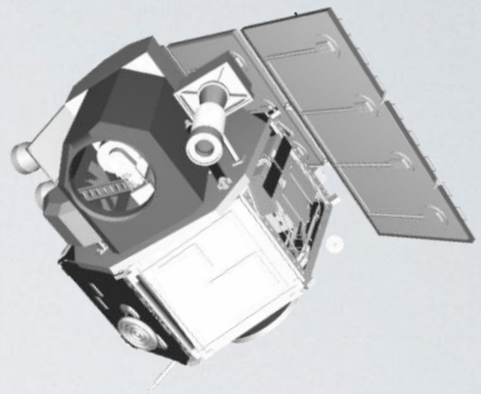


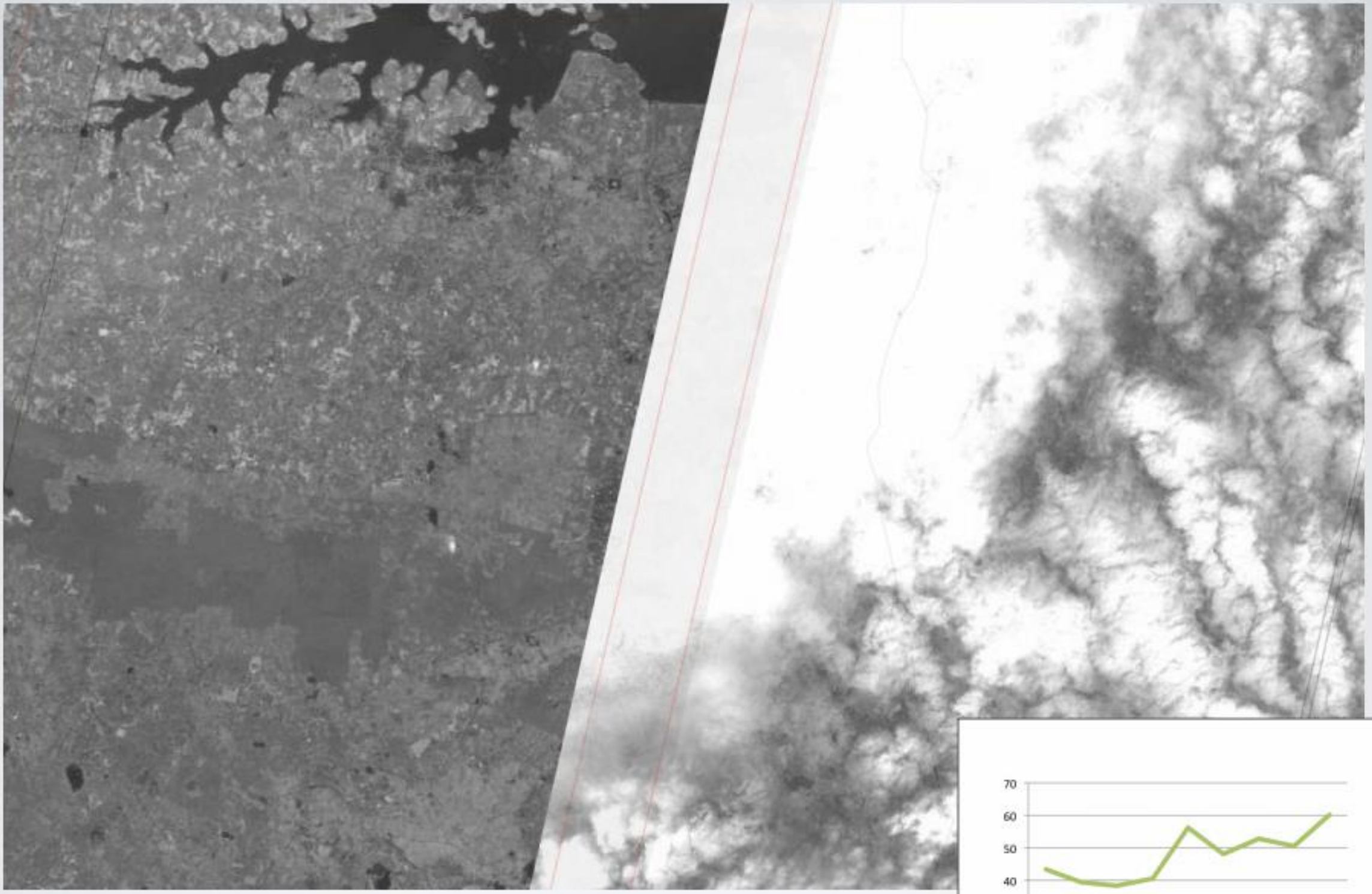
MISSION PLANNING TOOL FOR EARTH OBSERVATION SATELLITE

Wasanchai Vongsantivanich, OPTEMIS Program Leader
GISTDA SKP, Chonburi

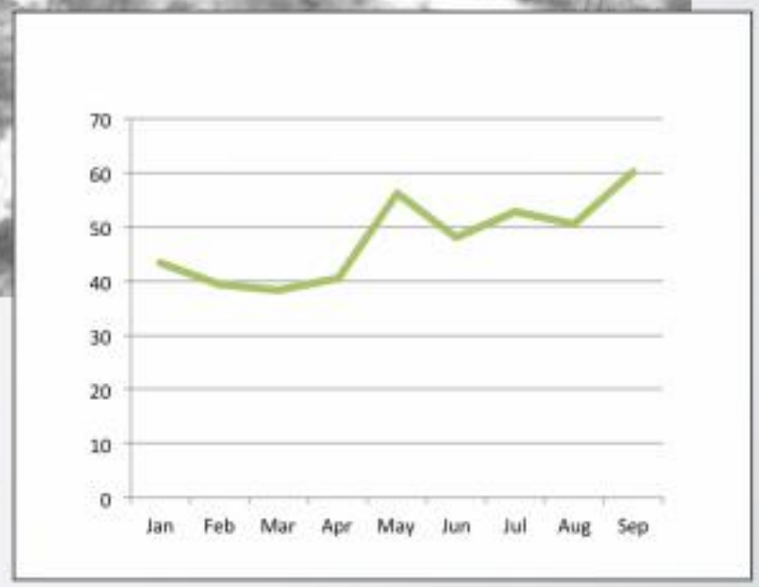
Objectives

To response to these comments…

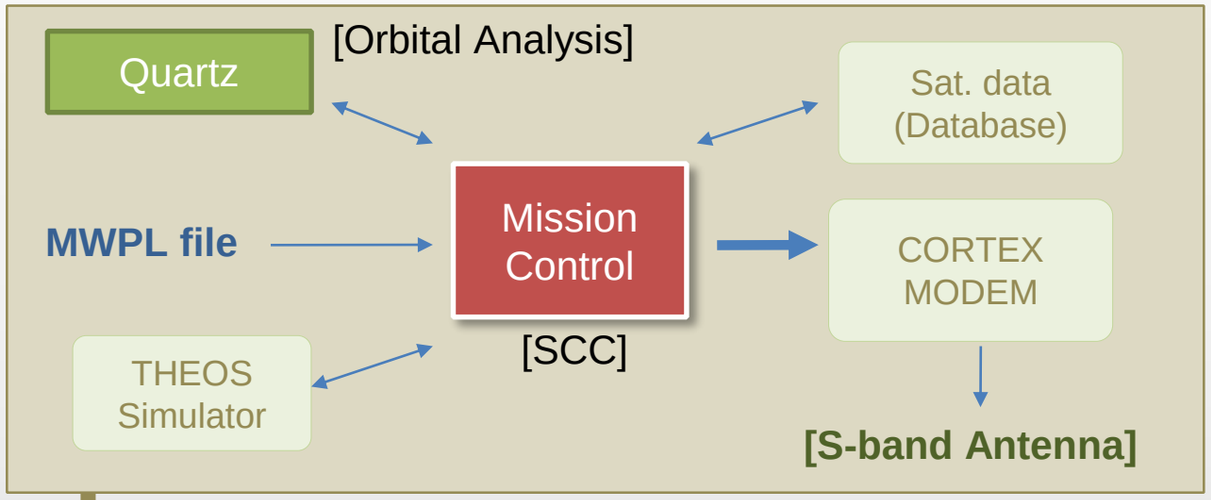
- Users don’t know about the resources that they could use.
