

**UAEU | NSSTC**

**Space2Earth seminar**  
**Driving Innovation**  
**and Collaboration in**  
**the Space Economy**

**"SPACE WITHOUT BOUNDARIES"**



## Overview

- Established in 2016
- Based at UAE University
- National hub for space research & innovation

## Core Capabilities

- Develop space technologies & missions
- Support national space programs
- Conduct research in Earth observation & advanced systems

## Strategic Impact

- Strengthening UAE space capabilities
- Bridging academia, industry & government
- Enabling future space workforce

## Government

**NSSTC**

**Entrepreneur  
s**

**Investors**

**Academia**

**Industry**

## AlainSat-1

- A 3U educational CubeSat developed by NSSTC in collaboration with the IEEE GRSS.
- Enables international student teams to design and test innovative Earth observation payloads in orbit.
- Operates in a Sun-synchronous orbit (SSO) with active 3-axis ADCS for precise attitude control.
- Utilizes UHF (TT&C) and S-band (payload data) communication systems.

## The Arab Satellite 813

- A hyperspectral Earth observation satellite focused on advanced imaging applications.
- Provides high-resolution spectral data for environmental monitoring and analysis.
- Supports applications such as agriculture, land use mapping, and resource management.
- Contributes to regional space capabilities and scientific research.

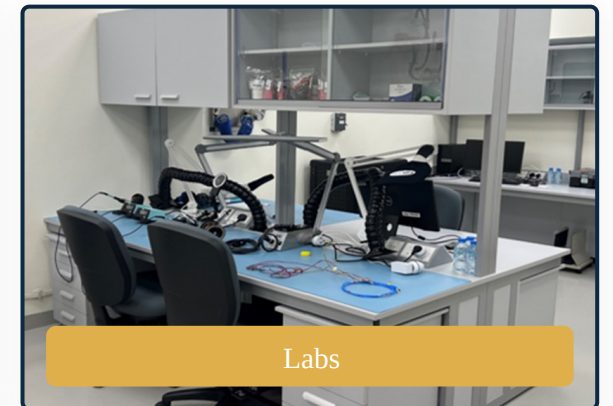
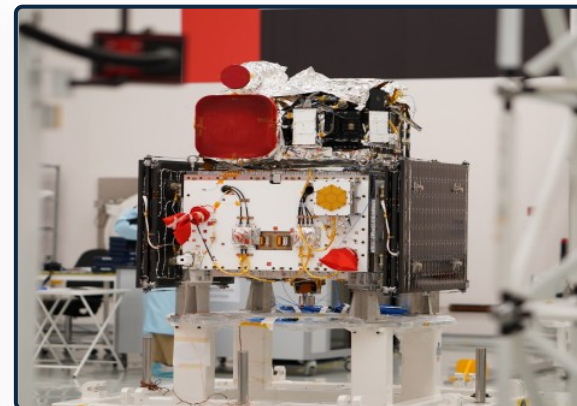
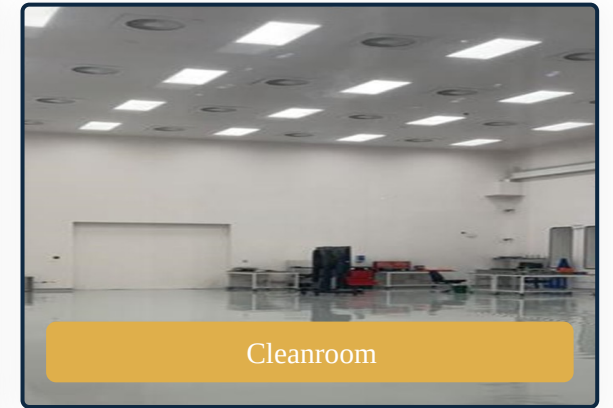
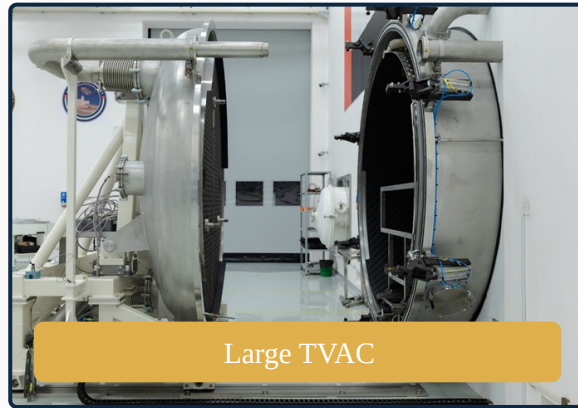
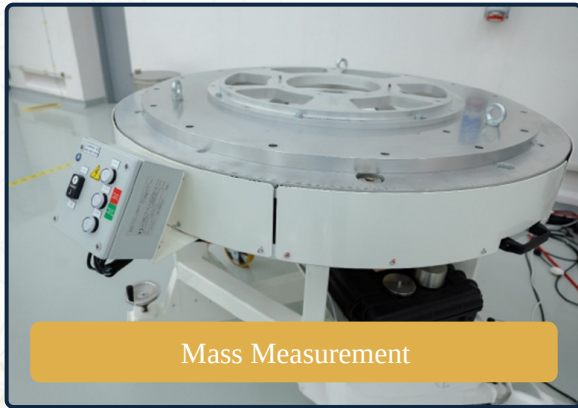


