

Emerging Space Ecosystem in India



Presentation by Indian delegation

to

66th Session of COPUOS

Vienna, Austria



INDIAN SPACE POLICY 2023



- Ease-of-doing business
- Utilization of Government facilities
- Single window
- Ensure safety and security
- Ease of access to RS data



ISRO

- Annual Budget of about \$1.6B
- 17,000 strong workforce
- 21 Centres/ Units spread across the country



NSIL

- Commercial arm of DoS
- Handle Operational launch vehicles and satellites
- Production of launch vehicle through industry
- Technology Transfer



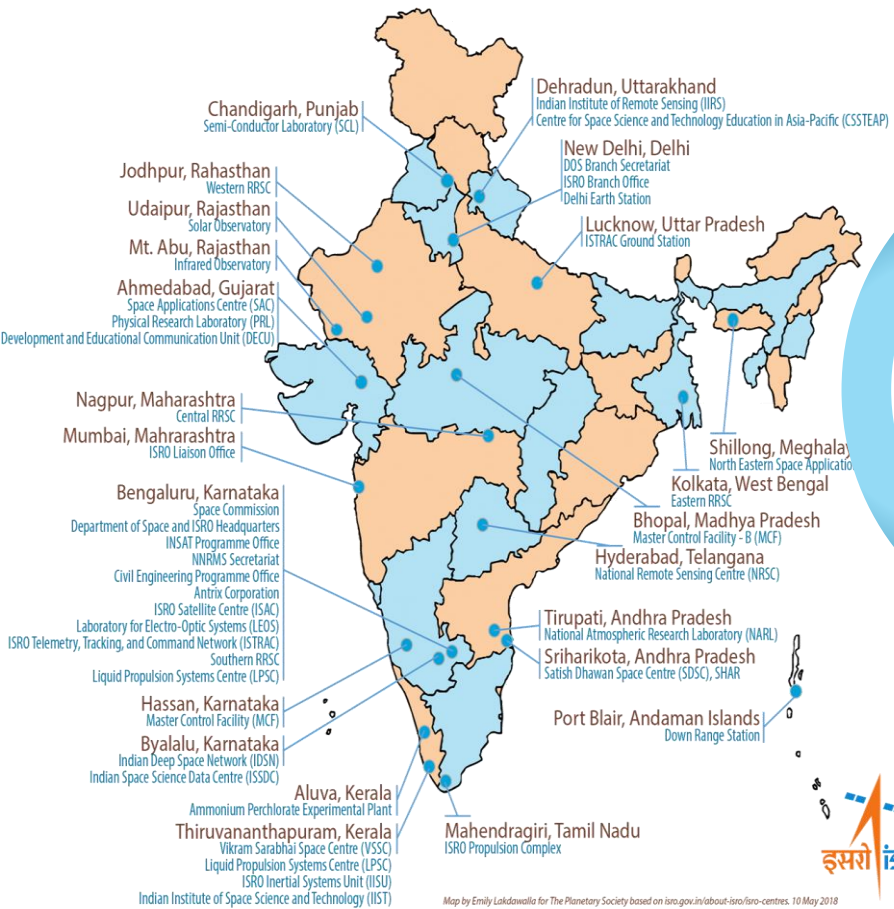
IN-SPACe

- Promote, handhold and authorize private space industry
- 450+ SMEs
- 50+ Large Industries
- 100+ startups

Indian Space EcoSystem



ISRO & It's technical ecosystem ~ Across the country



Map by Emily Lakdawalla for The Planetary Society based on isro.gov.in/about-isro/isro-centres. 10 May 2018



Recent missions / Operational models



Commercial Missions

Scientific Missions

User funded Missions



OneWeb India-2/
NSIL



Chandrayaan-2

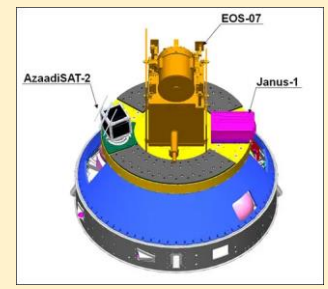
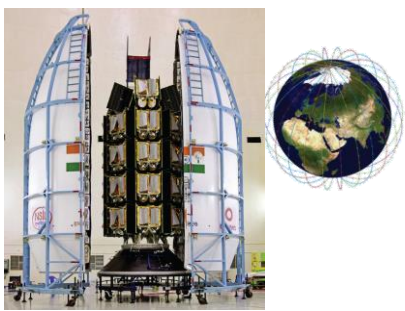


EOS-06 / OceanSat

SSLV-D2



EOS-07,
Janus-1 & AzaadiSAT-2



Accomplished on 10th Feb-23

NewSpace India



Enabling growth



Space research & Technology development



Commercial space tech / Industrial operations.

