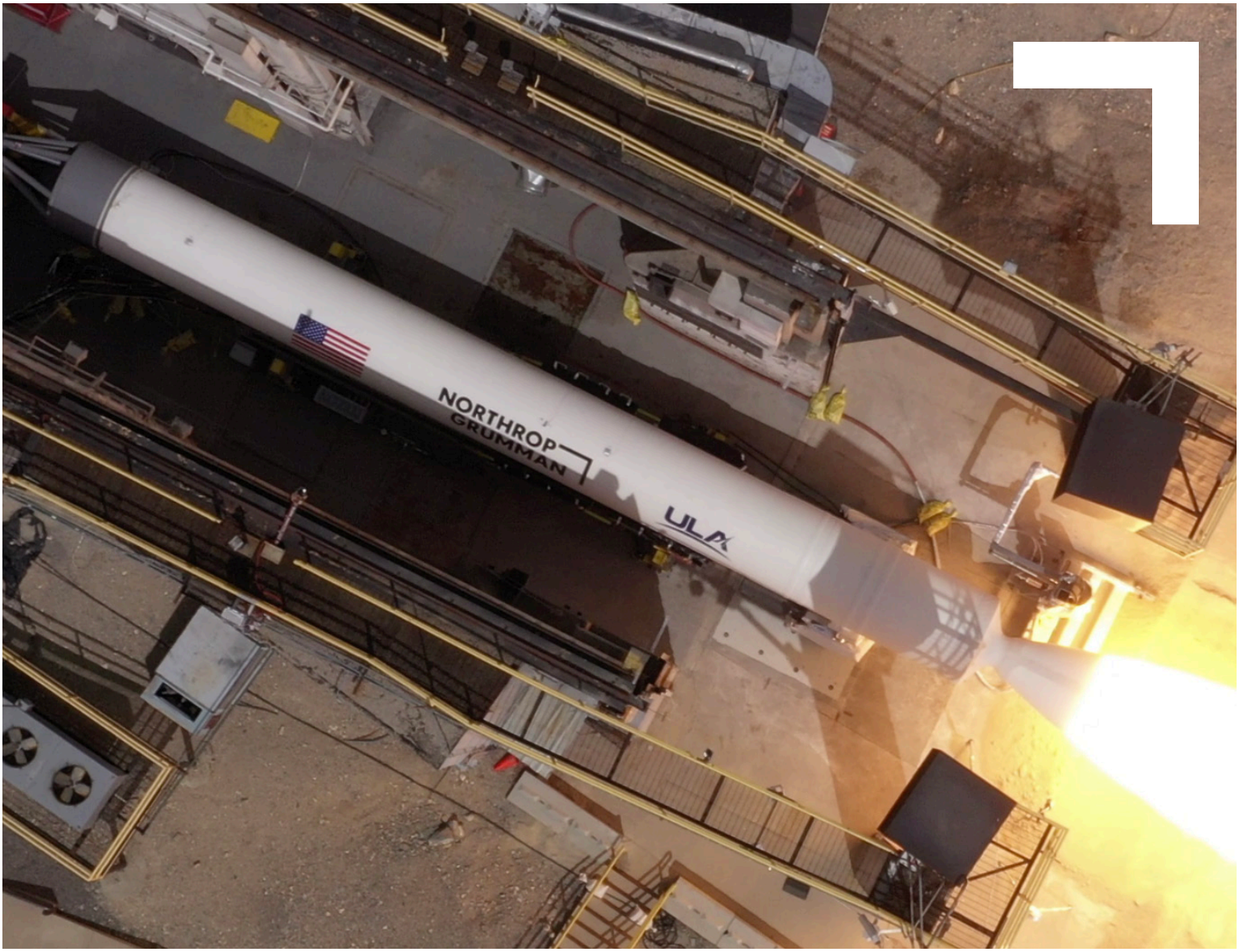


GEM 63 AND GEM 63XL

Providing Thrust Augmentation for National Space Priorities

Northrop Grumman began developing the next generation of the Graphite Epoxy Motor (GEM) family of strap-on boosters to support medium- and heavy-lift launch vehicles in 2015. These boosters build on the company's extensive history of successful GEM 40, GEM 46 and GEM 60 motors and leverage the company's industry-leading expertise in composite large solid rocket motor development and manufacturing to provide customers with a cost-effective, reliable, flexible and on-time system.

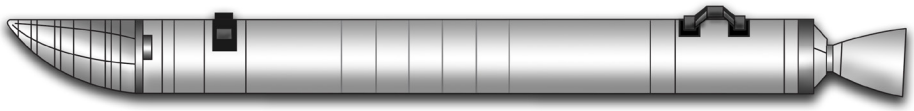
The GEM 63 is a 63-inch-diameter strap-on solid rocket booster that is powering ULA's Atlas V launch vehicle. In partnership with United Launch Alliance (ULA), the motors were qualified for national security, science and commercial payload launches starting in 2020. The GEM 63 first flew on the Atlas V's National Reconnaissance Office Launch 101 (NROL-101) mission in November 2020.

The GEM family has recently expanded with the development of the GEM 63XL variant to support ULA's Vulcan Centaur launch vehicle. The extended length GEM 63XL, tested and qualified for use in 2021, first flew on the Vulcan's first certification flight (Cert-1) mission in January 2024.

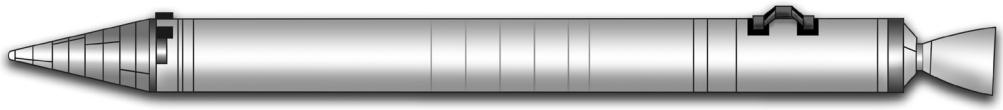
Measuring more than 72-feet-long, the GEM 63XL is the longest monolithic, single-cast solid rocket motor ever produced — a designation previously held by GEM 63. As the newest members of the Graphite Epoxy Motor family of motors, both boosters come from a long line of highly-reliable motors that have continuously evolved to provide customers with assured access to space.

	GEM 40	GEM 46	GEM 46
Motors Flown	1,003	132	132
Number of Launches	132	7	7
First Flight	Nov. 26, 1990	Aug. 26, 1998	Aug. 26, 1998
Final Flight	Sept. 15, 2018	Sept. 10, 2011	Sept. 10, 2011

NORTHROP GRUMMAN



GEM 63



GEM 63XL

Specifications

	GEM 63	GEM 63XL
Total Mass	108,600 lb (49,300 kg)	117,700 lb (53,400 kg)
Propellant Mass	97,500 lb (44,200 kg)	105,900 lb (48,000 kg)
Burn Time	97.6 sec	87.3 sec
Maximum Thrust	370,835 lbf	463,249 lbf
Total Length	791 in (2,009 cm)	864 in (2,195 cm)
Motor Diameter	63 in (160 cm)	63 in (160 cm)
Exit Plan Diamter	54 in (137 cm)	56 in (142 cm)
Application	Atlas V	Vulcan Centaur

Vulcan and Atlas V launches boosted by GEM 63 and GEM 63XL SRMs

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