- It takes long time from request, to getting the data. (5.5 days?)
- Different users/agencies have different needs/requirements.
- User don’t know the status of the current situation, services. (Who’s doing what.. When..)
- Collection of success cases for Sentinel Asia.
- Some data should be made available for future disaster management, post-analysis, …
- Etc..

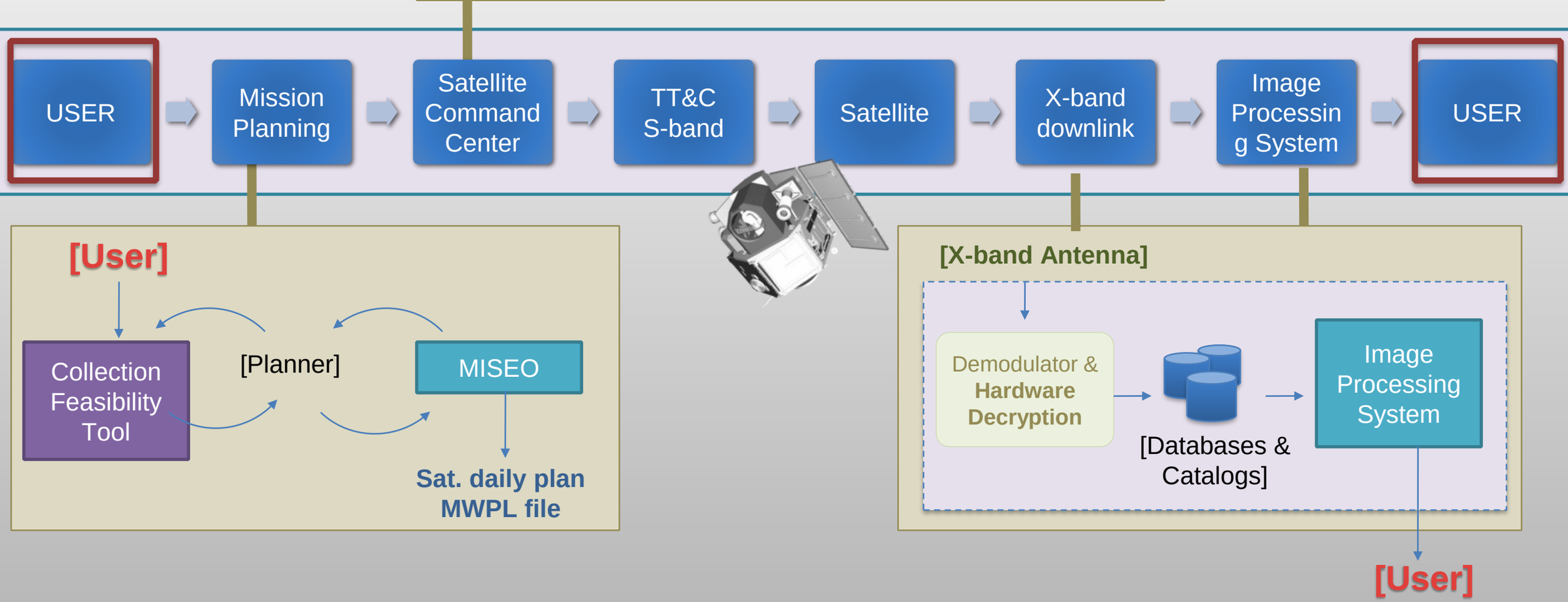


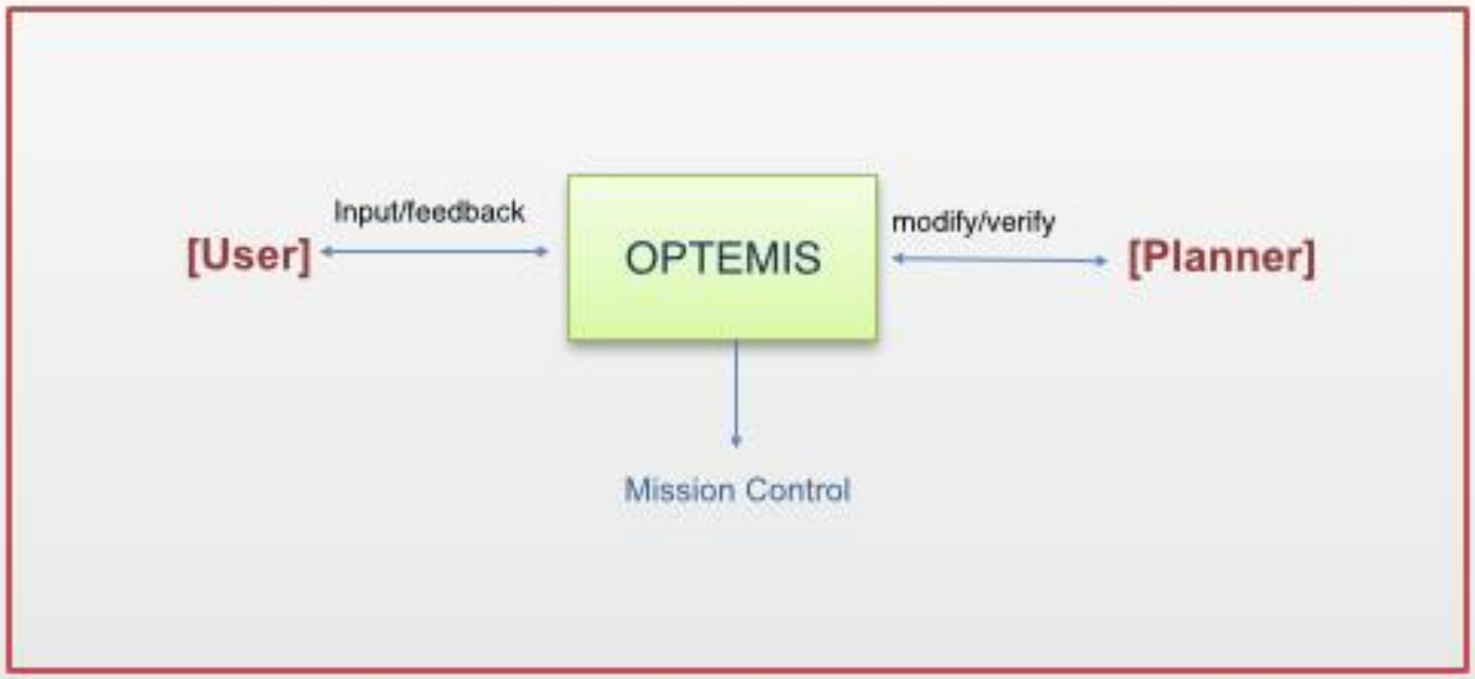
REJECTED!



