Title: TPS and Entry System Technologies for Future Mars and Titan Exploration

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Description:

During the past twenty years, NASA effectively erased earlier Mars mishaps with six successful missions to the Red Planet. These missions delivered one orbiter and five payloads to the surface. Those payloads included three rovers, Spirit (2004) which roamed 11 years, Opportunity (2004) which roamed nearly 15 years, and Curiosity (2012) which is in its ninth year, along with two landers, Phoenix (2008) and InSIGHT (2018). In July, the Mars 2020 mission will send another large rover, Perseverance, which will land in 2021. The InSIGHT mission even demonstrated the capability to send CubeSats along to help with communication back to the surface. NASA has demonstrated the capability to land a metric ton of vehicles plus science instruments on Mars and expects that the same technologies will be equally successful landing Dragonfly on Titan in the 2030's. The thermal protection systems (TPS) used on the Mars missions are sufficiently developed and matured to continue furthering science on both Mars and Titan, assuming that the TPS materials are sustained by industry. The purpose of this white paper is to encourage further exploration and science on both Mars and Titan because we have the technologies to support them. In addition, we will look forward to human exploration of Mars and identify the improvements in TPS materials required to facilitate landing the larger payloads.

Status:

This white paper is currently under development and, after discussions with interested collaborators, is expected to be completed by June 1

Collaboration sought:

This group is asking for status on the development of and the current TRL of improved (higher strain-to-failure, scalable to larger sizes, easier process and manufacturing, etc) TPS. In addition, we are looking for additional reviewers and cosigners for the final paper