## LEONAV-1

- A Low Earth Orbit Positioning Navigation, and Timing (LEO PNT) Satellite mission designed to enhance accuracy, increase availability, improve robustness.
- LEONAV-1 is the first step toward a sovereign LEO PNT constellation that strengthens the UAE's role as a navigation service provider

## Capabilities to build Future Space Missions in-house

End-to-end AIT capabilities: from assembly and integration to environmental testing and launch readiness.



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## Robust communication links with satellites

### Data Reception

Captures and relays satellite data back to Earth.

### Command & Control

Sends critical commands to the satellite to manage its operations.



### Telemetry Tracking

Monitors the health and status of satellites in real-time.



NSSTC Antenna Farm



Antenna Domes



Mission Operation Center

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# S813 Overview

## S813 Scientific Payloads

01

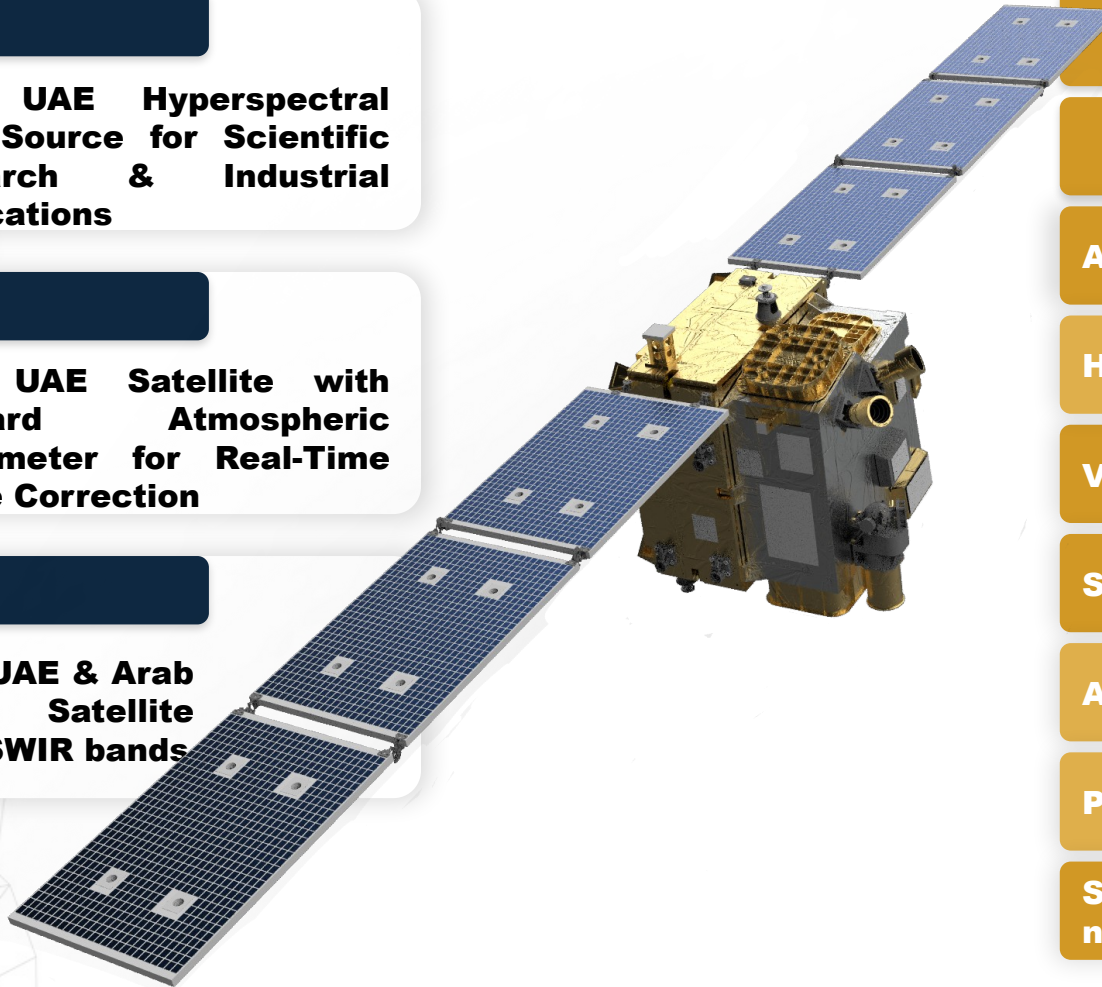
First UAE Hyperspectral Data Source for Scientific Research & Industrial Applications

