

PSLV-C59

Proba-3

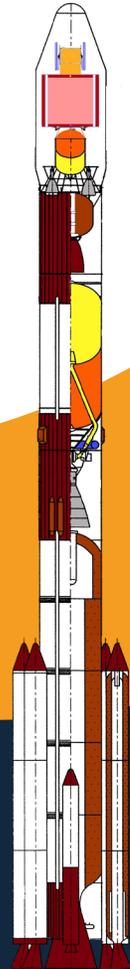
Mission



→ PSLV-C59/Proba-3 Mission

PSLV-C59 vehicle will carry Proba-3 spacecraft into a highly elliptical orbit as a Dedicated commercial mission of NewSpace India Limited (NSIL).

Proba-3 is an In-Orbit Demonstration (IOD) mission of the European Space Agency. The mission goal is to demonstrate precise formation flying. It consists of 2 spacecrafts viz. the Coronagraph Spacecraft (CSC) and the Occulter Spacecraft (OSC) and it will be launched together in a stacked configuration. Launch is planned from First Launch Pad (FLP), Satish Dhawan Space Centre (SDSC-SHAR), Sriharikota.



26th PSLV-XL

61st PSLV Flight

→ PSLV-C59 Vehicle Characteristics

Vehicle Height	44.5 m
Lift off Mass	320 t
Propulsion Stages	
First Stage	6PSOM-XL+ S139
Second Stage	PL40
Third Stage	HPS3
Fourth Stage	L2.5

→ PSLV-C59 Mission Specifications

Semi-major Axis	36943.14 km
Apogee	60530 km
Perigee	600 km
Inclination	59°
Argument of Perigee	188°
Launch Pad	FLP
Launch Azimuth	134°



Payload Accommodation
in PSLV-C59

→ Satellites in PSLV-C59

Satellites	Agency	Spacecraft Mass
Proba-3	European Space Agency	~ 550 kg

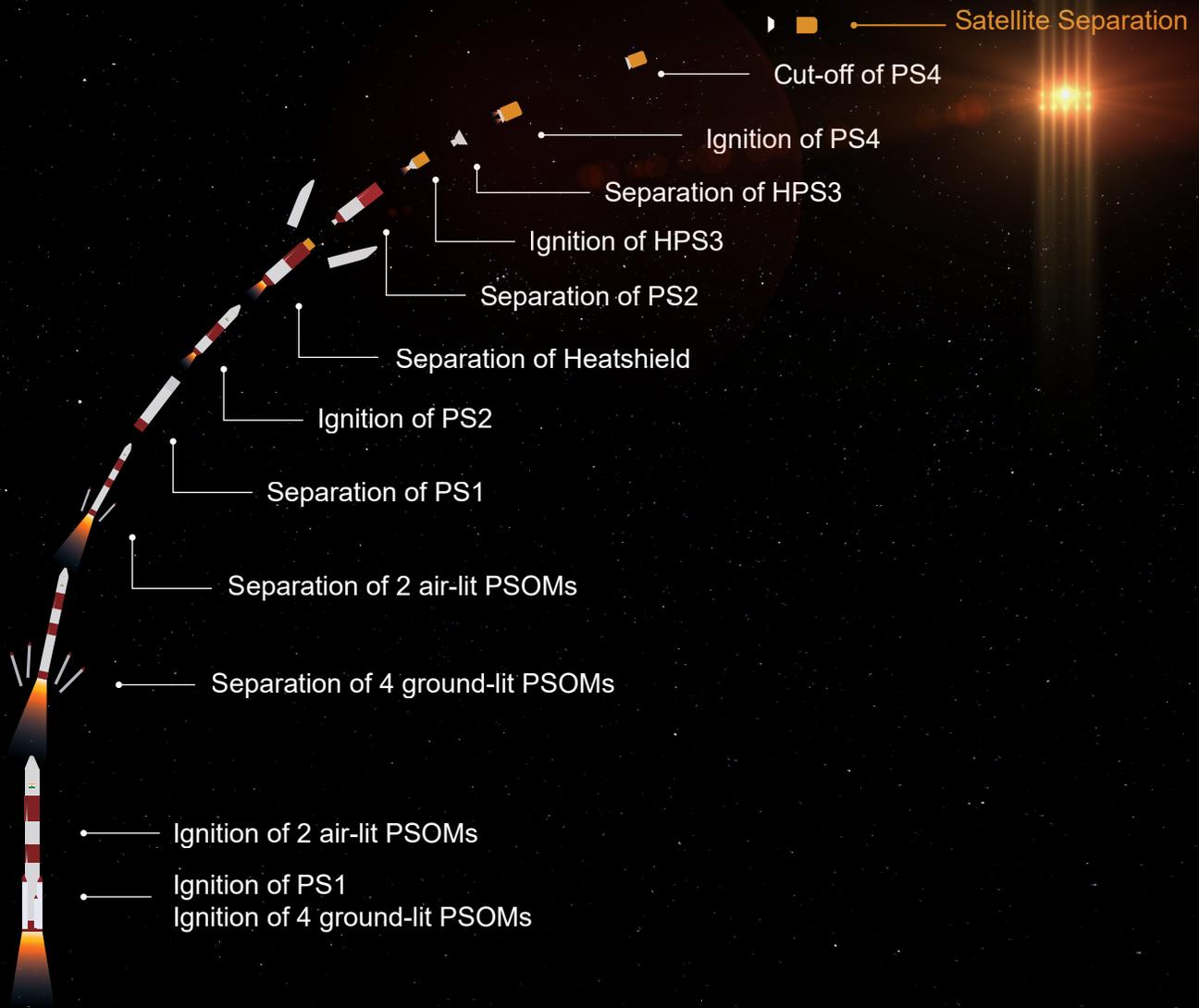
PSLV-C59 Vehicle Configuration (6PSOM-XL+S139+PL40+HPS3+L2.5)