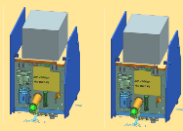


Promoting, regulating & handholding NGPEs



Engaging Industries

Production of launch vehicles



Small satellite



S/C production



Start-ups New players

Launch vehicles



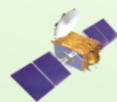
Satellites



Space Applications



Public Private Partnerships



EO satellite



New LV Concepts

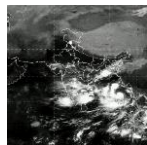


Spacecrafts: *Build in India*

ISRO: Mandate & future plans



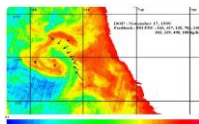
Space based solutions



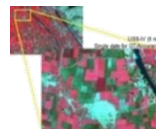
Weather



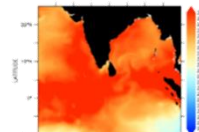
Disaster Support



PFZ



Agriculture



Ocean



Navic



SATCOM

Science for the next generation



National Science pool

ISRO, DST
IITs, NITs, IISER

60+ institutes

Mission to study Sun



Aditya-L1

Missions to Moon



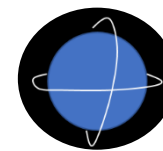
Chandrayaan 3
LuPEX

High Res. Thermal
Infra-red Imaging



TRISHNA

Aeronomy



DISHA

Mission to Venus



Science data to global pool of researchers

Human Spaceflight



Gaganyaan

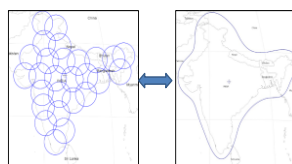


New Domains

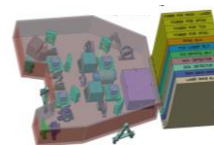
collaboration
across
spectrum of
Space activities



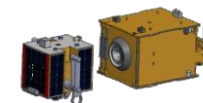
Winged re-usable
vehicle



Flexible payloads



Quantum
communication

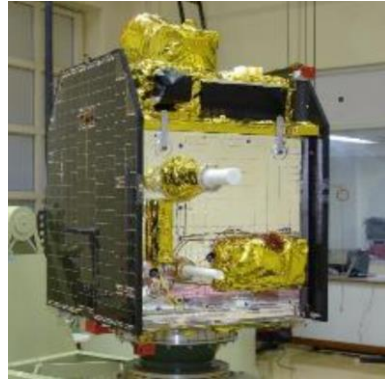


Space Docking

Initiatives to offload production

IMS bus technology transfer

Small satellite platform for Low-cost access to space



PSLV Production

Production of PSLV through Industry consortium



SSLV technology transfer

Production through Industry to meet small sat. launch requirements



LVM3 production

To meet enhanced commercial launch requirement



India's emerging Private Space Sector

Skyroot Aerospace



1st Suborbital flight

Agnikul Cosmos

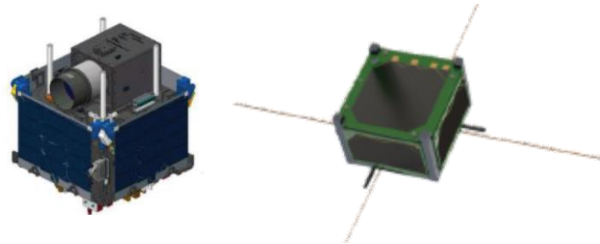


Semicryo Engine test

Non-Governmental Entities in the Space business in India



Private Satellite launched by PSLV-C54



Solutions by Indian Private sector

- Development of advanced small satellites
- Small satellite launch vehicles
- Space debris management & mitigation
- Geospatial solutions
- Communication services
- Orbital transfer vehicles

Typical cases: Start-ups in Satellite Applications



Remote sensing | Machine learning | Big data analytics | Cloud computing
Create products and solutions for smart decision making

- Crop insurance
- Agriculture Trading
- Agriculture Banking
- Agriculture Inputs

- Food Processing
- Insurance
- Credit
- Banking



Remote sensing data from: Satellites | Aerial platforms | Field sensors
Deep learning algorithms to analyze biggest and heaviest datasets in a short time.



Urban



Agriculture



Environment



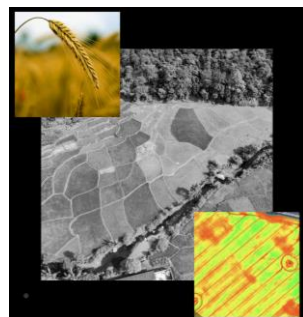
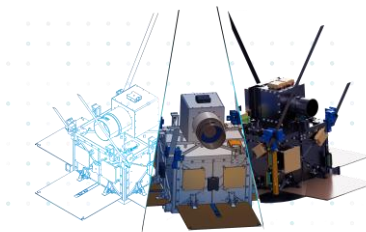
Disaster



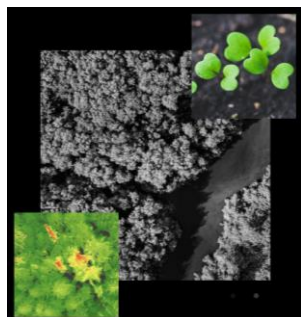
Defense



More frequent **hyperspectral imagery**; targeted monitoring, localised problem detection, and hyper optimised solutions



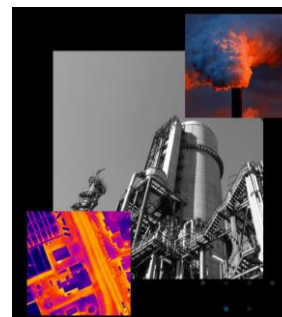
Agriculture



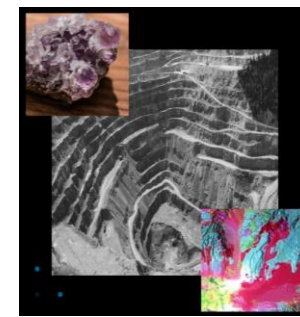
Environment



Governance



Energy



Mining



*Emerging Indian
Space Ecosystem*

Thank you