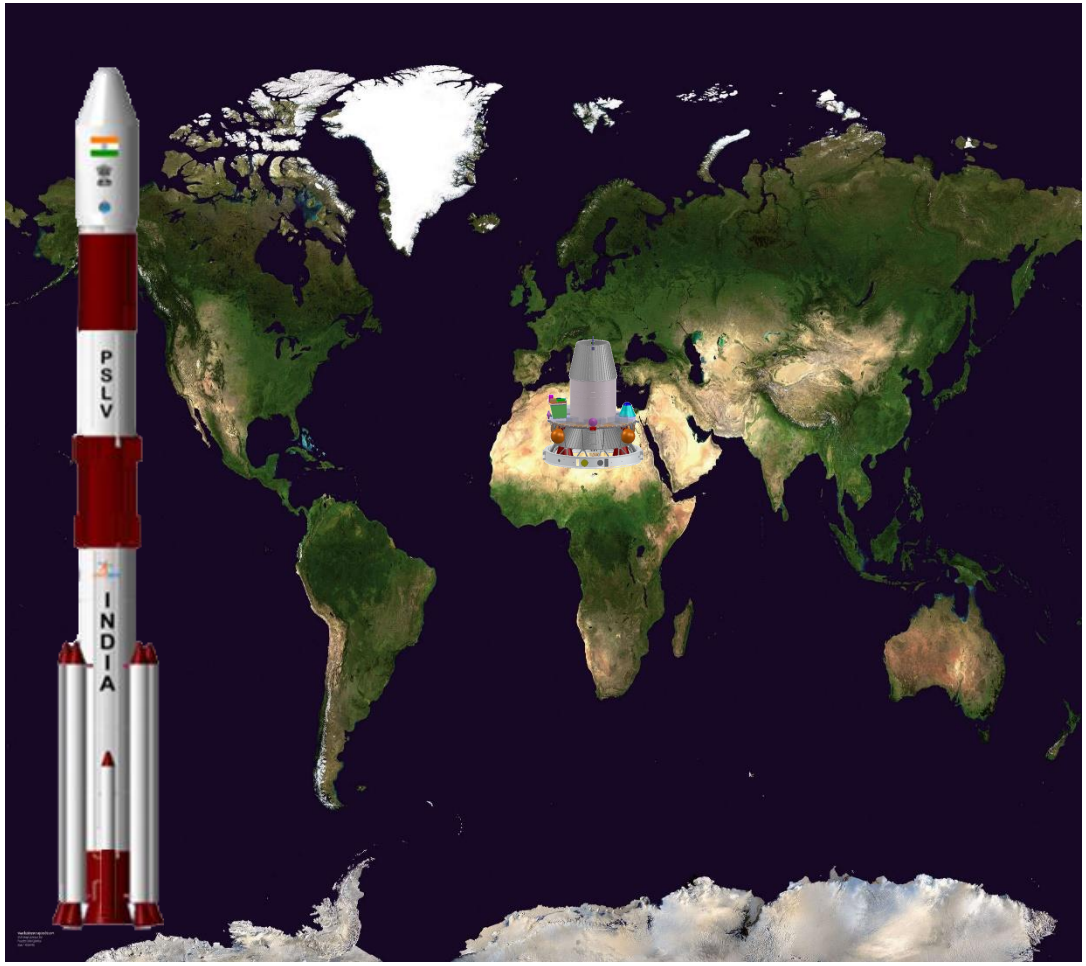
Opportunity for Scientific Experiments on PSLV Upper Stage Orbital Platform



Presentation to UNOOSA
16.6.21

PSLV Launch capability

SSPO(600km)-1.75t, sub-GTO-1.4t
Earth Observation missions, Navigation missions, Science missions

PSLV-XL version will be used for Orbital platform experiments

About PSLV	
Height	44 m
Diameter	2.8 m
Number of Stages	4
Lift Off Mass	320 tonnes (XL)
First Flight	September 20, 1993
Missions	51 successful missions till date

PSLV Upper Stage as Orbital platform

The Fourth stage of PSLV (PS4) is offered as an experimental platform, after the completion of prime mission for conducting scientific experiments in micro gravity conditions.