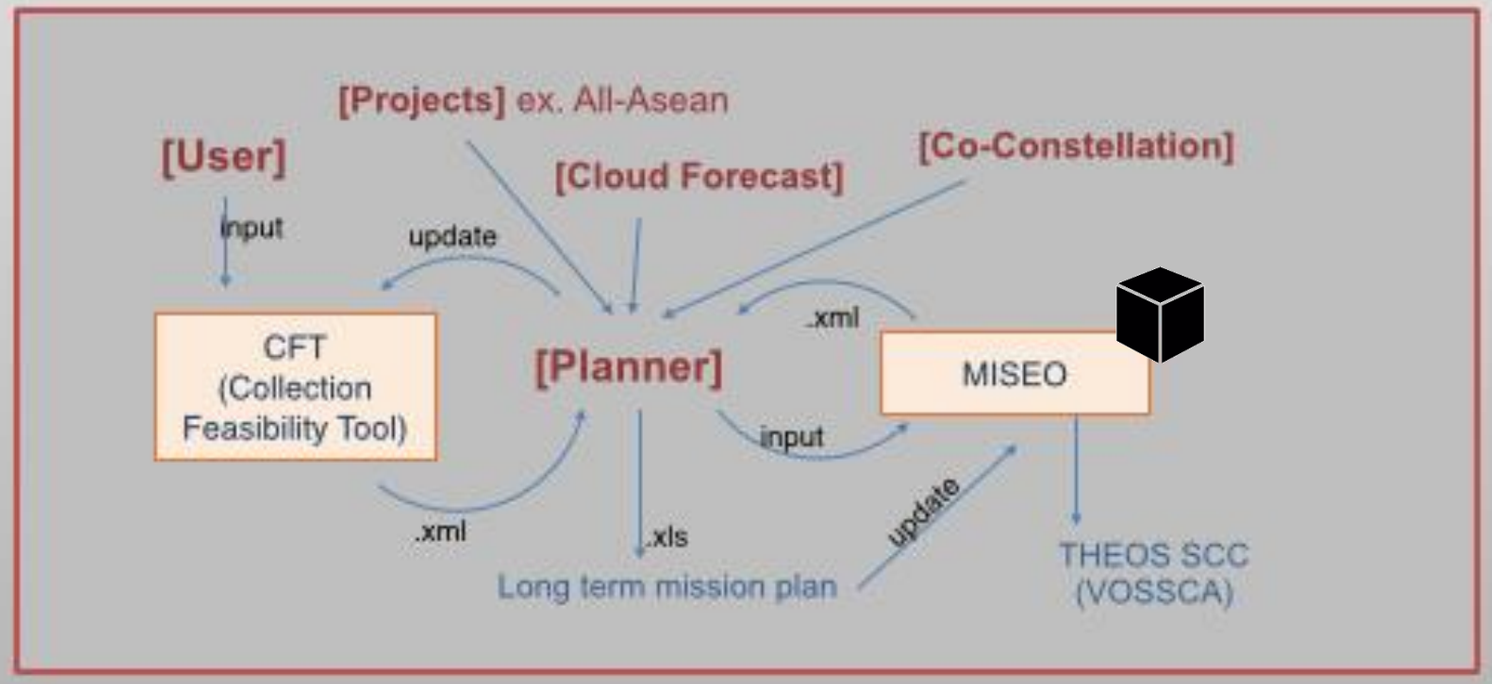
Earth-Observation Satellite Operation



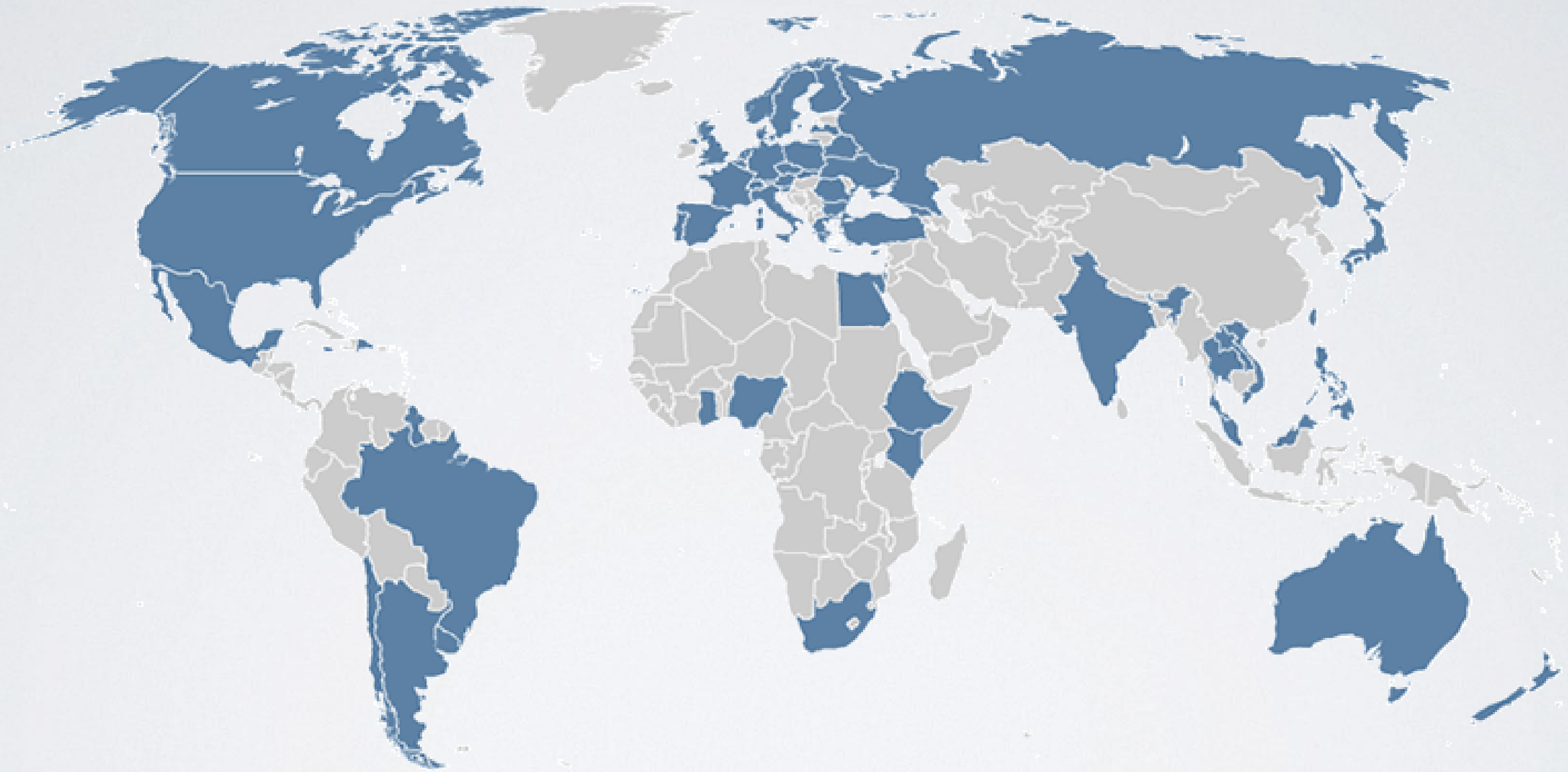




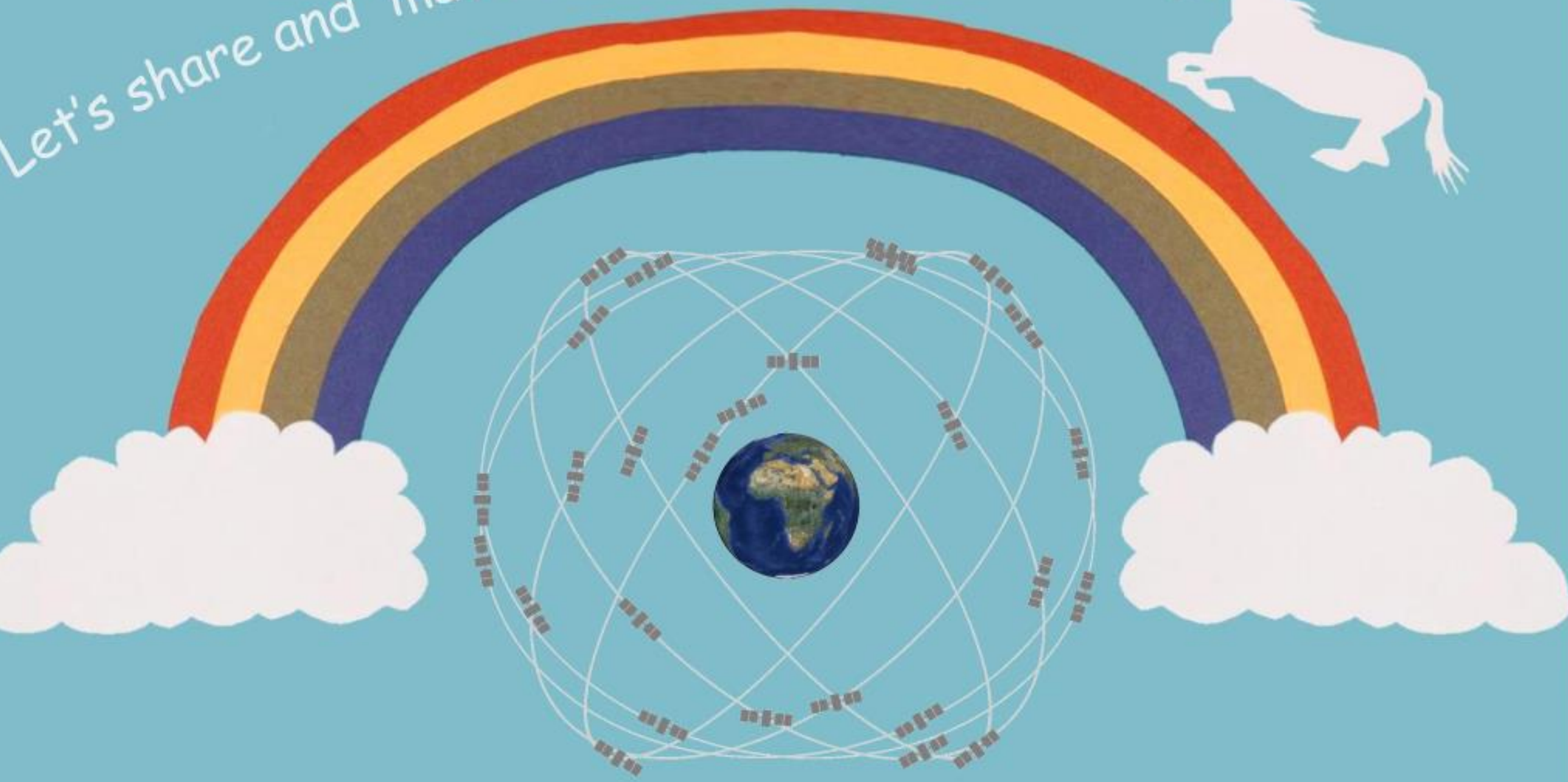
