

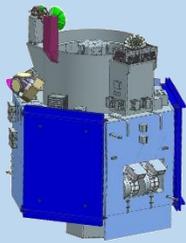
Recent Indian Space Missions

Umamaheswaran, R

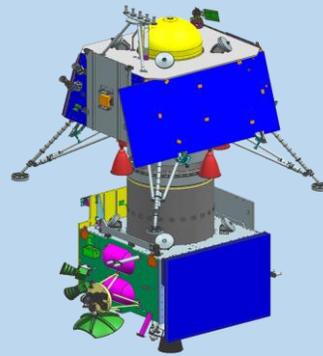
**Presentation to 64th Session of UNCOPUOS
Vienna, Austria**

August 26, 2021

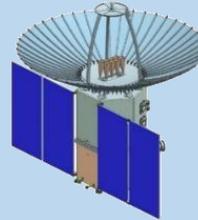
Missions Accomplished since last COPUOS session



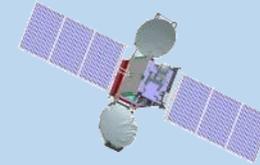
Cartosat-3



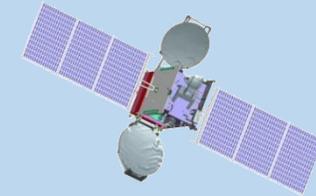
Chandrayaan-2



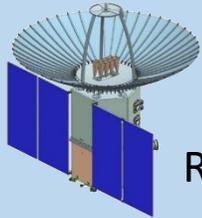
EOS-01



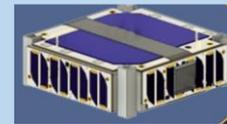
CMS-01



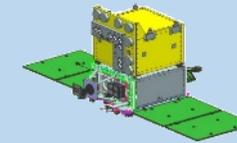
GSAT-30



RISAT-2BR1



UNITYsat (3)



SDSAT

June 2019 to August 2021



5 PSLV
C47, C48, C49, C50, C51

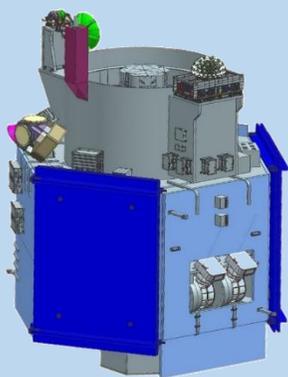
49 Foreign satellites



GSLV MkIII M1

GSLV MkIII operationalised

PSLV-C47/ Cartosat-3 & PSLV-C48/ RISAT-2BR1 Missions

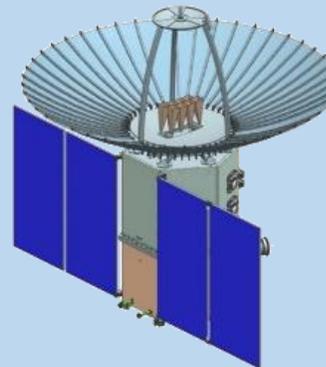


Cartosat-3
3rd generation
agile advanced
satellite with
high resolution
imaging
capability



