



LTA Testing in Sandia's HWT

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Motivation

- Ablative shape change is particularly important for maneuvering flight vehicles, affecting:

- Aerodynamic Forces
- Boundary Layer Transition
- Heating
- Vehicle Survivability

• No ground facility replicates all conditions of flight

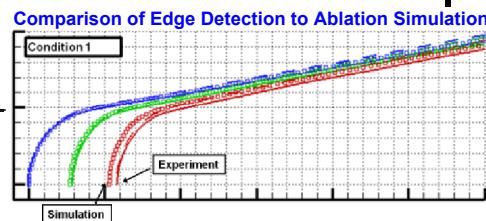
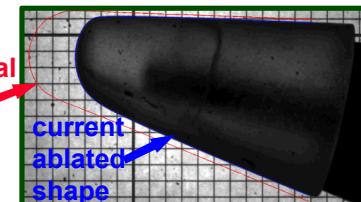
- Traditional arc-heated facilities often lack high Mach number/ Re and flow uniformity of flight
- Low temperature ablators (LTA's) sublime like real nosetip TPS in flight, but at much lower enthalpies attainable in hypersonic wind tunnels.

Results

- The success of LTA tests in the HWT has been proven, resurrecting a national hypersonic test capability after 25 years of dormancy.

- Ablation results compare well with simulation.

- Further ablation tests to be performed on full-scale flight vehicle nosetip in mid-April.

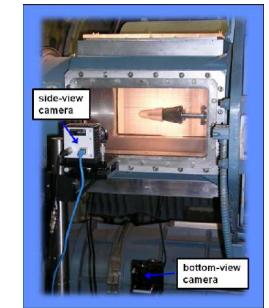


Testing

- Sandia teamed with Southern Research Institute to design and test 13 LTA sphercones nosetips in Sandia's HWT.

- Flight Mach & Reynolds numbers
- Several Angles of Attack
- Run times of 60 seconds

- Photogrammetry and custom edge detection algorithms used to measure time-resolved surface ablation.



Acknowledgements

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