Uncluttering the Workflow



Emerging Countries in Space Technologies



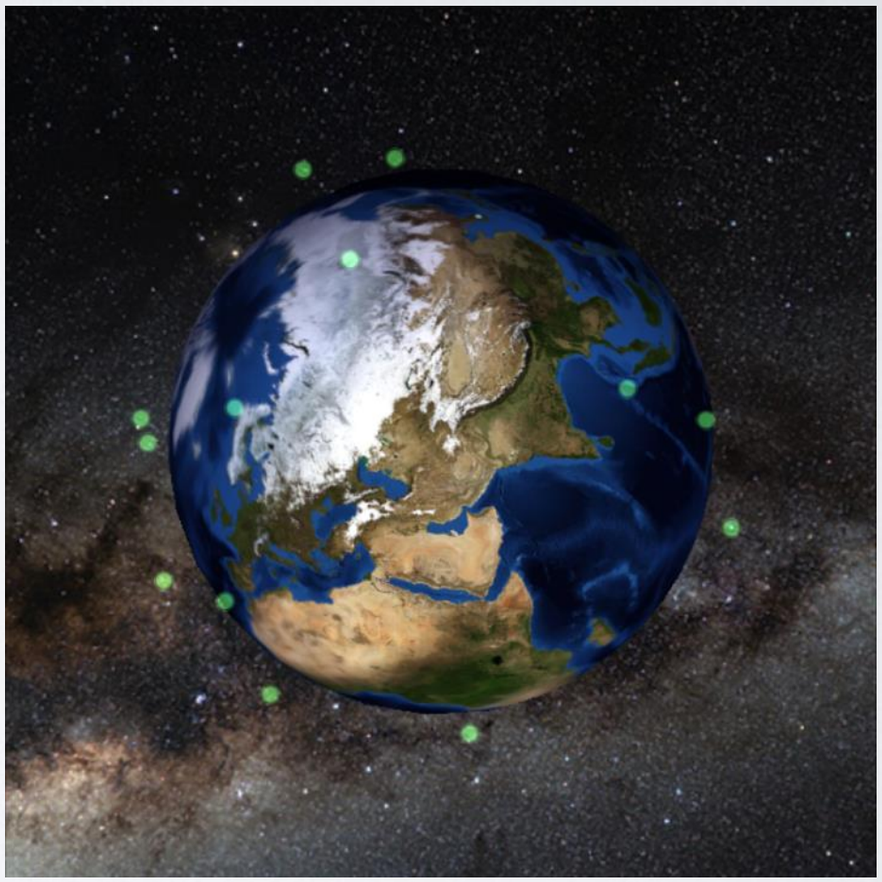
Let's share and make a CONSTELLATION !