PSLV-C47
49th Flight
PSLV-XL

27 Nov 2019



RISAT-2BR1
Radar imaging
earth
observation
satellite



PSLV-C48
50th Flight
PSLV-QL

11 Dec 2019

GSLV Mk III M1 / Chandrayaan-2 Mission

GSLV MK III M1

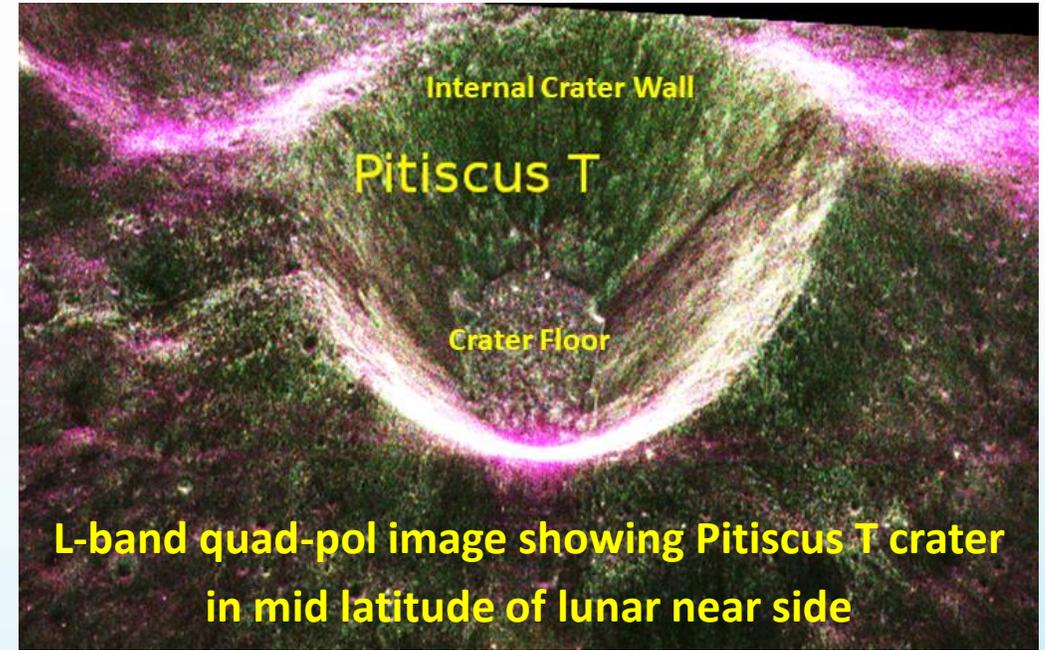


22nd July 2019

Chandrayaan-2



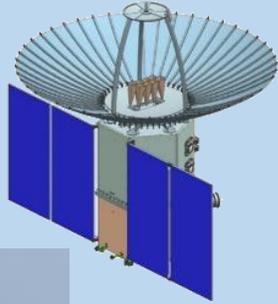
Lander with Rover



L-band quad-pol image showing Pitiscus T crater in mid latitude of lunar near side

- Chandrayaan-2 Orbiter was injected into lunar orbit on 2nd Sept 2019
- All the 8 payloads are working fine
- The first set of data from this mission is released for all users in the Planetary Data System 4 (PDS4) format.
- <https://www.issdc.gov.in/>

PSLV-C49 / EOS-01 & PSLV-C50 CMS-01 Missions

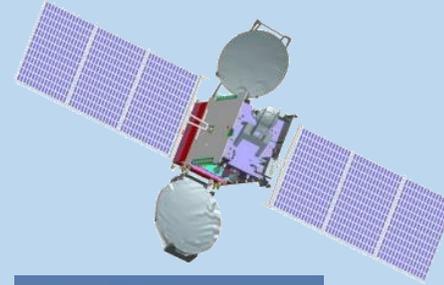


EOS -01
Earth
Observation
satellite



PSLV-C49
2nd Flight
PSLV-DL

07 November 2020



CMS-01
Communication
satellite



PSLV-C50
22nd Flight
PSLV-XL

17 Dec 2020

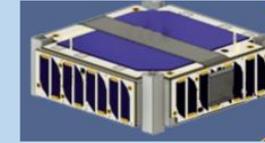
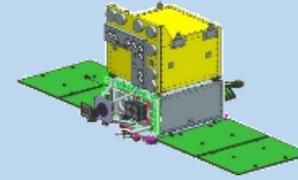
PSLV-C51 / Amazonia-1 Mission



28 February 2021



SDSAT



UNITYsat (3)

PSLV-C51 : 3rd Flight in PSLV-DL Configuration

A commercial mission for launching Amazonia-1 satellite from Brazil and 14 Co-Passenger satellites.

