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## ITASAT-2: CONOPS REVIEW AND NEAR-TERM CHALLENGES (SSC23-P4-25)



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### Abstract

ITASAT-2 is a Brazil-United States mission to study ionospheric phenomena that occur in low orbit and to develop and demonstrate capabilities in geolocation. Brazil will be responsible for the spacecraft development, integration and testing of the CubeSat and the US partners will provide the space weather payloads. The geolocation payload and radiation measurement instrument is intended to be provided by Brazil partners. To be able to accommodate the expected payloads and the required subsystems a 12 U CubeSat is foreseen. This works presents the ongoing work of ITASAT-2 mission covering the Concept of Operation and expected challenges identified for mission development, maneuvers and propulsion, commissioning and operations. The intended partners for the mission are NASA Marshall Space Flight Center, Utah State University, University of Texas at Dallas, Aerospace Corporation, Brazilian Universities and institutes.

### Mission Characteristics and Objectives

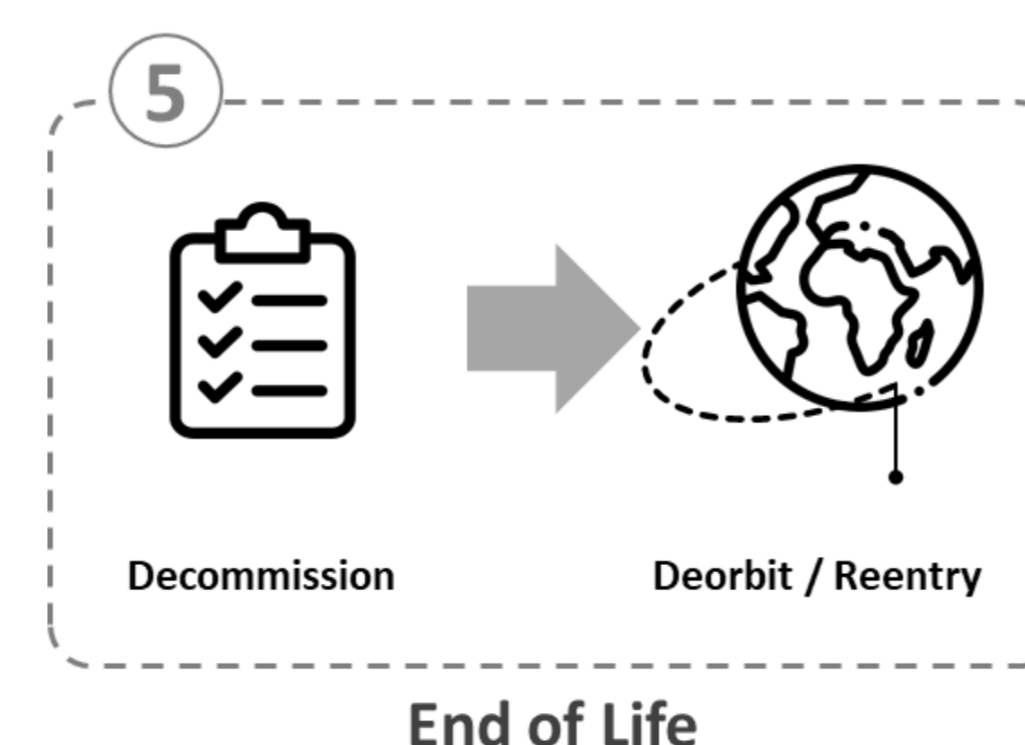
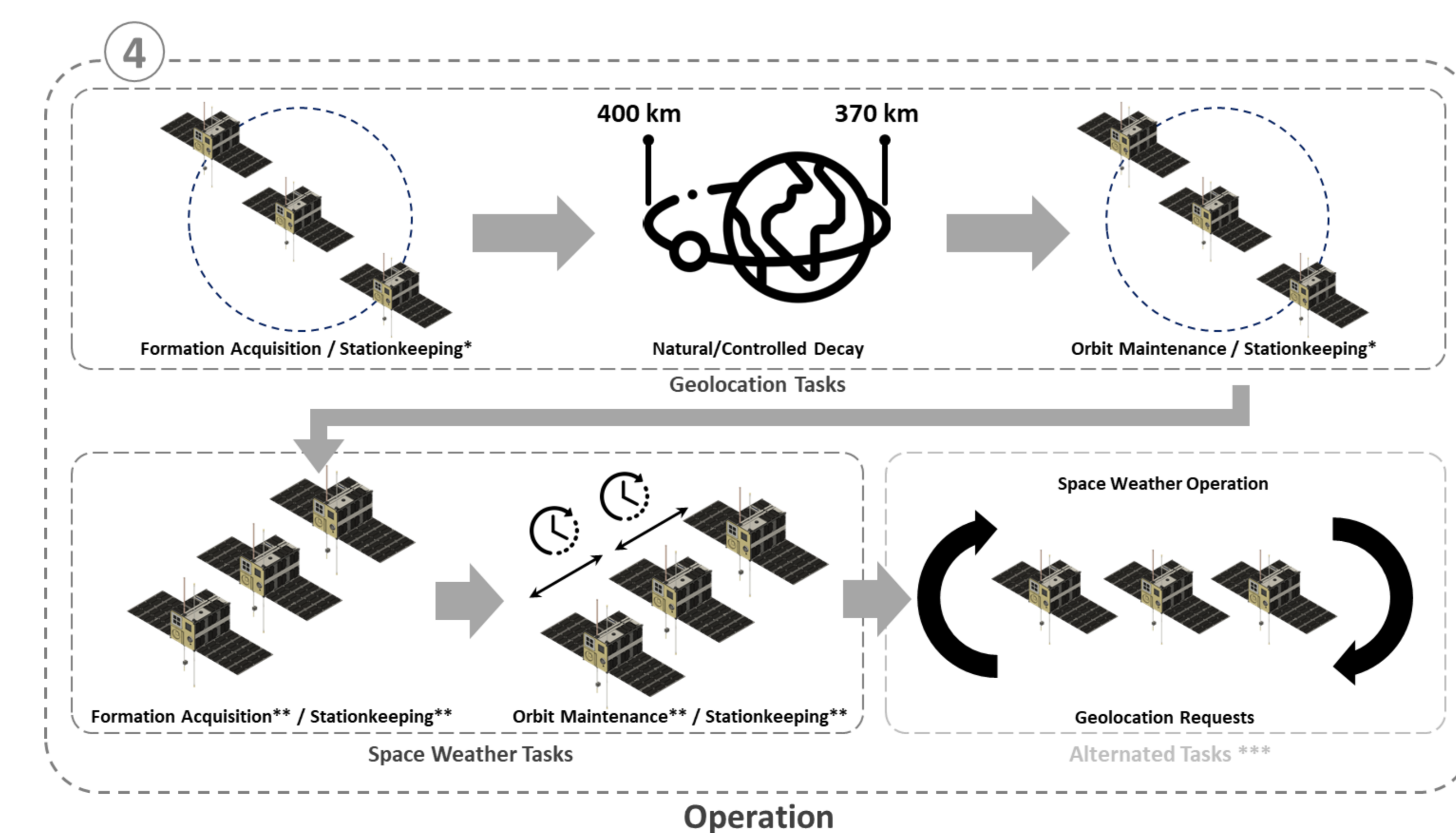
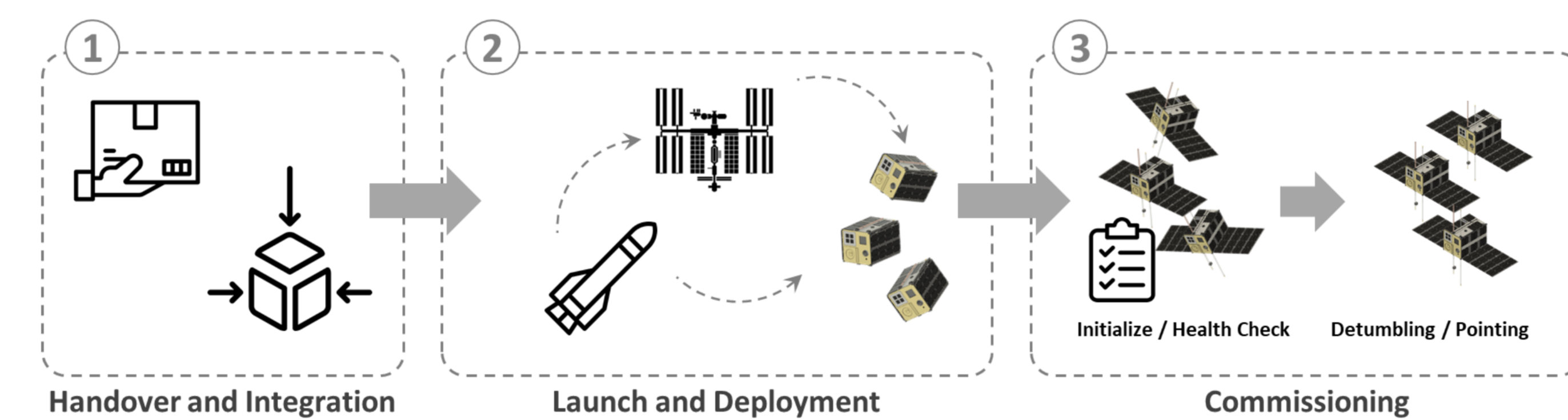
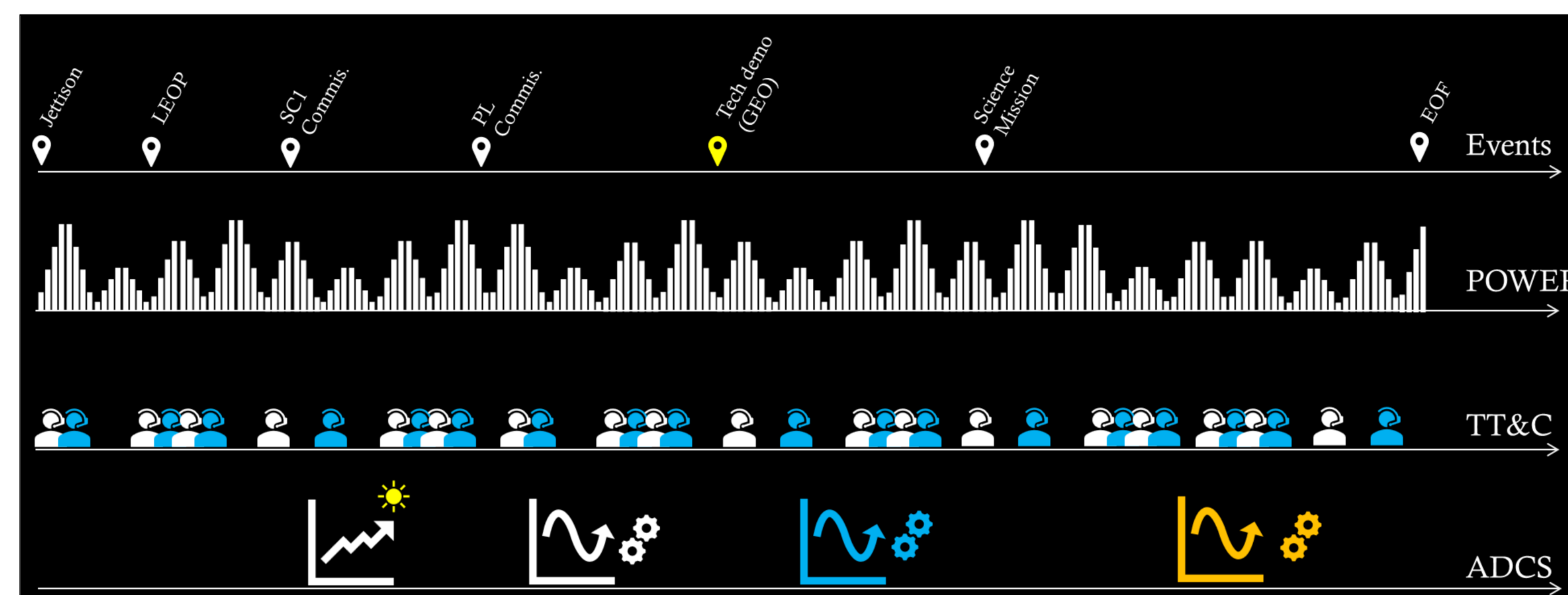
- SPORT Incremental Evolution
- Propulsive Capacity
- 3 CubeSats
- 12U ~ 24kg
- Operational Lifetime: 1 year
- Operational Orbit: 370 km @ 51.6 deg