IDEAL

Homogeneous
Coordinate

REALITY

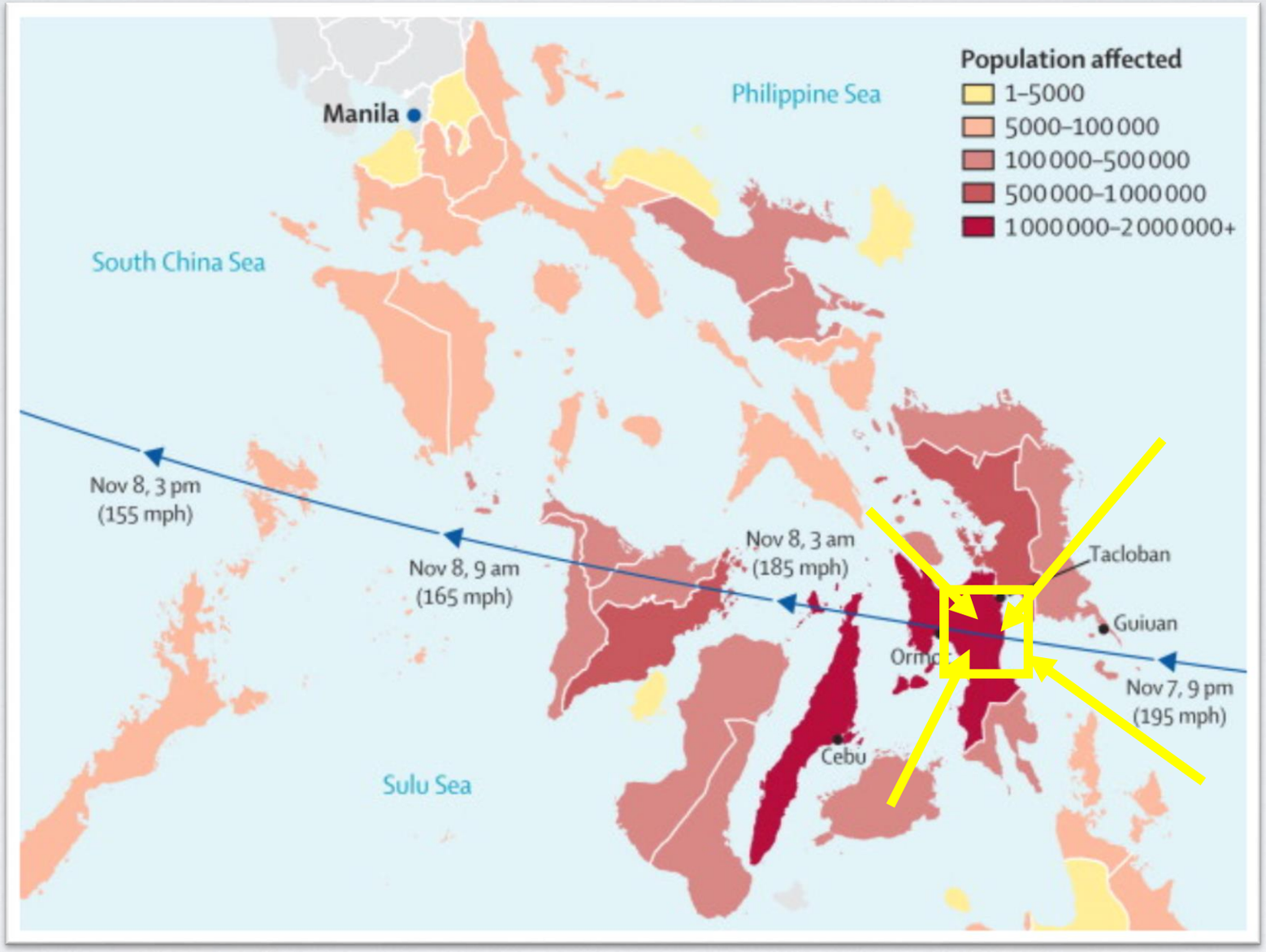


Non-homogeneous
Non-coordinate

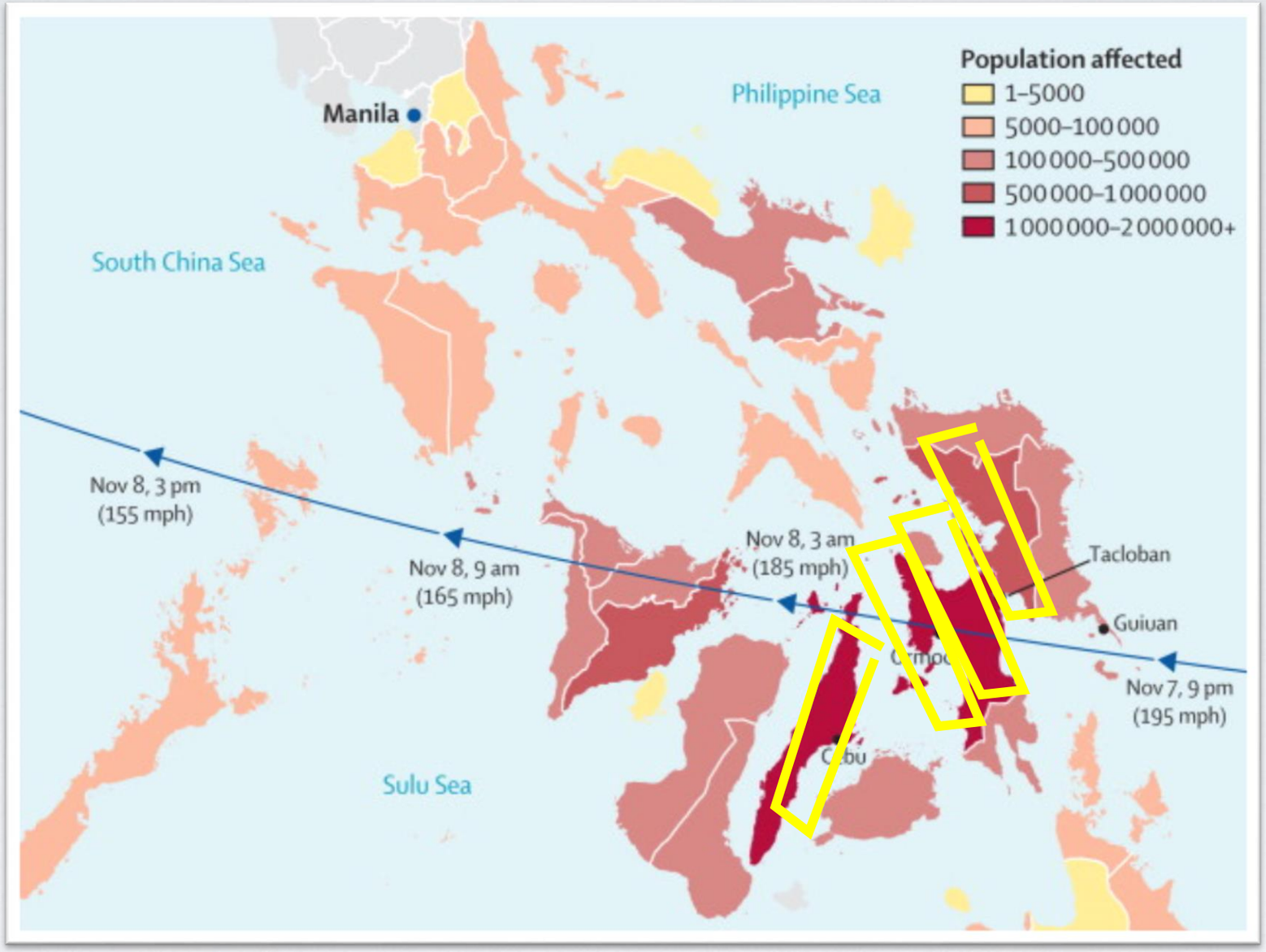
The usages of EOS satellites resources have to be **‘optimized‘** and **‘equally’** shared among the owners…

HOW?