Also 4 Indian student satellites were put in orbit

GSAT 30 Mission

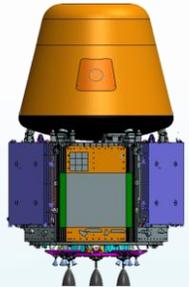


17th January , 2020

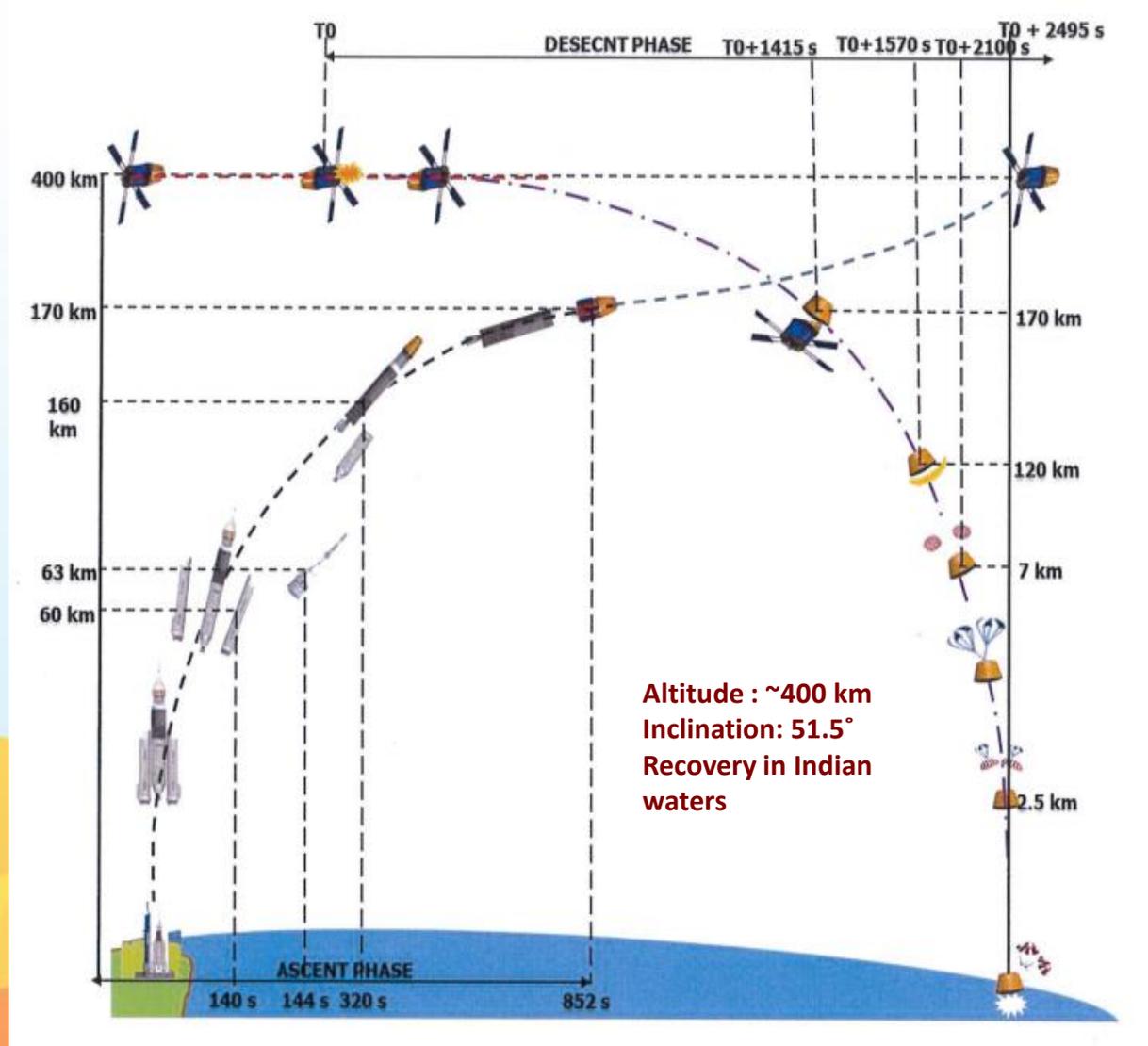
- Communication satellite configured on ISRO's enhanced I-3K Bus structure
- Services in C and Ku bands.
- Indian Mainland and islands coverage in Ku band
- Extended coverage in C-band covering Gulf countries, a large number of Asian countries and Australia.
- Launched in Ariane 5 VA-251, Kourou Launch base

