

POTENTIAL TERM PAPER TOPICS –Feb. 16, 2004

(there could be many more)

MOON

Analysis of the constraints imposed on lunar and planetary accretion and evolution by the Hf/W isotopic system

Analysis of the constraints imposed on lunar and planetary accretion and evolution by the Lu/Hf isotopic system

Review of analysis and/or modeling related to the potential a lunar origin by capture of a co-Earth orbiting planetesimal

Analysis of data on lunar drill and drive tube cores relative to the distribution of solar wind resources in the upper 3m of the lunar regolith.

Review of the data sets relevant to understanding the local distribution of titanium in the regolith of Mare Tranquillitatis.

How the Moon was formed and the effect it had on the lunar distributions of C, Fe, and Ti.

MARS

Comparison of magnetic striping on Mars with magnetic anomalies on the Moon and their significance

Water on Mars: evidence, location, and ranges of estimates on quantity

Review of the arguments for and against evidence of life forms in Martian meteorites

Review of ideas on the use of indigenous Martian resources for the production of rocket fuels.

SOLAR SYSTEM

Structure and composition of the Kuiper Belt and nature of recent discoveries of Kuiper Belt objects

Review of ideas on the origin and evolution of the Main Belt Asteroids.

Potential resources of the Galilean satellites

Mining Asteroids to supply Mars surface bases.

The formation and deposition of ^4He , C, Fe, and Pt in Space.

Synthesis and deposition of H, N, Si, and Au.

Formation and emplacement of elements on the terrestrial planets: The role s of differentiation and planetary volcanism in element emplacement.

Where they are from and where they have been: Helium-3, Oxygen, Aluminum, and Silver.

The creation of ^3He , O, Al, and Ag and their distribution across the Moon, Mars, and Asteroids.

Diverting a Comet into a Useful Orbit

Acquiring ^3He from a Gas Giant's Atmosphere

ENGINEERING

Comparison of power required for sintering ilmenite with solar or RF energy

Weight constraints for use of an IEC power system on a KC135-class aircraft

Conceptual analysis of a closed cycle, solar wind hydrogen/regolith oxygen/solar electrolysis fuel cell system for lunar electrical power.

Review and analysis of options for the launching of resource payloads from the Moon

Feasibility of an ilmenite reduction process for lunar oxygen production.

Constraints on obtaining space resources due to radiation effects on people.

Potential mitigation & control of lunar dusts & their deleterious effects.

Lunar surface transportation

Lunar concrete production for use in construction on the Moon

Centralized lunar mining operations-robotic platforms

RESOURCE USE

Potential annual consumables market represented by the International Space Station – today and in the future

Review of the history of new technology introduction relative to the likely rate at which Helium-3 fusion power plants could be introduced in to the U.S. electrical power structure.

Fuel, Food and Foundation: Potential Uses in Space for ^3He , O, Al, and Ag.

Extraterrestrial sources of hydrogen nitrogen, silicon, and gold-their potential value to travelers and residents in Space.

How to Provide, From Lunar Sources, the Elements Consumed in a Typical Student's Diet for 1 Day

A 10 tonne/d oxygen plant that uses lunar "ore"

SOCIO-ECONOMIC ISSUES

Current status of the 1979 Moon Agreement and comparison with Outer Space Treaty of 1967

Comparison of Resource regime of the Outer Space Treaty of 1967 and U.S. Public lands resource policy

Analysis of the U.S. regulatory licensing that would be required for a lunar resource venture