Example: Post-Disaster Management



Example: Post-Disaster Assessment



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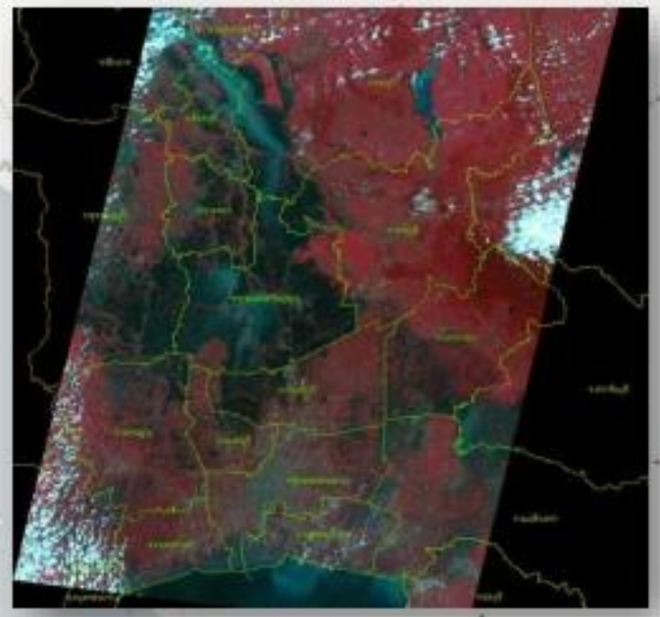
Satellite Acquisition Feasibility
เครื่องมือแสดงโอกาสการเข้าถึงของดาวเทียมสำรวจโลก

Daily Acquisition Plan
แผนการถ่ายภาพประจำวัน

Project Tracking
เครื่องมือติดตามการถ่ายภาพดาวเทียมไทยโซต



Sangkhla Buri
Sing Buri
Doem Bang Nang Buat
Lop Buri
Amphoe Sikhiu
Ban Sam Chuk
Chaiyo
Phra Phutthabat
Pak Chong
Chok Chai
Wiset Chai Chan
Ban Mo
Tha Rua
Kaeng Khoi
Saraburi
Khon Buri
Suphan Buri
Phak Hai
Nakhon Luang
Bang Ban
Phra Nakhon Si Ayutthaya
Bo Phloi
Bang Pa-in
Nakhon Nayok
Phanom Thuan
Prachin Buri
Kanchanaburi
Bang Len
Pathum Thani
Tha Muang
Ban Lam Luk Ka
Kabin Buri
Tha Maka
Bang Bua Thong
Ban Pong
Bang Yai
Bang Kruai
Sa Kaeo
Bangkok
Phanom Sarakham
Sam Phran
Photharam
Chachoengsao
Krathum Baen
Bang Khla
Chom Bung
Ban Khlong Bang Sao Thong
Ban Phaeo
Ban Bang Bo (1)
Samut Sakhon
Bang Pakong
Ratchaburi
Wang Nam Yen
Pharat Nikhom
Samut Songkhram
Khao Yoi
Phetchaburi
Bang Lamung
Tha Yang
Phattaya
Cha-am
Klaeng
20 km
10 mi
Leaflet

GISTDA | OPTEMIS

Satellite Acquisition Feasibility
เครื่องมือแสดงโอกาสการเข้าถึงของดาวเทียมสำรวจโลก

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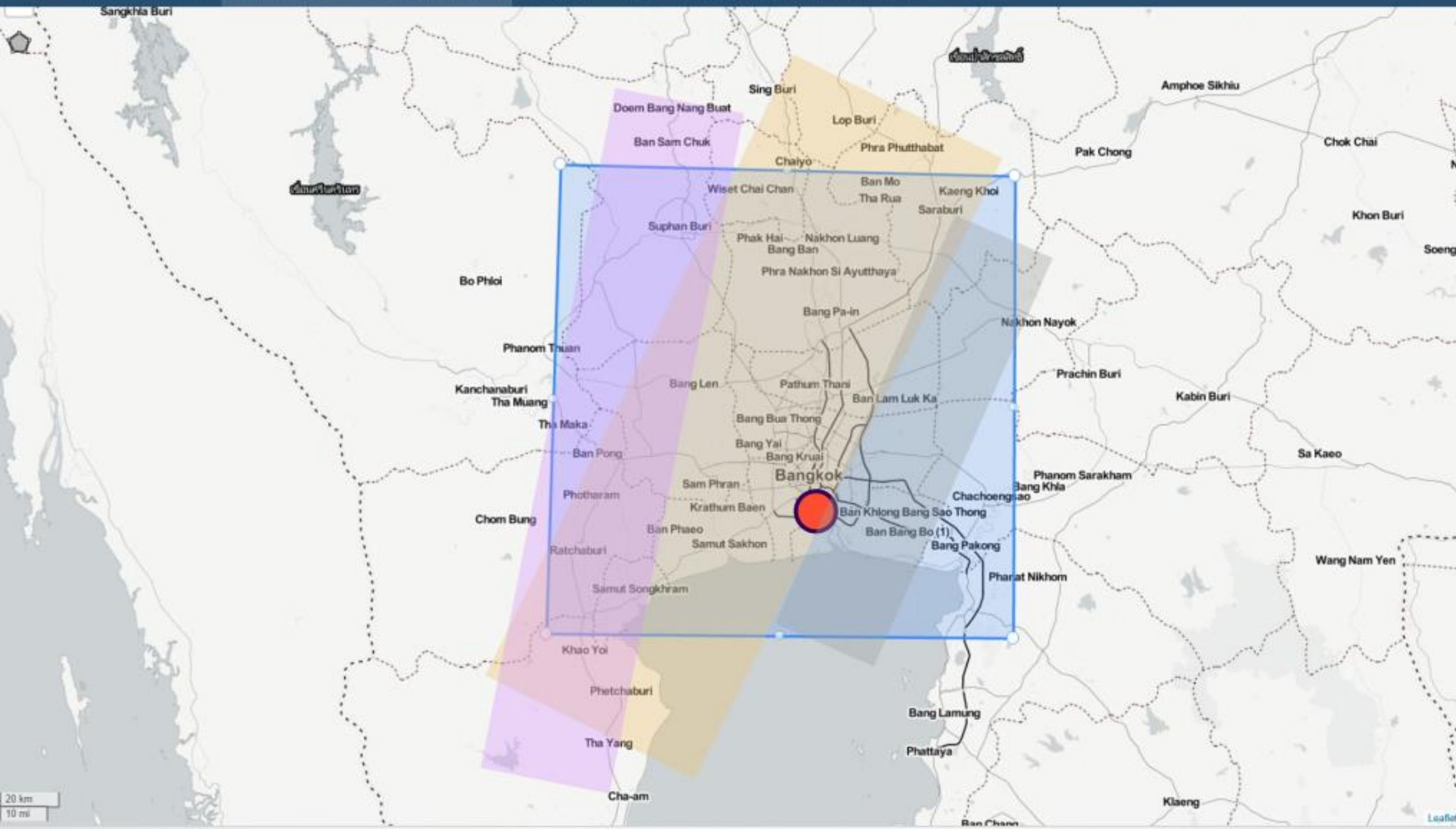
เครื่องมือติดตามการถ่ายภาพดาวเทียมไทยโชต



