Performance of Conformable Phenolic Impregnated Carbon Ablator in Aerothermal Environments

Jeremy Thornton,1 Wendy Fan,1 Mairead Stackpoole,1 David Kao,3 Kristina Skokova,1 Jose Chavez-Garcia,1

1ERC Inc, Moffett Field CA 94035
2NASA Ames Research Center, Moffett Field CA 94035
3Universities Space Research Association, Moffett Field CA 94035

Conformable Phenolic Impregnated Carbon Ablator, a cousin of Phenolic Impregnated Carbon Ablator (PICA), was developed at NASA Ames Research Center as a lightweight thermal protection system under the Fundamental Aeronautics Program. PICA is made using a brittle carbon substrate, which has a very low strain to failure. Conformable PICA is made using a flexible carbon substrate, a felt in this case. The flexible felt significantly increases the strain to failure of the ablator. PICA is limited by its thermal mechanical properties. Future NASA missions will require heatshields that are more fracture resistant than PICA and, as a result, NASA Ames is working to improve PICA’s performance by developing conformable PICA to meet these needs. Research efforts include tailoring the chemistry of conformable PICA with varying amounts of additives to enhance mechanical properties and testing them in aerothermal environments. This poster shows the performance of conformable PICA variants in arc jets tests. Some mechanical and thermal properties will also be presented.