02

First UAE Satellite with Onboard Atmospheric Polarimeter for Real-Time Image Correction

03

First UAE & Arab World Satellite with SWIR bands



Equipped with Hyperspectral imager

On-board Atmospheric Polarimeter

Applications in environmental monitoring

Hyperspectral imager

Collects spatial and spectral information  
No. of bands: 205

VINIR (400-760 nm)

Spectral resolution : 5 nm | Spatial resolution: 20m | Average SNR  $\geq$  150

SWIR (760-1700 nm)

Spectral resolution: 10 nm | Spatial resolution: 20m Average SNR  $\geq$  150

Atmospheric Polarimeter

Gathers radiation and polarization data

Panchromatic Camera

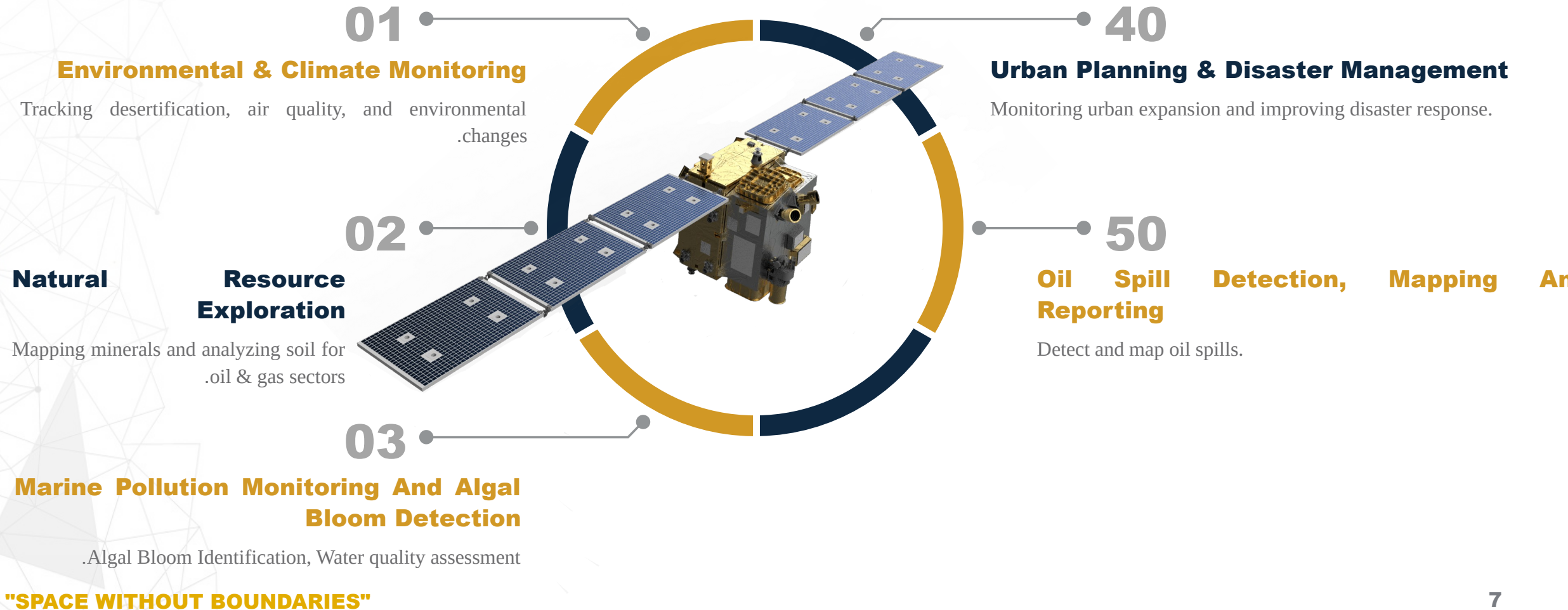
Captures high spatial resolution panchromatic imagery

