Panel Session IV - Creating a Tight Space Exploration Initiative

Robert Zubrin
President, The Mars Society

Follow this and additional works at: https://commons.erau.edu/space-congress-proceedings

Scholarly Commons Citation
https://commons.erau.edu/space-congress-proceedings/proceedings-2004-41st/april-28/22
Creating a **Tight**
Space Exploration Initiative

Dr. Robert Zubrin
President, Mars Society

**Question:** How much rope is needed to connect two posts separated by a distance of 10 meters?

In principle, it can take any amount:

But it can be done with about 10 meters, if the rope is pulled tight.

It is the same with the Space Exploration Initiative.

The issue is whether you want to connect the posts, or whether your goal is to sell rope.

---

**Rope Sale #1**

**The Lunar Tollbooth**

Even if Lunar fueling were free, it's easier to go direct to Mars!

---

**Rope Sale #2**

**Nuclear Electric Propulsion**

<table>
<thead>
<tr>
<th></th>
<th>Claim</th>
<th>Reality</th>
</tr>
</thead>
<tbody>
<tr>
<td>One-way Transit Time</td>
<td>60 days</td>
<td>1460 days</td>
</tr>
<tr>
<td>Power Density</td>
<td>3000 W/kg</td>
<td>16 W/kg</td>
</tr>
</tbody>
</table>

---

**Cumulative Radiation Doses Received in Space**

The cumulative radiation dose of a human roundtrip mission to Mars using current propulsion technology has already been experienced by numerous astronauts.

No radiation-induced health effects have been observed.
Making the First Mars Settlement Using Mars Direct

Lunar/Mars Direct Exploration Vehicles

- Common Systems Defined to Explore and Colonize the Moon and Mars
- MELO is the SAME for either Mars or Lunar Missions: 150 metric tons
- No LEO Assembly Required: Launch Direct to Moon or Mars
- ETG Vehicle is In-line Shuttle-C with Earth-Escape 2nd Stage on Top
- Configuration Optimized not to LEO but to Earth Escape
- Mars Mission has Simple Transfer Application to Achieve 3/2g Gravity
- Mars Mission Combines Earth Hydrogen with Martian CO2 to Create Methane and Oxygen (One kg of H2 Creates 1/2 kg of Propellant)
- Surface Habitation and Crew Return Vehicles are Reusable
- No Orbital Vehicles at Mars or Moon: All Elements go to Surface

"This proposition being made public and coming to the knowledge of all, it raised many variable opinions amongst men, and caused many fears & desire amongst themselves. Some, from their reason & hopes conceived, inclined to stay up & encourage the rest to undertake and prosecute the same, others, again, out of their fears, objected against it, it sought to divert from it, numbering many things, and these either, unreasonable or improbable, so that it was a great design, and subject to many unceasing states & dangers..."

"It was answered that all great & honorable actions are accompanied with great difficulties, and must be both expected and overcome with unceasing our urges."

-Governor William Bradford, "Of Plimoth Plantation," 1621