

presents

Speaker: Viktor Kerzhanovich

Topic: Titan Airship Explorer

Date: Friday, April 5, 2002

Time: 1:30 - 3:00 p.m.

Location: JPL Bldg. 306-302

Abstract:

Saturn's moon Titan is considered to be one of the prime locations for understanding the origins of life, because of its rich environment of organic chemicals. A unique combination of dense atmosphere (more than four times that of the Earth), low gravity (one-sixth that on the Earth), and small temperature variations make Titan well suited for studies with buoyant robotic vehicles (aerobots). Moreover, since the methane clouds obscure the entire surface, aerial platforms flying below the clouds are the only means of getting high-resolution global mapping of the Titan surface in the visible and infrared wavelengths. Major technical challenges for Titan aerobots include an extremely cold atmosphere (~ 90 K) and remoteness from the Earth (~ 10 AU), which limit data transmission and prevents meaningful real-time control, and the consequent need for a high degree of autonomous operation. Remoteness from the Sun and obscuring cloud cover make nuclear energy the only practical source of power. Radioisotope Thermal Generators (RTGs) can provide sufficient power to give an aerobot limited propulsion capability. Propeller-driven aerobots are essentially airships that can move to specific targets on Titan, rather than being constrained to travel with the prevailing winds. Such vehicles also can be used for in situ studies of the surface, either through combined airship/rover concepts ("aerover") or through winching down an instrumented surface platform from a station-keeping

airship. During this talk, Viktor Kerzhanovich will describe an airship baseline design, including the key technical aspects of airship configuration, propulsion system, navigation and control concepts, data acquisition, and communications. The resulting baseline design appears to be very attractive and suggests that airships are a good candidate for the post-Cassini exploration of Titan.

Biography:

Viktor Kerzhanovich received his B.S. in Physics from Moscow State University and his Candidate of Science and Doctor of Science, also in Physics, from the Space Research Institute of the Soviet Academy of Sciences, Moscow. He took part in atmospheric experiments, tracking, and data acquisition on all Soviet deep space probes to Venus and Mars, including Venera 4-16, VEGA, and Phobos. Since joining the Jet Propulsion Laboratory as a Senior Member of Technical Staff in 1997, Viktor's efforts have been concentrated on development of aerobot technology for planetary applications. His technical interests include scientific ballooning, communication, tracking, and navigation. He has published over 100 papers on technology applications, mission concepts, and planetary studies. Viktor is a member of the AIAA Technical Committee on Balloon Technology.

NOTE: If you do not wish to receive these announcements or other e-mail related to in situ exploration and sample return, please reply to this message and change the subject to "Remove from CISSR List."