Spectral range: 450-690 nm

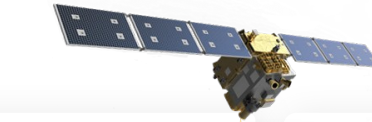
Spatial resolution: 5 m | Average SNR  $\geq$  150

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# Satellite 813 scientific applications



## Sustainability Development Goals



6 11 13 14

### Coastal and inland waters monitoring

- Pigments (e.g., water chlorophyll concentration)
- Colored dissolved organic matter
- Suspended sediment concentration
- Water transparency
- Water surface area

### Glacier and Snow cover monitoring

- Different sea-ice albedo types
- Extract melt pond fractions
- Map particle-laden sea ice, and assesses the particulate loading
- Glaciers and snow coverage
- Snow cover index

1 2 12 13 15

- Leaf biochemical and biophysical characterization
- Distinguish invasive species
- Distinguish plant with disease
- Tracking water stress change in leaves
- Monitoring soil moisture and leaf water content
- Assessing forest health
- Identifying tree species
- Detecting signs of disease or infestation

### Agriculture and forestry characterization and monitoring

- Mineral mapping applications
- Organic matter content
- Moisture content
- Salinity
- Texture and surface roughness

### Geology and soil characterization

6 7 13 14

2 11 12 13 15

1 2 13 15

### LAND COVER LAND USE

- Distinguish between different land features and use types
- Monitoring the interaction between human activities and the Earth's environment

