2024 SMART DEMO

ADVANCING SOLID ROCKET PROPULSION TECHNOLOGY

Northrop Grumman's Solid Motor Annual Rocket Technology Demonstrator (SMART Demo) is an annual effort to design, develop, build and test a new solid rocket motor and its associated tooling. Each year the design's configuration and performance will be tailored to specific industry or warfighter needs. The 2024 SMART Demo motor, the second annual demonstration, will further advance successes from the 2023 configuration and demonstrate new technologies, including new additively manufactured components that reduce solid rocket motor costs and lead times, advanced tooling and technologies to accelerate innovation and enhance performance, and alternate suppliers that augment the supply base.

Developed and manufactured in less than one year, the 2024 SMART Demo motor uses processes that are cost effective, increase efficiency and add value for solid rocket motor customers.

SMART Demo provides a cost effective, adaptable solution for advancing solid rocket motor technology and processes by providing a flight relevant scale for demonstrating new materials, new components, and advanced tooling and manufacturing methods. By annually demonstrating and qualifying new processes, technologies and materials with SMART Demo, Northrop Grumman will rapidly advance solid rocket motor innovations and insert them into current and future production programs to meet customers' fast-changing needs.

Leveraging more than six decades of proven solid rocket motor experience and infrastructure, Northrop Grumman is leaning forward to explore and demonstrate some of the most advanced solid rocket motor technologies available.

NORTHROP GRUMMAN

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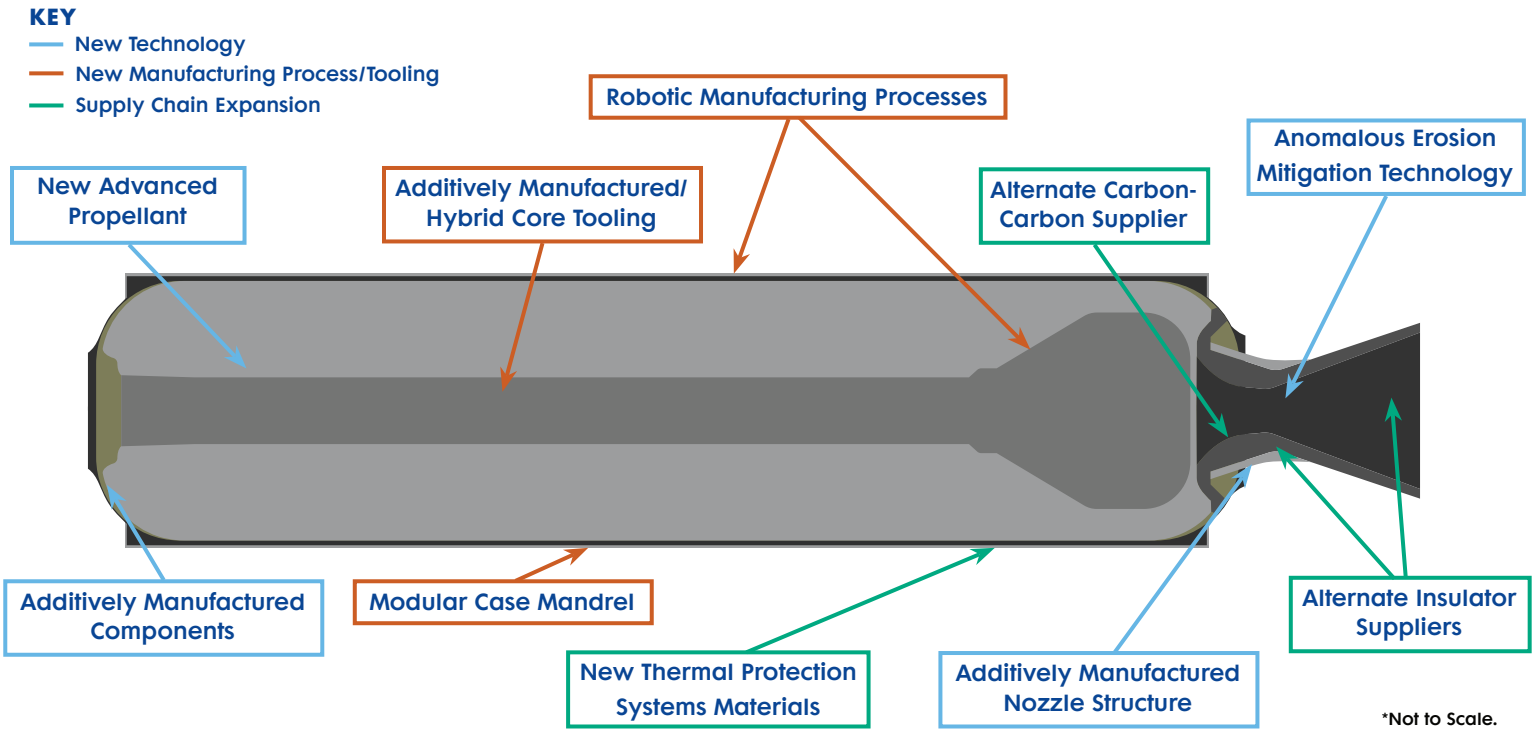
2024 SMART DEMO OVERVIEW