1. To measure ionospheric plasma movements
2. To measure ionospheric plasma density and temperature
3. To measure ionospheric plasma impedance
4. To measure small-scale ionospheric structures
5. To measure magnetic field
6. To measure the electron density
7. To measure the electric field
8. To measure in orbit radiation
9. To geolocate RF emitting objects
10. To perform formation flight

**Project Team at ITA:** Luis Eduardo Vergueiro Loures da Costa, Lidia Hissae Shibuya Sato, Tiago Henrique Matos de Carvalho, Ana Carolina di Iorio Jeronymo, Sonia Aparecida de Sousa, Jonas Bianchini Fulindi, Douglas Estevam Casale, Denis Guilgim Vieira, Renan Guilherme Soares Menezes, Herbi Júnior Pereira Moreira, Victória de Souza Rodrigues, Thadeu Augusto Medina de Carvalho, Victor Oliveira Costa, Isabela dos Santos Pereira, Carla Juren Lucas, Bruno Leonardo Schuster, Uziel Parada Nunes, Douglas Luan Cardoso Arena, Cléber Toss Hoffmann, Paull Cristhian Acosta Mendoza, Linécio dos Santos Paula, Pedro Henrique Casarin Camardelo, Débora Cristina Alves dos Santos Siqueira, Edson Pereira

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### Concept of Operation - ConOps

