sound at high frequencies in low-pressure  $CO_2$  atmosphere along with the dispersion of the sound speed with frequency, which helped infer the high-frequency dynamics with respect to atmospheric turbulence. Now, should we envision another surface mission on Mars (similarly for Titan and Venus) without a microphone? Imagine an array of microphones to infer the wind direction and intensity! Small, low power, and robust: electret, MEMS (the most promising technology), fiber-optic microphones are readily available. The paper presents the science rational and feasibility studies: design, development, and testing in anechoic chamber or Mars chamber to actualize the maturity of such devices system for spaceflight conditions.