# Hyperspectral Data For Everyone!

## Arab Satellite 813 Data Flow & Sharing Process

National agencies and stakeholders

01

02

National Academic institutions

Academic and research institutions of the ASCG

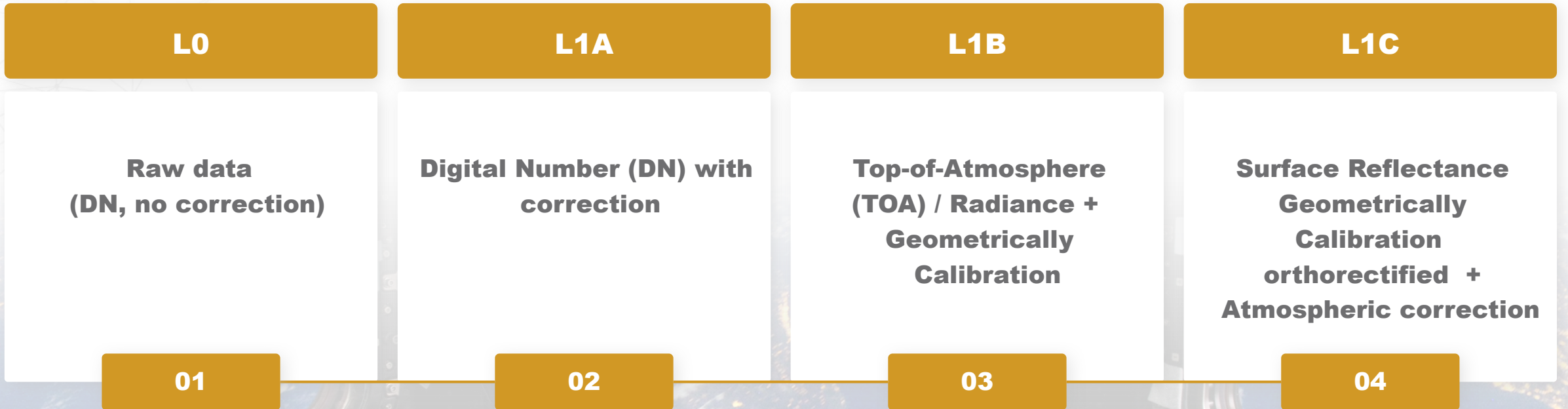
03

04

International partners

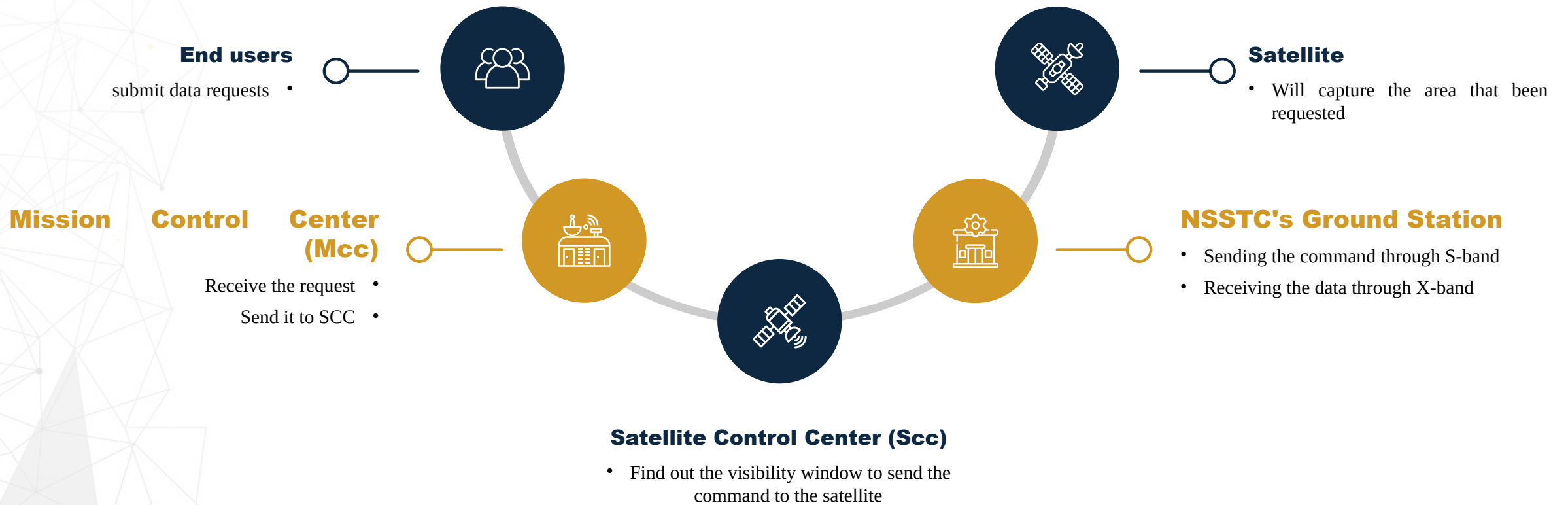
# The Arab Satellite 813

## S813 Data Levels



**Processed & delivered via SAS platform (NSSTC)**

## Forwards tasking to the Satellite Control Center



**Any Question ?**



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**Thank  
You.**