2024 SMART DEMO STATIC TEST

The new cutting-edge solid rocket motor configuration that will be static fired later this year as part of the 2024 SMART Demo will demonstrate new and advanced technologies including:

- Additively manufactured solid rocket motor components and tooling
- Advanced solid rocket motor propellant
- Robotic manufacturing processes
- Alternate suppliers that augment industry supply base
- Modular tooling

MOTOR SPECIFICATIONS

Propellant Mass (lbm)	4,200
Burn Time (sec)	40
Max Vacuum Thrust (lbf)	38,000
Total Length (in)	150
Motor Diameter (in)	30

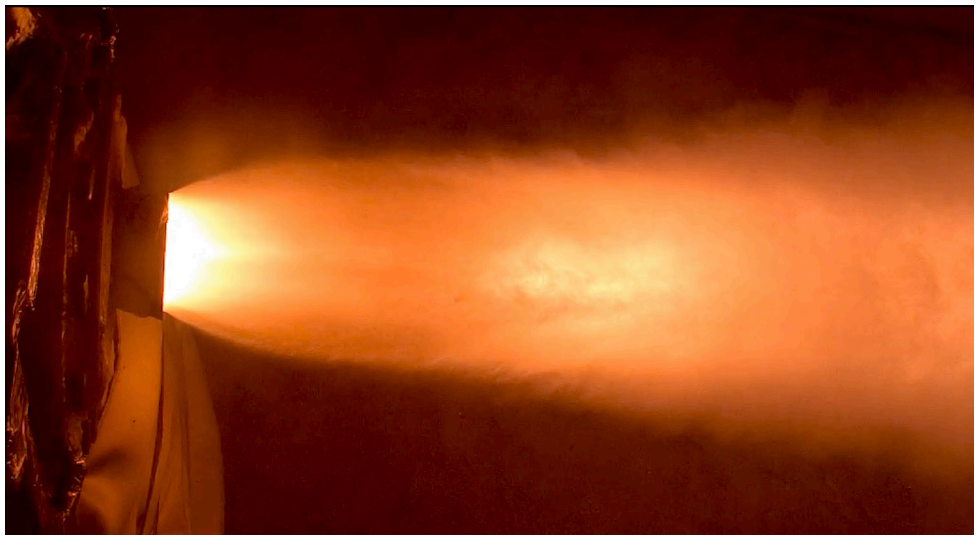
ADDITIVE MANUFACTURED TECHNOLOGIES

This test features a variety of highly advanced additively manufactured (AM) components:

- Hybrid metal-AM polymer propellant mold set and cast tooling components
- High-strength nozzle structure
- Elastomer propellant cast interfaces
- Elastomer environmental seal

ADDITIONAL DETAILS

- First time demonstration of this Propellant-Liner-Insulation combination
- Static fire results will anchor new ballistic regression and insulation ablation analytical tools
- Innovative sensors and data collection methods to determine material capabilities
- Modular tooling used throughout solid rocket motor build



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