PSLV-C59 Stages at a Glance

	Stage 1		Stage 2 (PS2)	Stage 3 (HPS3)	Stage 4 (PS4)
	PS1	PSOM-XL			
Length (m)	20	12	12.8	3.6	3.0
Diameter (m)	2.8	1	2.8	2	1.34
Propellant	Solid (HTPB based)	Solid (HTPB based)	Liquid (UH25 + N ₂ O ₄)	Solid (HTPB based)	Liquid (MMH+ MON3)
Propellant Mass (t)	139	6x12.2	41	7.65	2.5



PSLV-C59 Flight Sequence



PSLV-C59

Flight Profile



Event	Time (s)	Local Altitude (km)	Inertial Velocity (m/s)
RCT Ignition	-3	0.024	451.9
PS1 Ignition	0	0.024	451.9
PSOM XL 1,2 (GL) Ignition	0.42	0.024	451.9
PSOM XL 3,4 (GL) Ignition	0.62	0.024	451.9
PSOM XL 5, 6 (AL) Ignition	25.0	2.761	598.5
PSOM XL 1,2 (GL) Separation	69.9	24.739	1416.4
PSOM XL 3,4 (GL) Separation	70.1	24.876	1421.3
PSOM XL 5,6 (AL) Separation	92.0	42.004	2005.0
PS1 Separation	109.70	58.249	2307.8
PS2 Ignition	109.90	58.428	2307.2
CLG Initiation	114.90	62.814	2333.7
Heat Shield Separation	184.60	114.838	3205.2
PS2 Separation	262.38	165.011	5188.9
PS3 Ignition	263.58	165.825	5187.4
PS3 Separation	489.22	340.687	7606.7
PS4 Ignition	499.62	349.967	7596.0
PS4 Cutoff	1015.48	1005.005	9855.3
Proba-3 Separation	1122.48	1267.901	9673.1
MON Passivation Start	1275.48	1730.332	9362.3
MMH Passivation Start	1615.48	3011.779	8622.6



Proba-3 Mission ←

Proba-3 is a technology demonstration mission of European Space Agency (ESA). Proba-3 is ESA's and the world's first precision formation-flying mission. A pair of satellites will fly together, maintaining a fixed configuration as if they were a single large rigid structure in space, to prove innovative formation flying and rendezvous technologies.

→ Coronagraph Spacecraft

- **Laser and visual based targets**
- **Propulsion: Hydrazine**
- **Payloads:**
 - ASPIICS - Association of Spacecraft for Polarimetric and Imaging Investigation of Corona of the Sun,**
 - 3DEES - 3D Energetic Electron Spectrometer**
- **“Slave” for formation flying**
- **Mass: ~ 310 kg**

→ Occulter Spacecraft

- **Laser and visual based optical heads**
- **Propulsion: Cold gas**
- **Payload:**
 - DARA - Digital Absolute Radiometer Science experiment instrument**
- **“Master” for formation flying**
- **Mass: ~ 240 kg**



→ Mission Objectives

Proba-3 will function as an orbital laboratory, demonstrating acquisition, rendezvous, proximity operations and formation flying, while validating innovative metrology sensors and control algorithms, opening up novel methods of mission control. The 2 satellites will adopt a fixed configuration in space, 150m apart while lined up with the Sun so that OSC blocks out the brilliant solar disk for the CSC. This will open up continuous views of the Sun's faint corona, or surrounding atmosphere, for scientific observation.





**Capacity Building and Public Outreach (CBPO)
Indian Space Research Organisation**

Department of Space, Government of India
Antariksh Bhavan, New BEL Road
Bengaluru-560094, India
Telephone: +91 80 2217 2119

 www.isro.gov.in

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NEWSPACE INDIA LIMITED (NSIL)

Corporate Office : 11th Floor, Brigade Rubix,
20, Watch Factory Road, Phase-1, Yeswanthpur,
Bengaluru-560013, India
Telephone: +91 80 23 22 7777
E-mail : contact@nsilindia.co.in

 @NSIL_India www.nsilindia.co.in 