



## NASA SBIR 2015 Phase I Solicitation

### H7.02 Diagnostic Tools for High Velocity Testing and Analysis

Lead Center: ARC

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The company will develop diagnostics for analyzing ground tests in high enthalpy, high velocity flows used to replicate vehicle entry, descent and landing conditions. Diagnostics developed will be tested in NASA's high enthalpy facilities, which include the Electric Arc Shock Tube (EAST), Arc Jets, Ballistic Range, Hypersonic Materials Environmental Test System (HyMETS), and High Temperature Tunnel (HTT).

Development of improved diagnostics for hypervelocity flows allows us to better understand the composition and thermochemistry of our ground test facilities and are important for building ground-to-flight traceability. Characterizations in facilities may be used to validate and/or calibrate predictive modeling tools which are used to design and margin EDL requirements. This will reduce uncertainty in future mission planning.

The range of diagnostics to be considered is not restricted. Examples of diagnostics of interest include those that characterize high enthalpy flows (e.g., temperature, velocity, electron number density, pyrolysis/ablation byproducts) or characterization of test articles (recession, thermal emission, etc.). Proposals for adapting existing techniques to unique aspects of the facility (e.g., free flight in ballistic range, or short duration in shock tubes) are of interest, as well as the development of new techniques. Proposers are encouraged to contact operators and users of individual facilities to understand their specific challenges and requirements, and for details of interfacing into the existing systems.

Deliverable will be in the form of a diagnostic hardware system that can be employed by NASA engineers/scientists in the test facility.Â