Nano and Pico Landing Space Probe Swarm to Search the Possibility of Life at the Southern Pole of Mars with an Environmental Friendly Structure

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Introduction: Introduction:
The miniaturized modern measuring systems make it possible to survey the surface region of a planetary body with a new strategy. Great number of sensors (camera, bio detector and magnetometer), an emitter-receiver unit and a power supply can be built into the small sized lander units. The essentially new aspect of this strategy is scattering a great number of these small sized lander units in different fields of targets. [1]

MSSM & NPSDR: New devices in wide scale of shapes and sizes applicable to use for space missions, e.g. reduced MSSMs (jet-carrier analogue) nearly cube decimetres, are to carry and distribute fleet of nano probes of NPSDRs as sensor ships. NPSDRs are different shaped according to target and with wide spectrum of possible independent or more multiplied sensors - fleet of analytical sensor ships – and with reduced smart telecommunication systems. In case of MSSMs for NPSDR sensor probes, it is enough to communicate with motherships, which gather, pack and transmit the collected data towards to Earth.

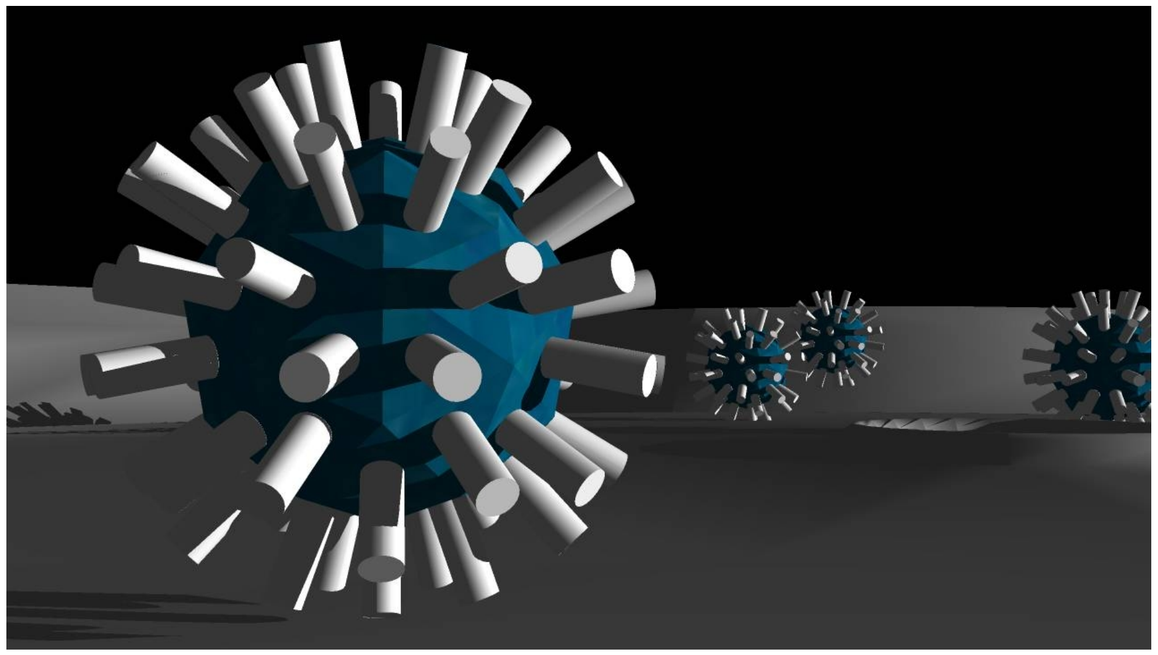

Figure 1 A possible realization or model of a nano-, or pico-lander. The sensors can be found in the prickle-like cylinders protruding from the central sphere which have the support leg function also [2]

