

Overview of the Development and Testing of the Heatshield for Extreme Entry Environment Technology (HEEET) TPS

Matthew Gasch, and Donald Ellerby
NASA Ames Research Center, Moffett Field, CA, 94035

Over the last 5 years, the Heatshield for Extreme Entry Environment Technology (HEEET) project has been working to mature a 3-D Woven Thermal Protection System (TPS) to Technical Readiness Level (TRL) 6 to support future NASA missions to destinations such as Venus and Saturn. A key aspect of the project has been the development of the manufacturing and integration processes/procedures necessary to build a heat shield utilizing the HEEET 3D-woven material. This has culminated in the building of a 1-meter diameter Engineering Test Unit (ETU) representative of what would be used for a Saturn probe. The present talk provides an overview of recent testing of NASA's Heatshield for Extreme Entry Environment Technology (HEEET) 3D Woven TPS. Under the current program, the ETU has been subjected to Thermal and Mechanical loads typical of deep space mission to Saturn. Thermal testing of HEEET coupons has performance up to 4,500 W/cm² at 5 atm stagnation pressure and successful shear performance up to 3000 Pa at 1,650 W/cm² and 2.6 atm pressure.