Moon Society - Mars Society
Collaboration & Joint Project Areas

FUTURE ROBOTIC PROBES

- **Push development of instruments to map near sub-surface voids (lavatubes)**. Such instruments can be test flown in Earth orbit where ground truth is in hand to calibrate the readings. We suspect these in shield volcanoes (Olympus Mons, and the three Tharsis Ridge volcanoes, Arsia, Pavonis, and Ascraeus) on Mars, and in lava sheet flows (maria) on both worlds. The Oregon L5 Society has two projects:
  - **Software to detect any exposed lavatube entrances** by their shadows in photos taken at high noon lighting conditions [e.g. Clementine data) - to narrow down the list of sites to be searched.
  - **A radar "flash-bulb" impactor** with two parts which would "telescope" on impact, creating a signal illuminating sub-surface voids within 8 kilometers, the signal to be received by an orbiter overhead.
- **Push development of permafrost-mapping instruments** that can also detect concentration (percentage soil moisture) and depth. A Permafrost Mapper could be tested in orbit above the Earth, where, with the advantage of available ground truth, we can establish the capacity and calibration of the instruments

LIST AND DEFINE ELEMENTS OF COMMONALITY: Structures, systems, infrastructures, and procedures needed for Exploration & Outpost Establishment Missions on both Moon and Mars - without prejudice to separately designing things that must be different.

This will result in shared cost assignments, or in the case of items designed and engineered for the Moon first, part of the Moon front effort, with only incremental cost of any needed adaptations being assigned to the Mars front effort.

MODULAR ARCHITECTURES FOR HABITAT & BIOSPHERE EXPANSION

- **Develop a versatile "language" of habitat modules**
  - that can be manufactured from locally processed building materials such as metal alloys, glass-glass composites, and fiberglass reinforced concrete.
  - that can be quickly and safely assembled on location with minimal man-hours on the surface, saving labor-intensive customization for indoor customizing.
  - a family of modules that allow diverse habitat designs.
  - Connections must be quick, secure, leak-resistant, and durable. Utility run interfaces must be standardized.
- **Toilet / greenhouse modules** that provide primary treatment of human wastes will allow the settlement biosphere to grow in modular fashion along with the mass and maze of interlinked habitat structures.

Modular Factory & Modular Industrial Park Concepts. Capital equipment is likely to be sized to fit available cargo holds and farings en route to the Moon or Mars. Developing a Container architecture and infrastructure will allow industrial parks to grow modular fashion. Modular Power Units, thermal management, and product and by-product movements should all be part of such designs, along with designing for both human tending and teleoperation.

There is already considerable progress made on developing container factories for use in the Third World. That is experience we can build on.

Work on the "Economic Case for Mars" incorporating Moon-Mars Trade along with the mutual development of other "in-space" sources and markets to include Earth-orbiting stations, factories, and tourist facilities; and asteroid mining efforts.

Design & Test dust control measures to impede migration of dust into habitat interiors through air-locks. Space-suit design and air-lock design should be integrated. Entry and exit of goods and materials should be handled separately. Dust repellent surfaces, especially surrounding airlocks, are worth developing. Dust can render lubricants non-functional and ways to protect bearings and other lubricated areas must be found.

"Spin-up, not off": List & Define the various technologies, not yet developed, that we will need on the frontier.

- Then brainstorm these technologies for potentially profitable terrestrial applications.
- Next layout the basis for a business plan for an enterprise that would develop such technologies just for those terrestrial applications.
- The hoped for result is that these technologies will be on the shelf, ready to apply when we need them, the cost of their development reimbursed by consumers.
- If we don't do this, and leave it to NASA, some of these technologies may be victims of budget cuts, others developed in expensive crash programs paid for by taxpayers. By pursuing the spin-up route we are taking charge, making sure that the technologies we need to open the lunar and Martian frontiers are there when we need them, and not subject to budget scrutiny.
- Many, not all, of these future frontier technologies will be needed on both worlds. .Many of the technologies needed on the Moon, but not applicable to Mars, may be needed on Phobos and Deimos

OUTPOST SIMULATION: some Moon Society members could volunteer to crew an MDRS in Utah, to further simulate conditions common to both frontiers from a new perspective.

JOINT CONFERENCE COSPONSORSHIPS: The Moon Society has offered to host the Moon track at the National Space Society's annual International Space Development Conference. We could invite Mars Society personnel to help us turn this into a Moon & Mars track. We might also want to contribute presentations to future Mars Society Conventions on topics of shared interest.

UNITED PUBLIC POSTURE: coordinating our public positions on the Moon-to-Mars initiative. This can include joint position papers and press releases, when appropriate, and when touching on area of mutual interest and collaboration.

JOINT PUBLISHING VENTURES, for example "Lavatube Sanctuaries (word)? on the Moon and Mars" (alternate title, "The Hidden Valleys of the Moon and Mars" // "Pioneering New Worlds: The Moon and Mars," etc., etc. Again, spreading the message of a united front. Another idea is joint CD-ROMs on Moon and Mars

This is but START OF A LIST of what we can fruitfully pursue together The whole idea of collaboration and cooperation is open and fluid. These are just some suggestions that appear worth pursuing.

The writer welcomes suggestions and constructive criticism.
Peter Kokh, 1630 N. 32nd Street, Milwaukee, WI 53208
(414) 342-0705 - kokhmmm@aol.com