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MELOS1 Mars Exploration for Life-Organism Search

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Mars exploration is uniquely significant as it includes all of "scientific", "engineering", and "exploration" importances almos equally. Visiting Mars is, therefore, an essential milestone to expand the frontier of human being. In this paper, as part of JSPS "next decade" activity, we discuss MELOS1 with view points of science and engineering.

The target of MELOS1 is direct detection of lives on Mars. It will be a simplified mission with just a rover plus a cruise stage, no orbiter at all. It may not be unreasonable to expect relay orbiters in Mars orbit when MELOS1 will arrive at the red planet as there are a number of mission plans from the U.S.A., Europe, and Russia.

The MELOS1 rover will weigh about 60 kg, equipped with a life-detection microscope (LDM) and meteorology sensors to monitor its environment. Details of LDM will be presented elsewhere. In brief, the LDM uses the highest possible sensitivity technique, dyeing cells with pigment and observe them by fluorescent light. This technique will give us 3 orders of magnitudes higher sensitivity of life detection than was done on Viking Landers.

If discovered, it should undoubtedly be the biggest discovery in science. The surface area of Mars is so wide and so different from one place to another. Yet, we had only 7 landers, basically at places similar to each other. The best places for life-detection experimetn, fluvial feasures or mud volcanoes (may be methane hot spots) are still intact. In MELOS1, we will perform high-precision landing to such a place and will search for lives for the first time. The current status of planning will be presented. In addition, the position in Japan's future missions will be discussed with

audience of greater variety.

Keywords: Mars, exploration, landing, life, rover