GAGANYAAN - Exploring New Territories

Orbital Module
(~7.5 t)



Human Rated
Launch
Vehicle
Derived from
GSLV Mk-III



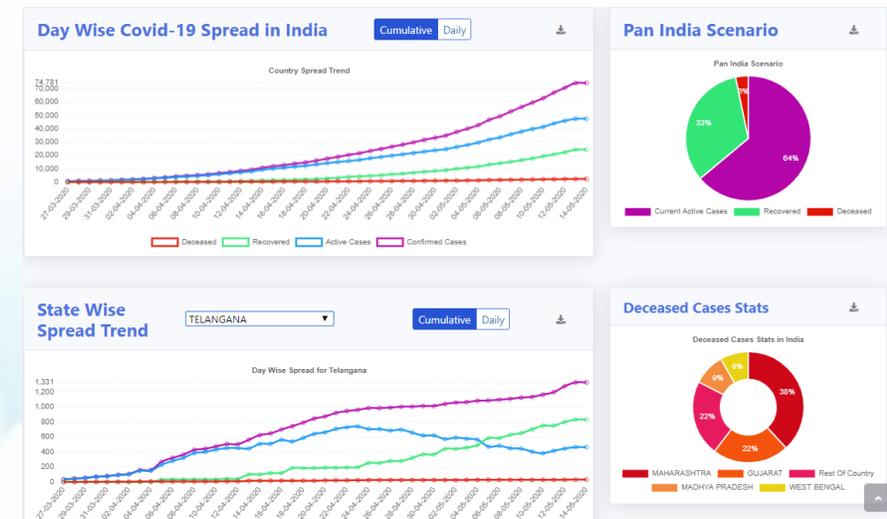
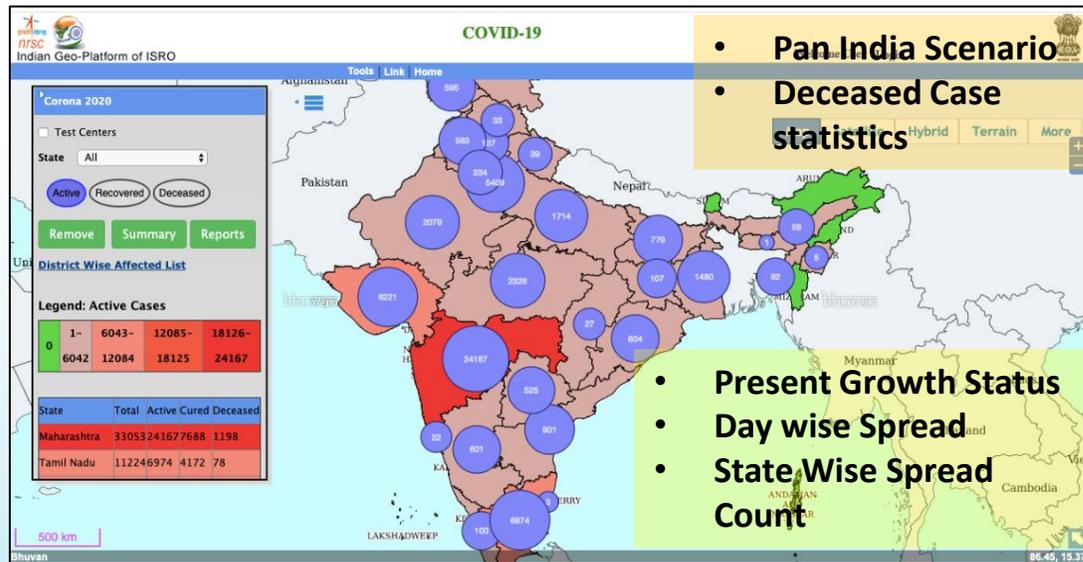
- Flagship project
- Two Unmanned flights followed by Manned mission
- First Unmanned Flight scheduled in Dec, 2021
- Astronaut candidates selected. Training in progress
- Microgravity payloads identified
- Large number of national and international collaborations