GISTDA | OPTEMIS

Satellite Acquisition Feasibility
เครื่องมือแสดงโอกาสการเข้าถึงของดาวเทียมสำรวจโลก

Daily Acquisition Plan
แผนการถ่ายภาพประจำวัน

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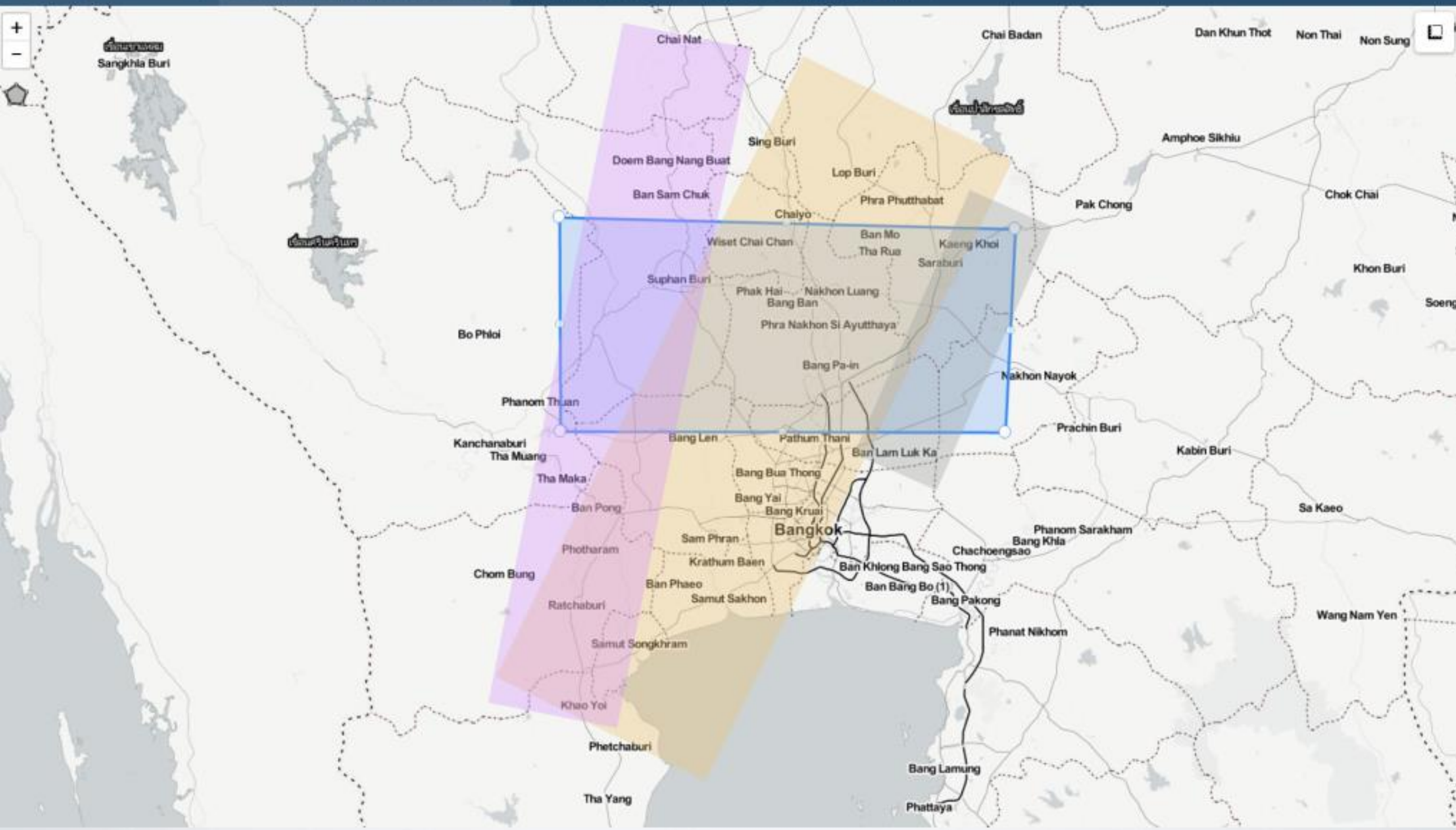
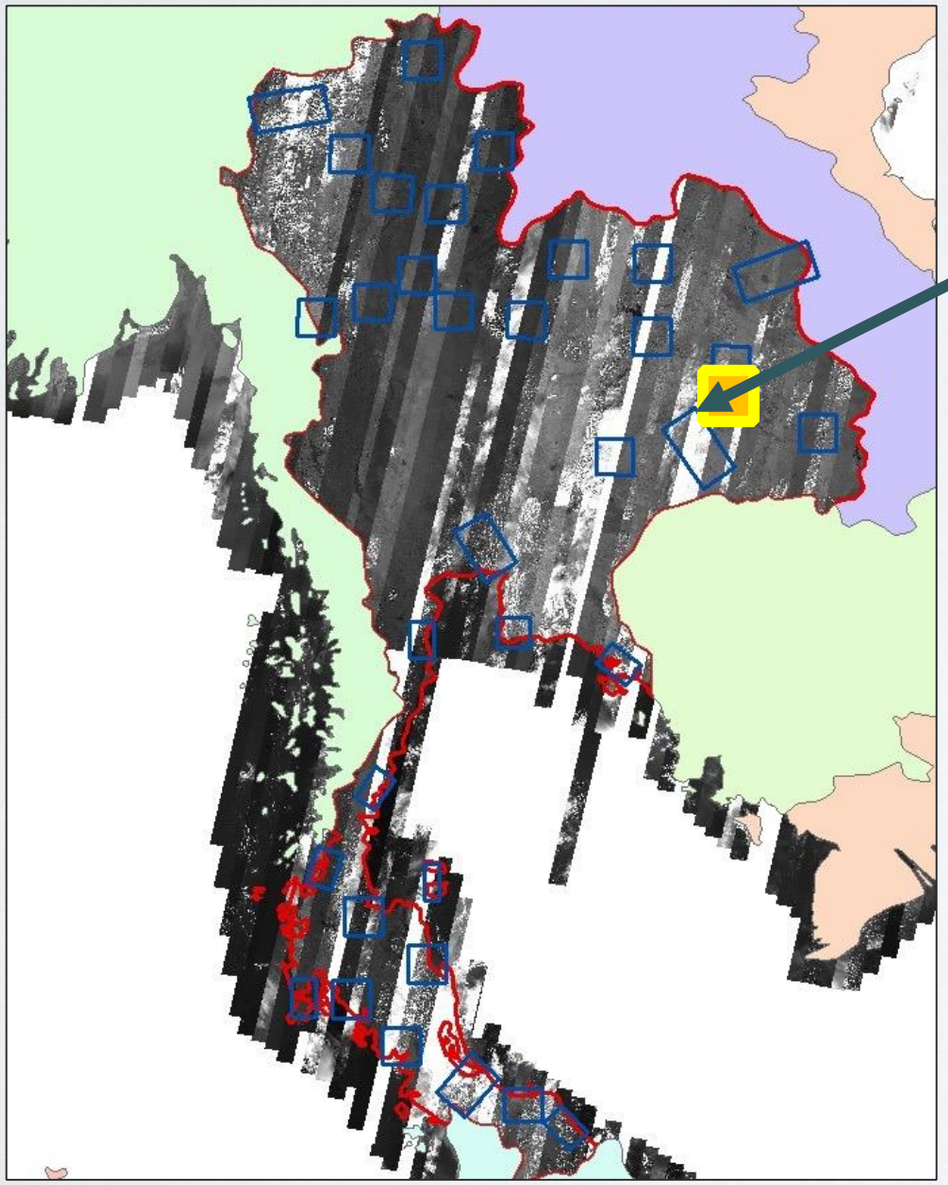
เครื่องมือติดตามการถ่ายภาพดาวเทียมไทยโชต

