Lunar Lava Tubes: An anologue for Martian lava tubes: Resource that should be mapped today for use as habitation structures when we go back to the Moon. A. A. Mardon[1], [1]Antarctic Institute of Canada, (Director, Post Office Box 1223, Main Post Office, Edmonton, Alberta, CANADA T5J 2M4 Phone +1-780-378-0063, email: aamardon@yahoo.ca)

Abstract. Lava tubes on the Moon and other Solar System bodies could be used as structures within which first stage permanent manned lunar bases could be erected. Before this occurs lava tubes that are suitable must be mapped out from archived lunar orbital data and then dedicated robotic missions would have to be sent to short-listed lava tubes that could be later used as manned station infrastructures.

Discussion. The author and others for over thirty years proposed that the next first stage manned habitation that is permanent should be lunar lava tubes that are altered so that they can be used.

The first stage before that is to launch in-depth mapping and scientific exploration of the locations and structural characteristics of lunar lava tubes. Many analogue terrestrial lava tubes exist on Earth that have been mapped and scientifically studied over the years. With the extensive orbital remote sensing that has occurred of the Moon's surface since the 1960's it is possible to map out the Moon's lava tubes that show surface characteristics and evidence. Lava tubes are structural different under the Moon's surface due to different geochemical, weathering and gravity environments. The first stage before the possibility of using a lava tube as a tunnel that could have other structures or even be pressurized is to find out where they are on the Moon. Then of course dedicated robotic missions would have to be made and they would have to be examined for the potential lava tubes feasibility as a base structure.

Many scenarios show the first base on Mars being on the surface but these structures in some cases if they were sealed could be pressurized and used without any construction and any buildings that might be constructed or transported to the lava tubes would not have to withstand any micrometeorites as they would already be under the surface of Mars protected within the selected altered tubes.

Conclusion. Their would be little hardware cost in mapping out lunar lava tubes and Martian lava tubes and examining the literature and research done over the last 40 years on lunar lava tubes to see if lunar lava tubes could be used for the structural skeleton for future lunar permanent first stage manned stations on Mars It has been proposed that Lunar lava tubes be used for structures in the early stages of Lunar exploration and the author proposes that anologue lava tubes on Mars be mapped and then used as needed based on techniques developed in lunar lava tube use.

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