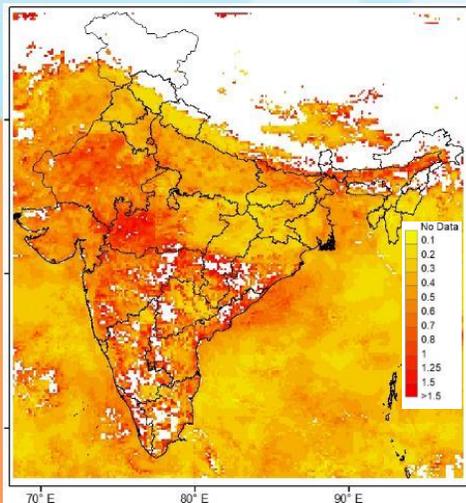
IAA-ISRO-ASI Symposium on Human Space Flight and Exploration in 2020

Bhuvan Geo-portal – Tracking COVID-19 in India

Geo-portal 'Bhuvan-COVID-19' at national level to track the pandemic and update common public on current situation

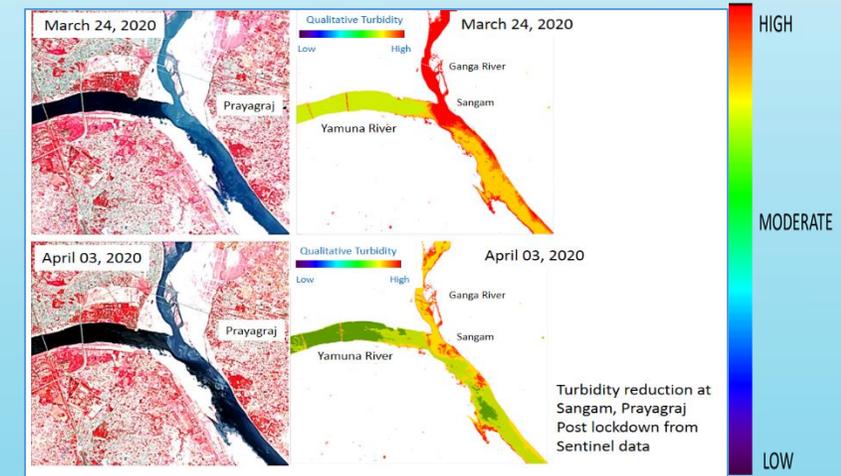


Air Pollution

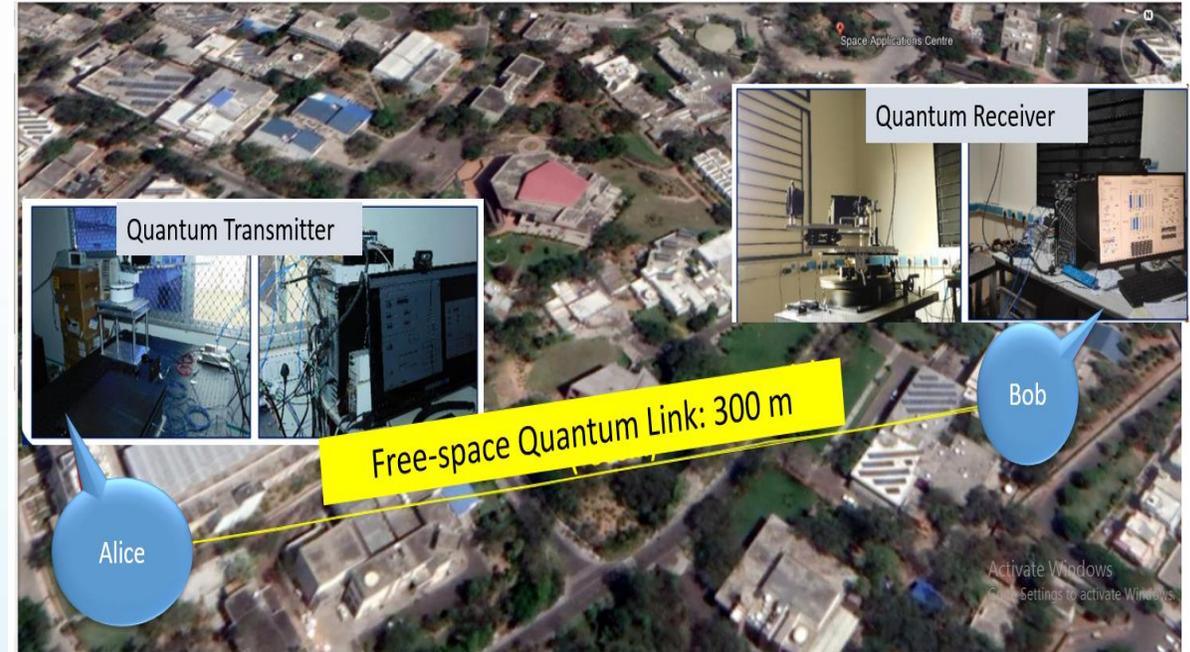


- NO2 shows significant decrease as compared to the previous years.
- INSAT-3D and MODIS measured the AOD and also the Particulate Matter (PM2.5 & PM10) show a decrease of about 20 to 36% in AOD levels