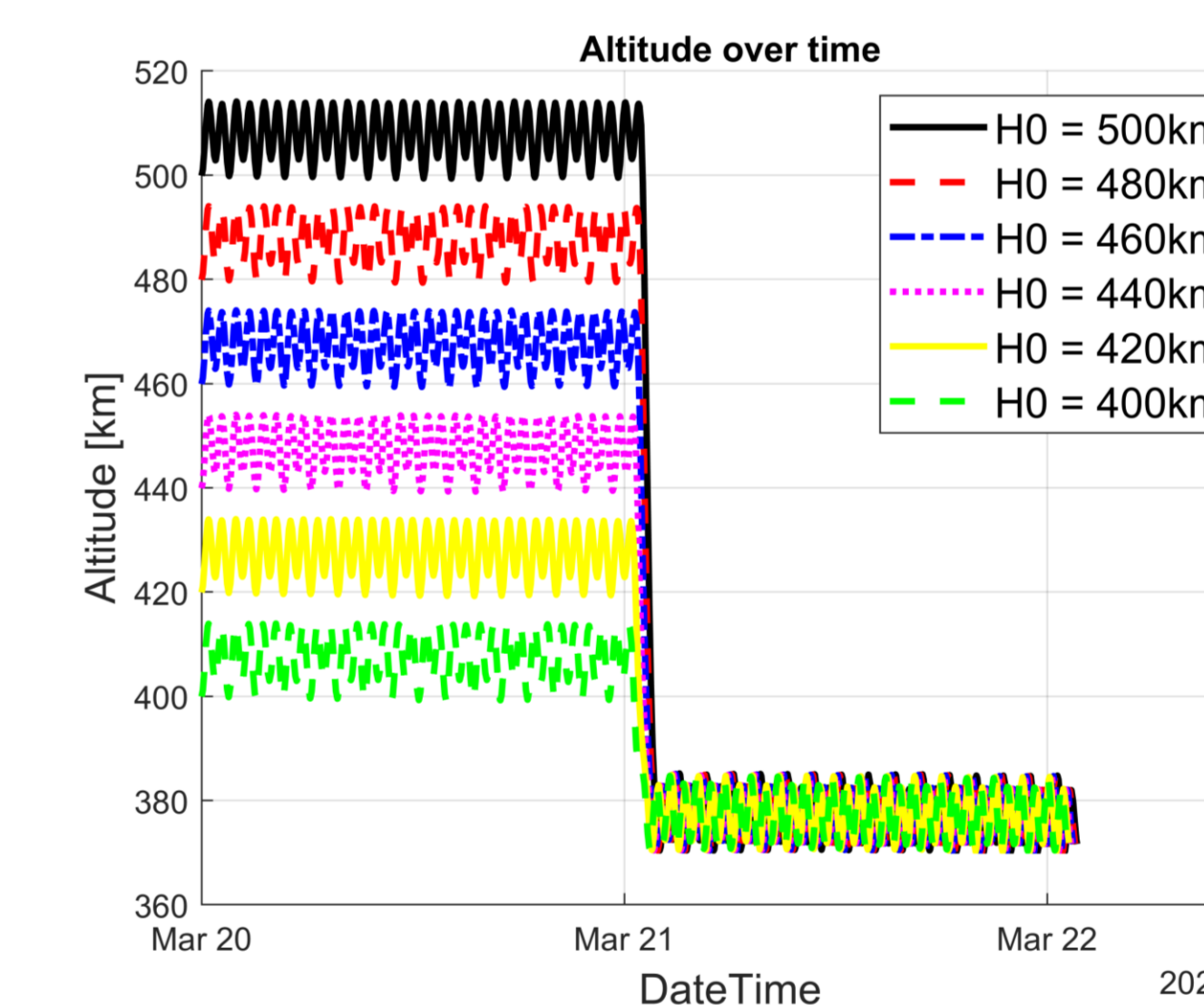


### Near-Term Challenges

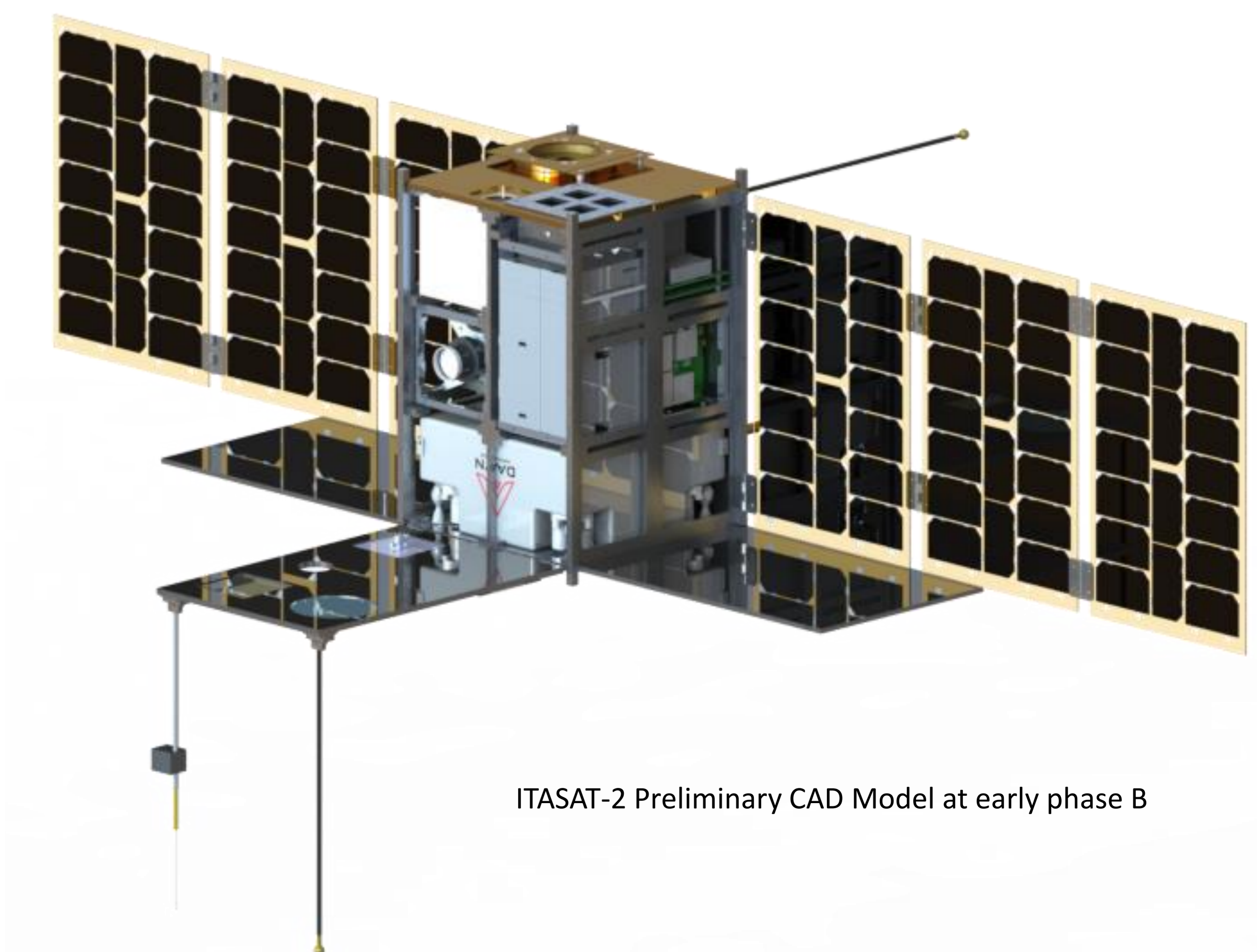
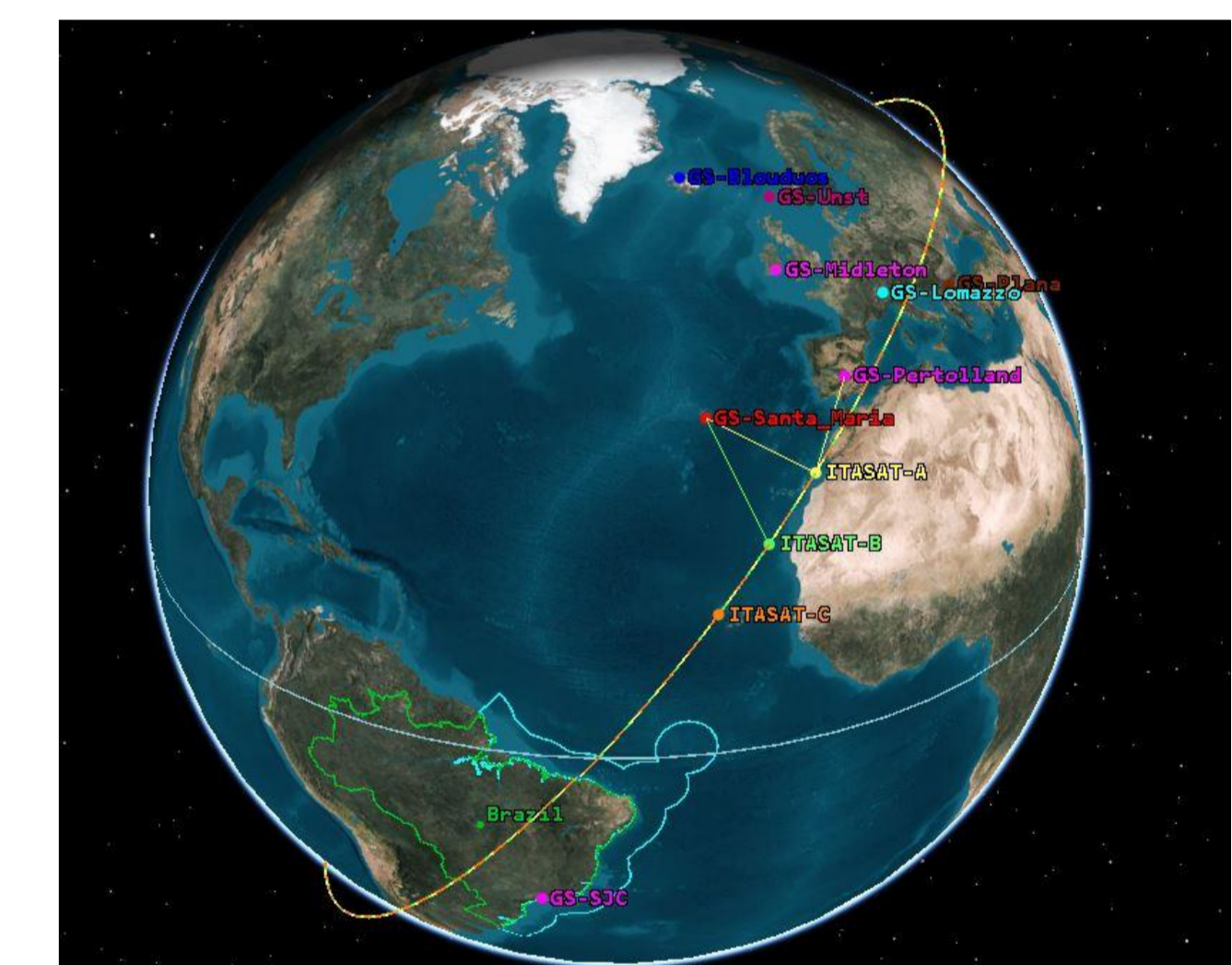
Requirements

- Unique identification to satellites
- Control the on/off of payloads in orbit
- Tolerance to temperature variation
- Tolerance to radiation

Orbital Analysis



Communication & Operation



ITASAT-2 Preliminary CAD Model at early phase B