

Development of a dust imager for Mars landing mission

SATOH, Takehiko^{1*} ; OGOHARA, Kazunori² ; HASHIMOTO, George³ ; MIURA, Kazuhiko⁴ ; MANO, Takaaki⁵

¹Japan Aerospace Exploration Agency, ²University of Shiga Prefecture, ³Okayama University, ⁴Tokyo University of Science, ⁵National Institute for Materials Science

We report progress in developing a dust imager for future Mars landing missions. As Martian dust is a key element of its environment and a potential hazard for human exploration, it is essential to know what is Martian dust and how it works. However, little is known about the Martian dust due primarily to lack of measurements. Direct imaging would greatly increase our knowledge about the Martian dust (previously, an Atomic-Force Microscope onboard Phoenix acquired just one image).

The dust imager under development is not a microscope but a "bare" imaging sensor of which pixels are fine pitched. After exposing the sensor to the air with dust for a while, we illuminate the sensor with a parallel beam so that shadows of particles on the sensor are directly imaged. In this way, the imager does not need a focusing mechanism and is expected to be very light-weighted and robust. Although the status is still the laboratory-experiment level, this small tool would greatly contribute to the Mars science and exploration.

Keywords: Mars, dust, imager, landing, mission