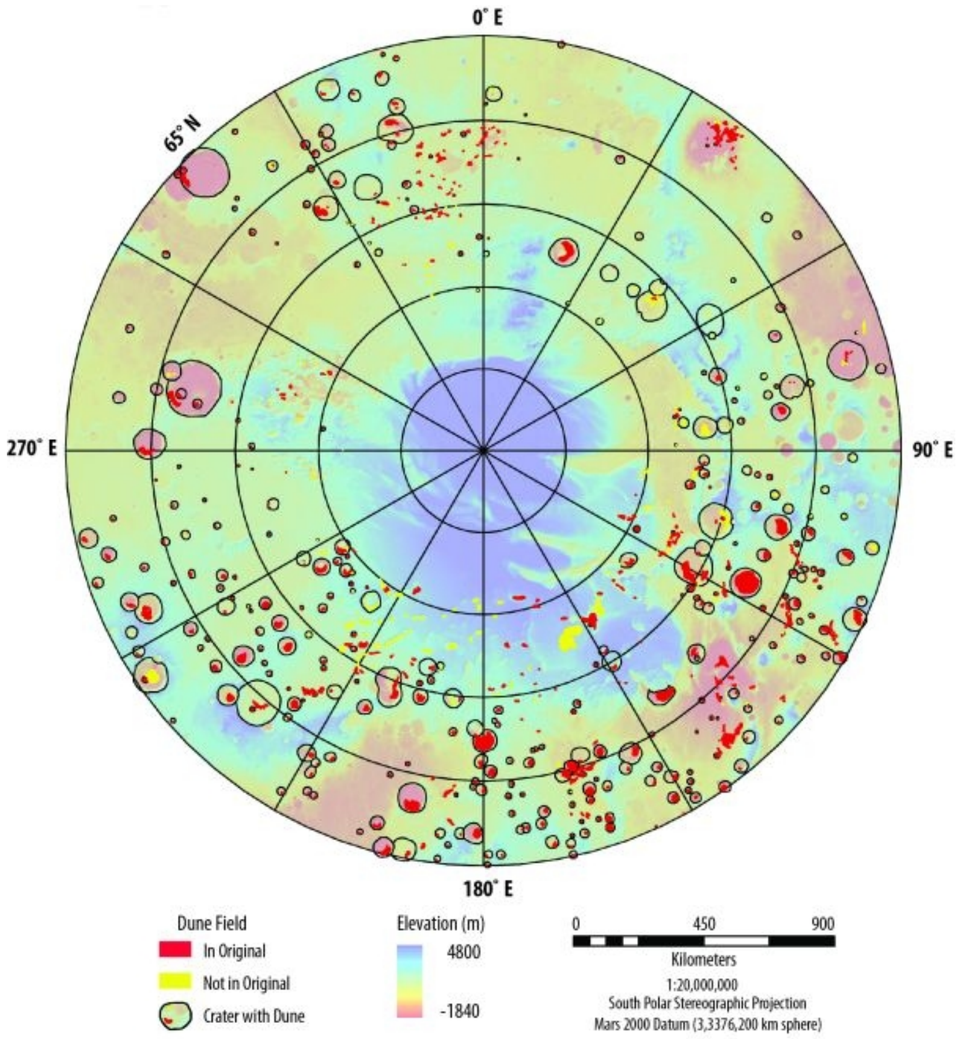

Figure 2 Mars Global Digital Dune (red) Database: MC–30. We propose the first use and landing these nano-pico units in the Southern Pole of Mars where dark dune fields, and seasonally can be found. [3]

It comes from the small size that great number (some dozen) can be scattered from such a small mass measuring units from the space probe which approaches the planetary surface in a 10-50 kilometers heights. They can be dropped out in a package, which is decelerated by a parachute braking if necessary. They can be packed and landed in a balloon, too. The collected data are emitted to the orbiting unit and transmit them to the Earth.
We propose the first use and landing these nano-pico units in the Southern Pole of Mars. Between the 60-90 degrees latitude there are a great number of craters in which dark dune fields and seasonally DDSs occur. The dune fields included in this global database were initially located using Mars Odyssey Thermal Emission Imaging System (THEMIS) Infrared (IR) images [3]. We suggested about DDS that probably primitive surface bio forms exist in these spots. [4, 5, 6], that is why are they the primary objects to reveal by the nano-pico lander units. [1].

Meteorite like landing:
The strength of meteorites is similar to that of artificially constructed nano-pico space probes. (That is the case with artillery projectiles.) Therefore scattering these small nano-pico instruments do not need extra strength of materials. Heat shielding is important, however, because the surface of the arriving meteorites frequently melts. The molten material forms a layer which is shaking, but – at the same time - droplets from this molten layer split off and carry the heat with itself. That is why the majority of falling meteorites do not heat up totally, in its cross section.
The technology of such robots is the following. During planning a package is constructed which will be thrown out at a height of some kilometers above the surface. Majority of the falling nano-pico robots - after a heating up period - fall down on the surface and begins to work. Insulator layer is planned on the surface to have been come away during the heated period.
During aero brake the lagging behind fragmentation catches the heat and the remaining inner part can be kept in cooler temperature. Additional possibility comes from nanotechnology at bit of drills. Nano layer coatings at top of the bits are elongating their life eight times, and can insulate the inner important body from the high temperature. [7]

Figure 3 Heat shield shaped meteorites

NPSDRs can be environmentally friendly because of their structure. It can contain only environmentally friendly resources as far as structure and content are concerned.
Further plans: If the first mission is successful then the Mars Northern Polar Regions should be investigated during the space mission in the next launching window.

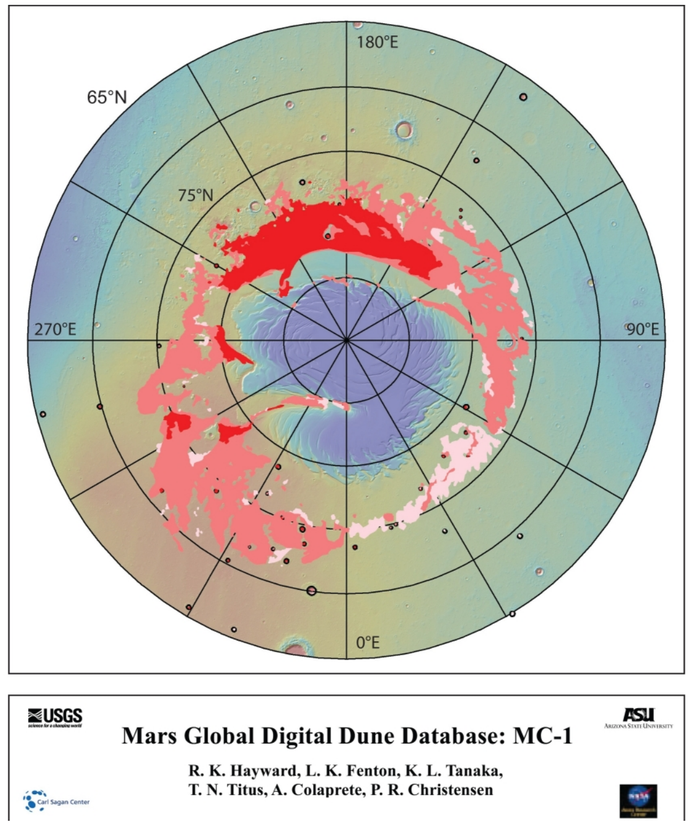

Figure 4 Mars Global Digital Dune Database: MC–1 [8]

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