LOW DENSITY SUPERSONIC DECELERATOR (LDSD) 
SUPERSONIC FLIGHT DYNAMICS TEST (SFDT) 
PLUME INDUCED ENVIRONMENT MODELLING

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**Objectives:**

- Provide plume induced heating (radiation & convection) predictions in support of the LDSD thermal design (pre-flight SFDT-1)
- Predict plume induced aerodynamics in support of flight dynamics, to achieve targeted freestream conditions to test supersonic deceleration technologies (post-flight SFDT-1, pre-flight SFDT-2)

**Approach:**

- Star48 and Small Solid Nozzle Flow Fields – RAMP engineering code
- Star48 and Small Solid Plume Flow Fields – Loci/CHEM 3.3 CFD code
- Plume Radiation – Reverse Monte Carlo (RMC) radiation code
- Reynolds Averaged Navier-Stokes (RANS) Simulations (varying fidelity, grids)
- Two-phase Flow (Gas + Al\textsubscript{2}O\textsubscript{3} particles)
- Two Gaseous Species (thermally perfect, equivalent air and plume, frozen chemistry)

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