Objective

To fly payloads with novelty, innovation, societal benefits	Instil scientific temper in academic institutes so as to come up with state of the art technologies	Promote Space based start-ups

The Orbital platform provides a unique opportunity for cost effective testing of payloads/instruments before inducting them into flight.

Experiment Opportunities

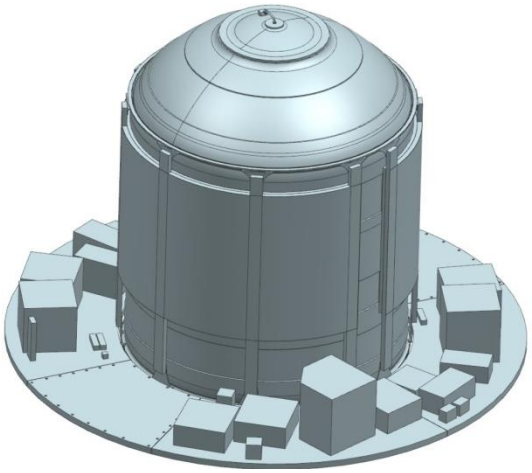
- 0-g experiments
- Technology demonstration experiments
- Biological experiments
- Student payloads

- Earth Science Experiments
- Tethered robot experiment
- Humanoid based robotic experiments

- De-orbit & re-entry for Debris Management

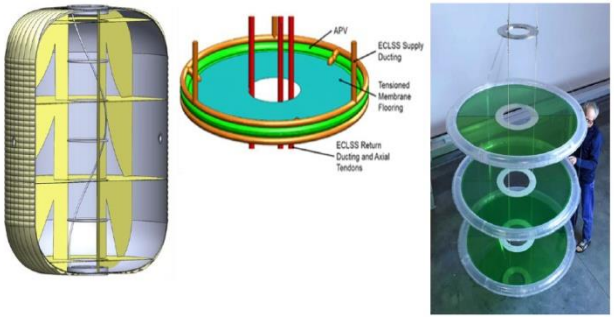
Platform resources

Provides platform for multiple payloads



Provides:

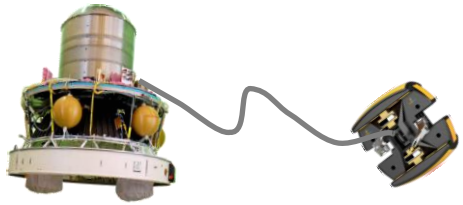
- **Power**
- **Attitude control**
- **Communication**
- **Data storage**



Can use COTS hardware

Suitable for experiments which need large Inertia & big Structure.

Mission life: 4-6 months



Platform capability

1. Maximum mass of payload:

- 10kg per payload.
- Each mission can have 3 payloads.

2. Maximum size (including the footprint) of payload:

- The volume & footprint depends on real estate availability in a particular mission & place of mounting.
- Generally specified as 3U for each payload.

3. Maximum power of payload:

- Total:100W. (30W per payload).

4.Maximum data rate:

- 1Mbps. S-band

5.Platform stability:

- Pointing accuracy within ±1deg during sunlit period
- ±5deg during eclipse
- Rate within 0.5deg/s during stabilized regime.

Successful demonstration in PSLV-C45 mission, 1st April, 2019

Flown three payloads with a total mass of 19kg.

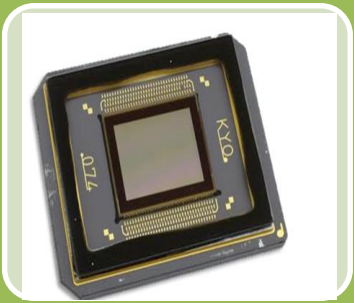
After the prime mission the stage was spin stabilised and offered as an orbital platform with an intentional firing of RCS thrusters.

The flexible solar array, power package & telemetry system performance were normal.

Payloads:
AISAT from AMSAT, India
AIS from SAC
ARIS from IIST

The Orbital platform & payloads performed satisfactorily for the intended mission life of 3 months. The AISAT payload is performing successfully till date.

Selection Criteria



- Innovation
- Novelty
- Societal benefits
- Technology demonstration for future missions

- Expertise & Experience in realising payloads
- Facility & Infrastructure available

- Requirements from PS4-OP
- Readiness level

Thank you