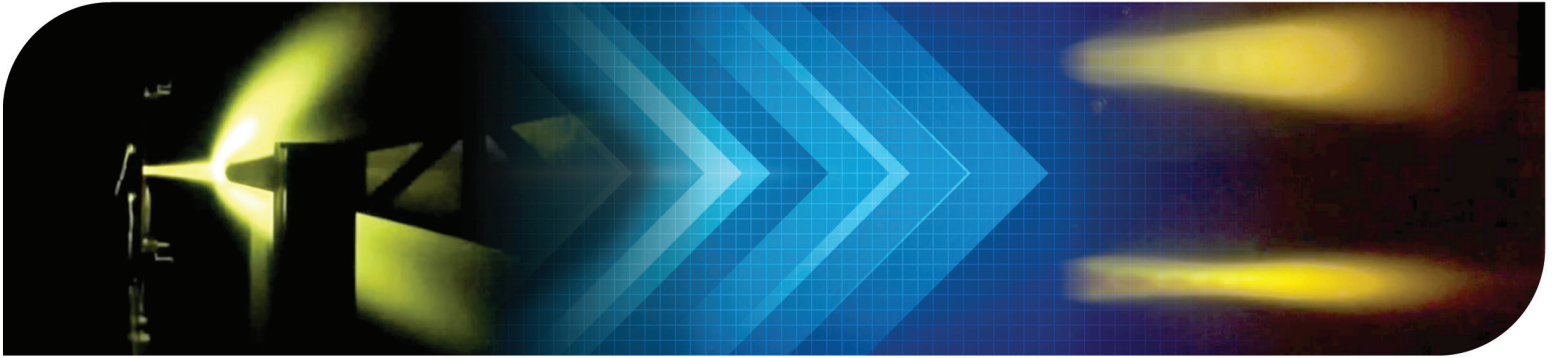


High-Enthalpy Testing

Expanded Access to Scalable, Affordable,
Safer Hypersonic Architecture



ARA ADVANTAGES



**CROSS-DOMAIN
TECHNICAL
EXPERTISE**



**HIGH-FIDELITY
MODELING AND
ADVANCED
TEST CAPABILITIES**



**PROVEN
INTEGRATION
ACROSS KINETIC
AND NON-KINETIC
SYSTEMS**



**AGILE, SECURE
ENGINEERING
PROCESSES
FOCUSED ON
MISSION OUTCOMES**

ARA and Utah State University (USU) have converted non volatile hybrid rockets into throttleable gas generators to deliver low cost, flight representative high-enthalpy and dynamic pressure conditions for hypersonic testing.

SAFER SCALABLE HYPERSONIC TESTING

- Inert 3D printed plastic fuel and electric ignitor using commercially available gaseous oxidizers (GOX/NOX) — no cryogenics, explosives, or hypergolic propellants
- Supports ARA's minimally invasive sensing and flush air data systems for real time spectral, temperature, and surface pressure measurements inside the hypersonic boundary layer
- Demonstrated runs up to several tens of seconds at Mach 8.3, scalable toward 100+ seconds near Mach 20

REPEATABLE TESTS GENERATING REAL-WORLD DATA

- Supports multiple repeatable tests per day, enabling rapid agile iteration of advanced materials and sensors
- Generates real-world data to improve modeling and simulation tools and help researchers better understand system performance, and increase confidence in analytical predictions

PROVIDES COMPLEMENTARY TESTING TO TRADITIONAL DESIGN

- Complements traditional testing like arc jets, wind tunnels, and flight testing by providing an intermediate validation step allowing researchers to refine design before advancing to higher-cost test environments

AFFORDABLE FLIGHT-REPRESENTATION VALIDATION

- Matures low Technology Readiness Level (TRL) materials/sensor concepts by providing affordable, flight representative tests and data to validate models and Hardware-in-the-Loop (HWIL) before committing to costly conventional testing

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