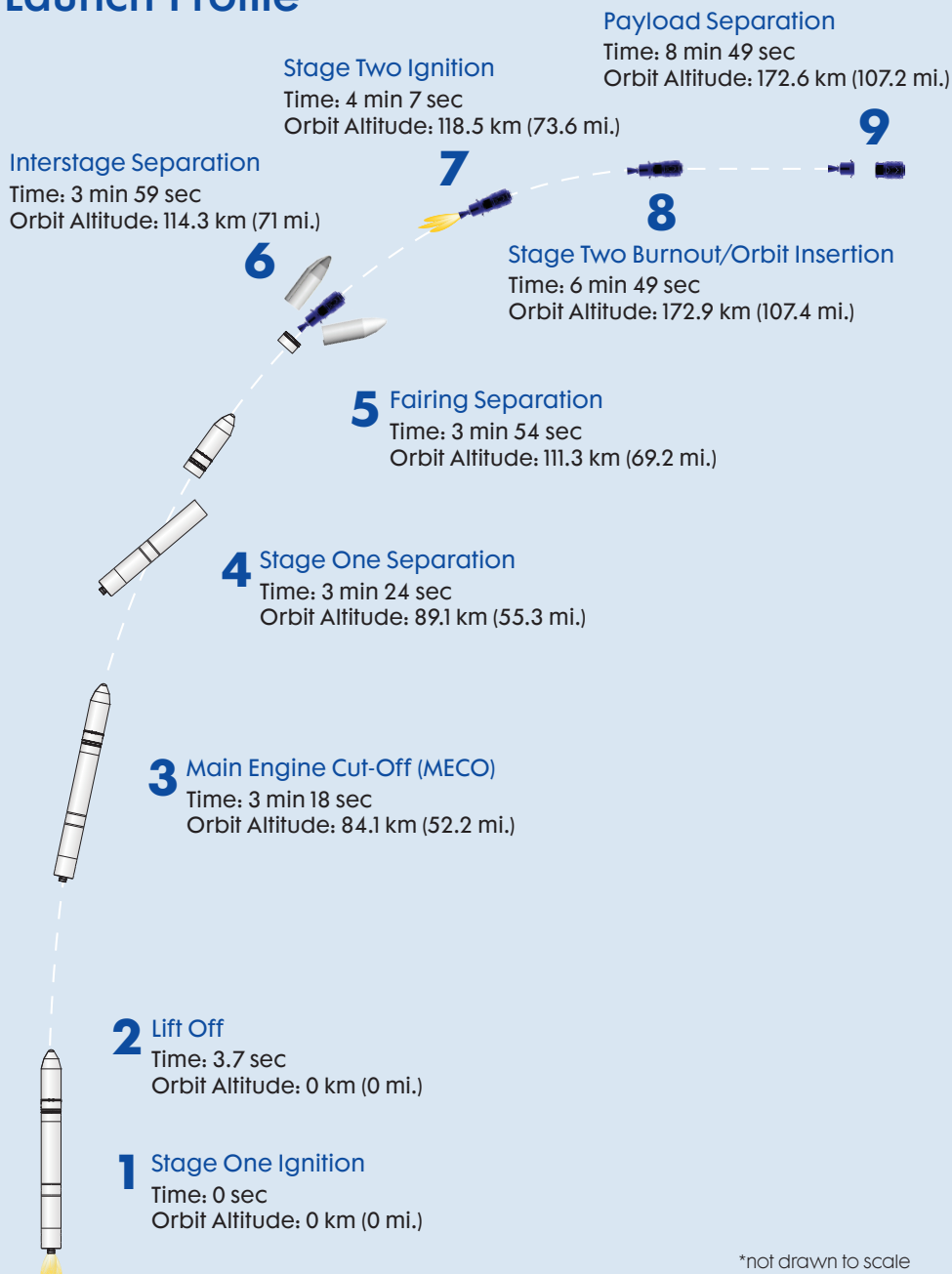
NG-19 Mission

Delivering Cargo to the International Space Station

Launch Profile



1 Stage One Ignition
Time: 0 sec
Orbit Altitude: 0 km (0 mi.)

2 Lift Off
Time: 3.7 sec
Orbit Altitude: 0 km (0 mi.)

3 Main Engine Cut-Off (MECO)
Time: 3 min 18 sec
Orbit Altitude: 84.1 km (52.2 mi.)

4 Stage One Separation
Time: 3 min 24 sec
Orbit Altitude: 89.1 km (55.3 mi.)

5 Fairing Separation
Time: 3 min 54 sec
Orbit Altitude: 111.3 km (69.2 mi.)

6 Interstage Separation
Time: 3 min 59 sec
Orbit Altitude: 114.3 km (71 mi.)

7 Stage Two Ignition
Time: 4 min 7 sec
Orbit Altitude: 118.5 km (73.6 mi.)

8 Stage Two Burnout/Orbit Insertion
Time: 6 min 49 sec
Orbit Altitude: 172.9 km (107.4 mi.)

9 Payload Separation
Time: 8 min 49 sec
Orbit Altitude: 172.6 km (107.2 mi.)

*not drawn to scale

Mission Parameters

Launch Vehicle:
Antares 230+

Cargo Spacecraft:
Cygnus

Launch Site:
MARS Pad 0A,
Wallops Island, Virginia

Ascent Cargo Mass:
Up to 3,729 kg (8,200 lb.)

