

## Engineering Mechanics Institute Conference 2019 (EMI 2019) co-organized by Caltech

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### **Lunar and Martian Vertical Takeoff & Vertical Landing (VTVL) Pad Concepts**

Landing space craft rocket plume exhaust interactions with the regolith surfaces on the Moon and Mars will result in cratering and regolith particle ejecta traveling at velocities up to 2,000 m/s in the vacuum surroundings. This phenomenon creates hazards for the spacecraft that is landing or launching and may also cause damage to surrounding assets, personnel and infrastructure. One potential solution to this issue is to construct vertical takeoff and vertical landing (VTVL) pad infrastructure systems which will mitigate these rocket plume exhaust effects. Concepts will be presented for the construction and maintenance of such VTVL pads in lunar and martian environments.