**Australian Government**

**Department of Defence**
Science and Technology



# CGHOST: A new paradigm for rocket design

DST in collaboration with the US Air Force Research Laboratory has developed a new paradigm for mission-based propulsion system design.

CGHOST* directly couples detailed physics-based rocket modules with vehicle trajectory optimisation — all nested within a global genetic algorithm. The result is a new standard for high-confidence rocket design.

CGHOST has been recognised internationally for the leap forward it offers in system design and evaluation of military systems.

## Features and applications

- Validated physics and engineering–based solid rocket design model
- Validated pseudo–spectral trajectory optimisation
- Black-box implementation capable of including alternate propulsion models
- Applicable to high–speed systems, tactical missiles, responsive space access — any application requiring a propulsive element and a flight trajectory
- Directly couples component material properties to mission performance for technology evaluation and investment for maximum mission improvement

*\* CMAES (Covariance Matrix Adaptation Evolution Strategy) with GPOPS (General Purpose Optimal Control Software) for Hypersonic Optimal Solid rocket Trajectories*

## Partnering opportunities

- Collaborative development of additional features and capabilities, including adaptive neural networks and multi-objective optimisation.
- Licensing and transition to the user community.



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