Paul van Susante
Space Mining is Almost Here!

In-Situ Resource Utilization (ISRU)

Space Mining (Moon, Mars, Asteroids)
- Water for rocket fuel/oxidizer
- Leverage (only send added value from Earth)
- Information, energy, local use, export

Space Construction
- Use local rocks, regolith
- Simple structures, e.g. 3D printing
Scholarly Contributions

- Chair of ASCE Aerospace Division
- Secretary of AIAA Space Resource TC
- NASA SBIR/STTR grant 2016-2017
- NASA JPL summer ISRU research 2017
- NASA Early Stage Innovation proposal
- Invited talks at UCF CLASS, CSM

<table>
<thead>
<tr>
<th>Distance to Center line (m)</th>
<th>Force - Layer 1 [N]</th>
<th>Force - Layer 2 [N]</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>5000.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>10000.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>15000.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>20000.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>25000.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
</tbody>
</table>

Rocks outside of center zone could be blown away but will blow away from vehicle and a shallow angle.

Experiments, field testing and CFD analysis are needed to confirm this.

Centre zone not impacted to move if no gaps in rock exist.