Water Pollution



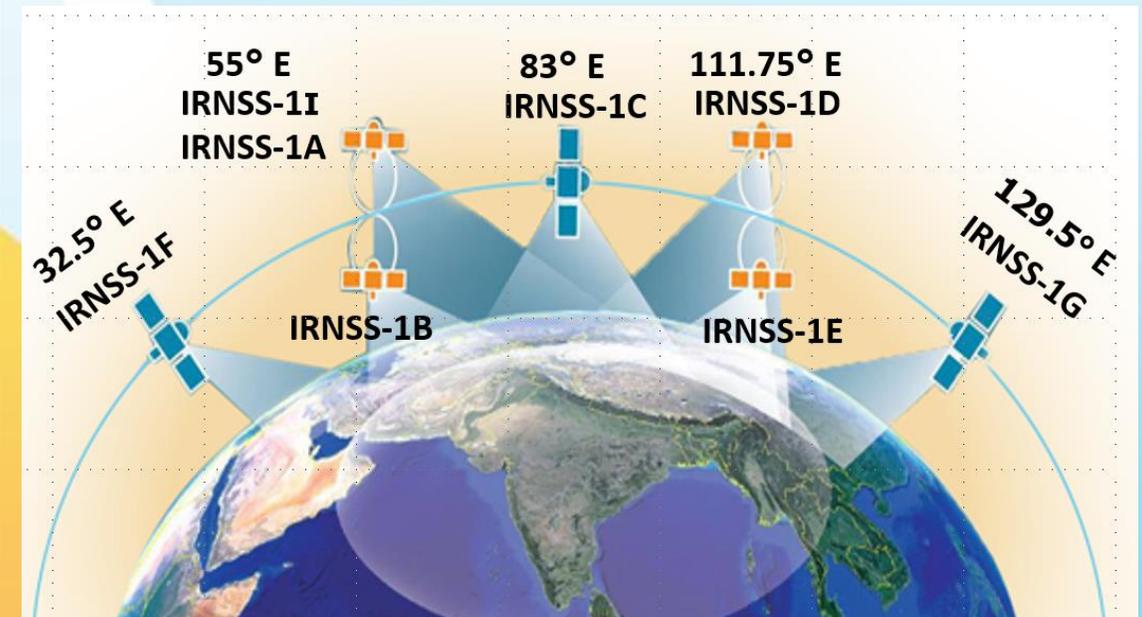
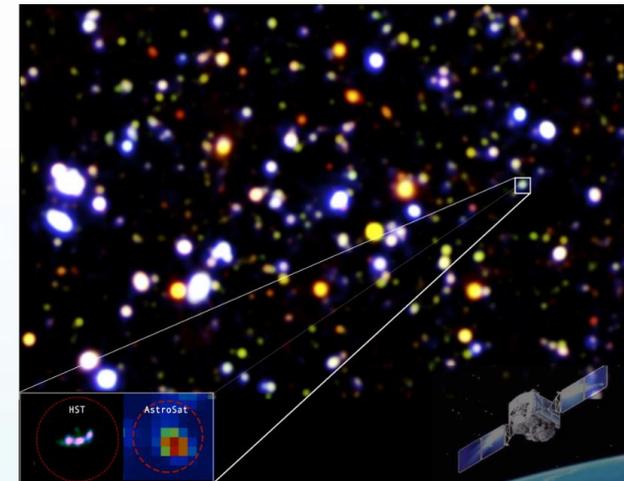
Demonstration of free-space Quantum Key Distribution



- Quantum Key-enabled live Videoconference demonstration
- Between two line-of-sight buildings separated by 300 m.
- Major breakthrough towards ISRO's goal of demonstrating Satellite Based Quantum Communication
- Ahmedabad, India. March 22, 2021

Other Major Events

- Astrosat detected extreme-UV light from a galaxy, AUDFs01, 9.3 billion light-years away from Earth - Astronomers from *India, Switzerland, France, USA, Japan & The Netherlands*.
- Mars Colour Camera (MCC) imaged Phobos, the closest and biggest moon of Mars at 210 m resolution
- *International Maritime Organisation (IMO) recognized NavIC as a component of the World-Wide Radio Navigation System (WWRNS) in Nov 2020.*
- *NavIC meets the operational requirements to assist in navigation of ships in ocean waters within the area covered by 550 E – 1100 E longitude, 500 N – 50 S latitude.*



International Cooperation

- **>250 MoUs with 59 nations & 5 Multilateral bodies**
 - **Joint missions**
 - **Payload accommodation**
 - **Joint experiments**
 - **Ground stations**
 - **Data sharing**
 - **Training and Capacity building**



NISAR joint mission (USA)

TRISHNA - TIR (France)

Lunar Polar mission (Japan)

Maritime mission (France)

Electric Propulsion (Israel)

India – ASEAN project

Human Space flight (Russia/ France)

Joint small satellite (Bhutan)