Descent Cargo Mass:
Up to 3,729 kg (8,200 lb.)

Initial Orbit Altitude:
165 km x 309 km

Inclination:
51.64°

Transit to Station:
Two Days

Duration at Station:
Up to 100 Days Berthed
Up to 30 days on orbit

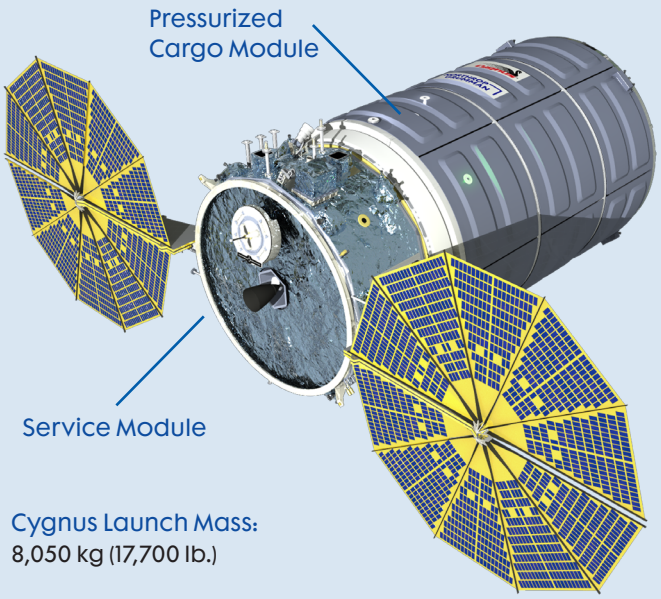
NORTHROP GRUMMAN

Mission Description

For the NG-19 mission, the Cygnus spacecraft will deliver more than 3,700 kg. (8,200 lb.) of cargo to the space station. Cygnus is comprised of two primary components, the Pressurized Cargo Module and the Service Module. In keeping with company tradition, each spacecraft is named after an important figure in the aerospace industry. Northrop Grumman is honored to name the NG-19 Cygnus spacecraft after NASA astronaut Dr. Laurel Clark, a mission specialist aboard the Space Shuttle Columbia for STS-107. The S.S. Laurel Clark will be launched into orbit using an Antares 230+ rocket from Virginia Space's Mid-Atlantic Regional Spaceport (MARS) Pad 0A on Wallops Island, Virginia. Northrop Grumman will once again load critical, time-sensitive cargo into Cygnus 24 hours before the scheduled launch.

Upon arrival at the International Space Station, the cargo will be unloaded from Cygnus. Beginning with the NG-17 mission, Cygnus offers the capability to perform routine reboost services as needed while berthed to the station. Once its mission has been completed, Cygnus will perform a safe, destructive reentry into Earth's atmosphere over the Pacific Ocean.

Cygnus Spacecraft



Cygnus Launch Mass:
8,050 kg (17,700 lb.)

Propellant Mass:
800 kg (1,764 lb.)

Ascent Cargo Mass:
Up to 3,729 kg (8,200 lb.)

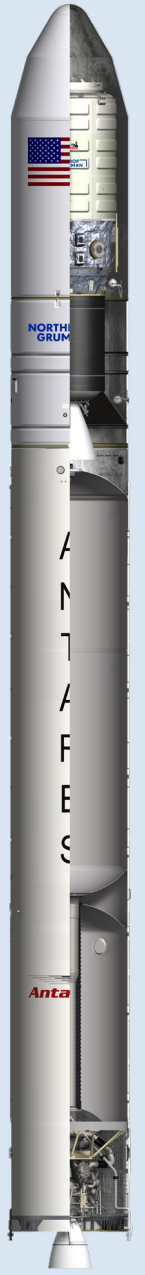
Pressurized Volume:
27 m^3

Height:
6.39 m (21 ft.)

Power Generation:
2 fixed wing UltraFlex™ solar arrays, ZTJ gallium arsenide cells

Descent Cargo Mass:
Up to 3,729 kg (8,200 lb.)

Antares Launch Vehicle



Diameter:
3.9 m (12.8 ft.)

Height:
42.5 m (139.4 ft.)

Mass:
290,000 - 310,000 kg
(639,341 - 683,433 lb.)

Cygnus Advanced Maneuvering Spacecraft

Stage 2
Northrop Grumman CASTOR® 30XL solid motor with thrust vectoring

Stage 1
Liquid oxygen/kerosene fueled

Northrop Grumman responsible for system development and integration

Core tank designed and verified by KB Yuzhnoye (Zenit-derived heritage)

Core tank production by Yuzhmash

Two Energomash RD-181 engines each with independent thrust vectoring

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