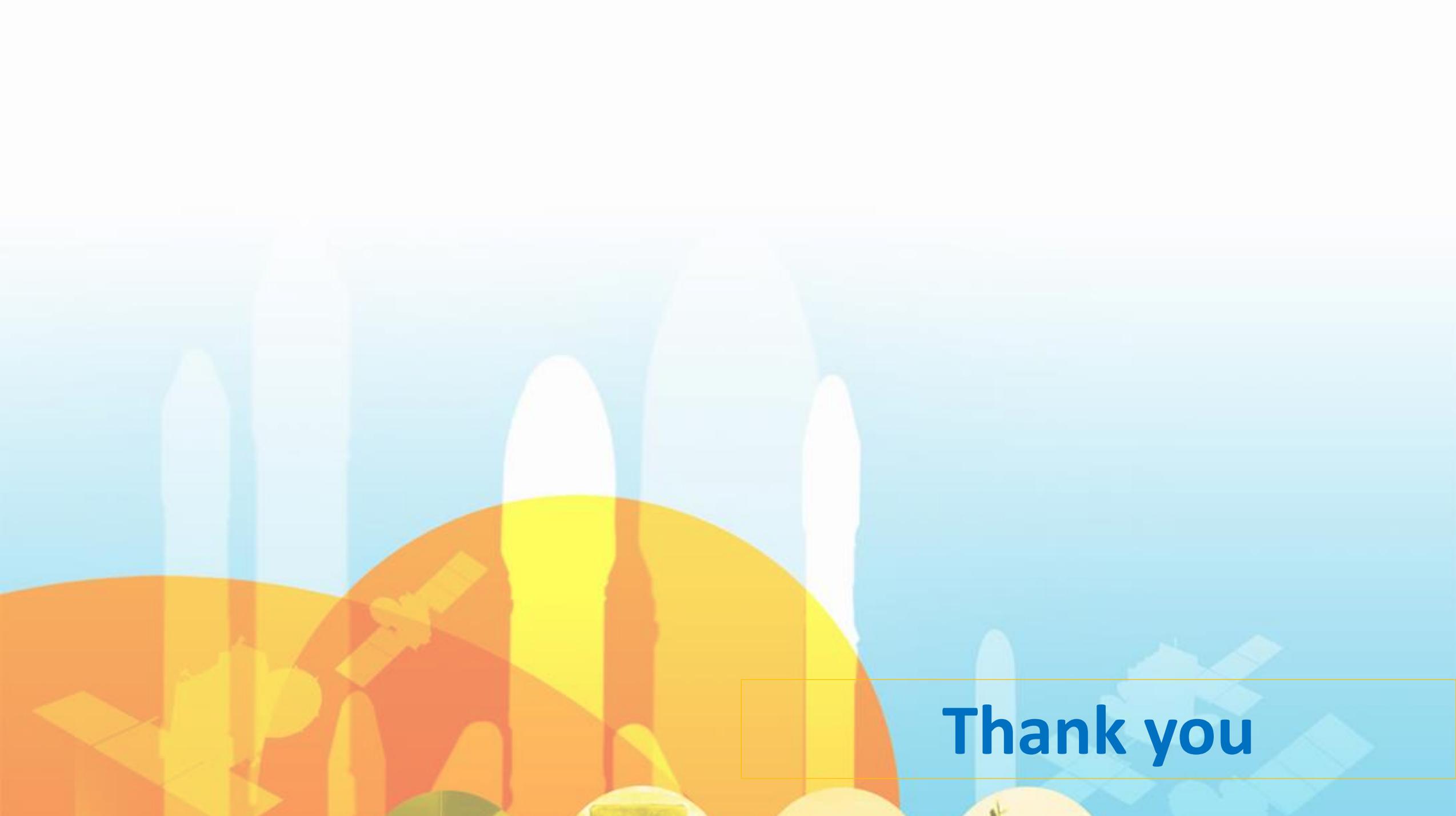
Capacity building (CSSTEAP, UNNATI)

Venus mission (Russia, France, Sweden, Germany)

International Events by ISRO

- 14th meeting of International Committee on GNSS (ICG): December 8-13,2019.
- 34th Plenary of Committee on Earth Observation Satellites (CEOS): October 18-20,2020.
- CSSTEAP- UNOOSA Online course on Geospatial applications for Disaster Risk Management: October-December 2020: 6870 officials from 102 countries.
- BRICS Space Agencies leaders meeting on August 18, 2021 & signing of RS satellite Agreement.





Thank you