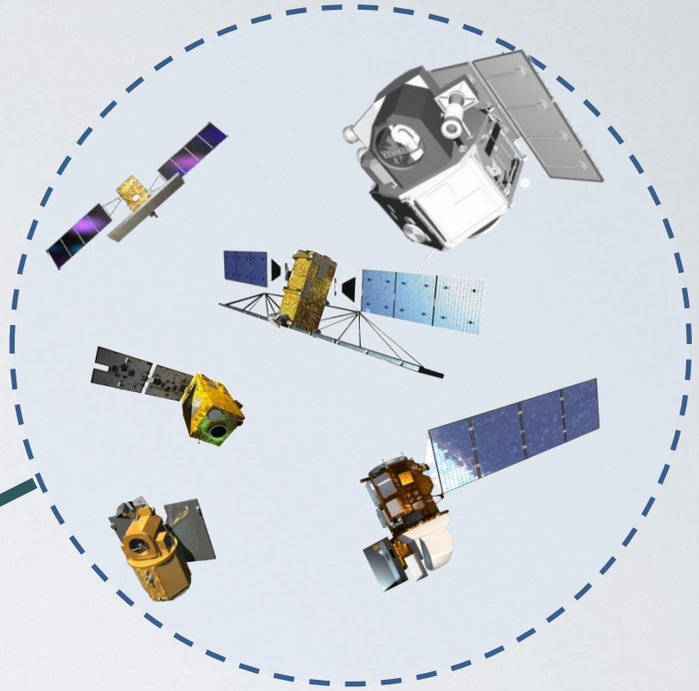


Examples…

<u>Requirements:</u>

2m Multispectral image every 15 days…

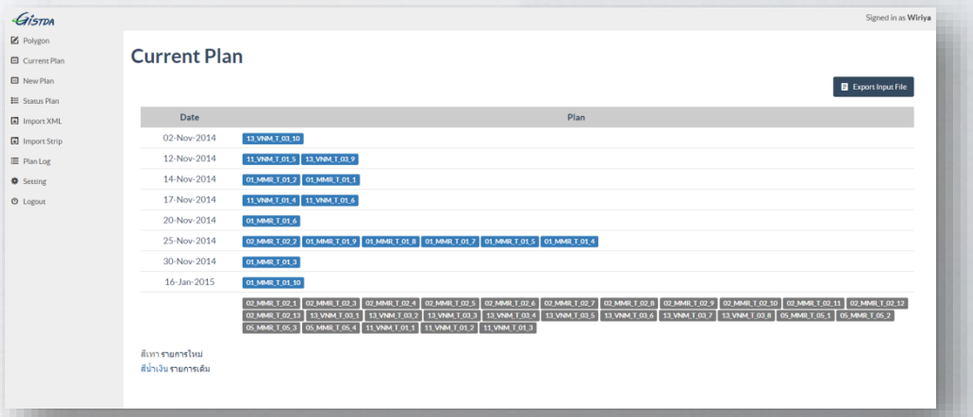




optemis

<u>Acquisition planning</u>

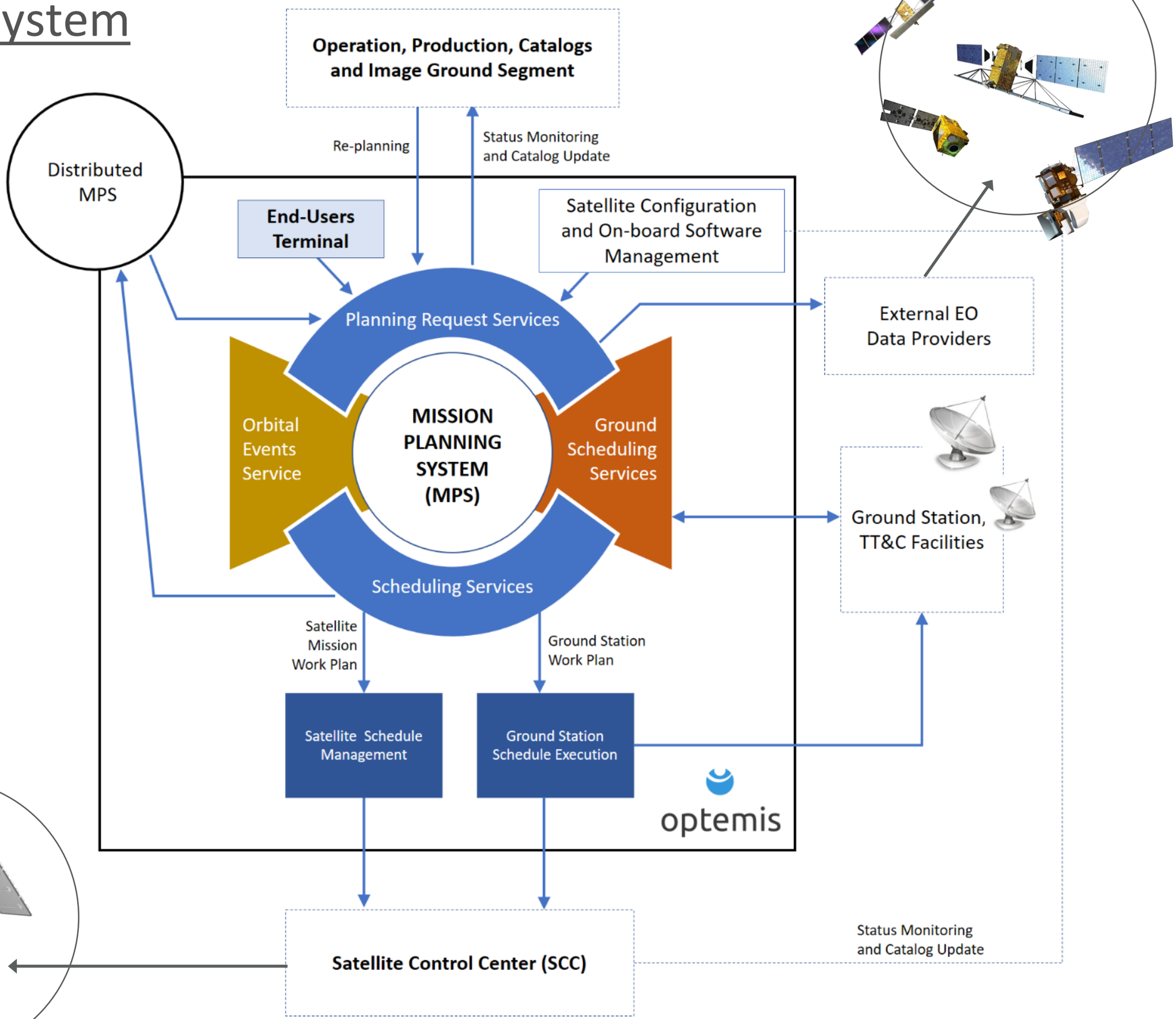
Satellite1 ……
Satellite2 ……

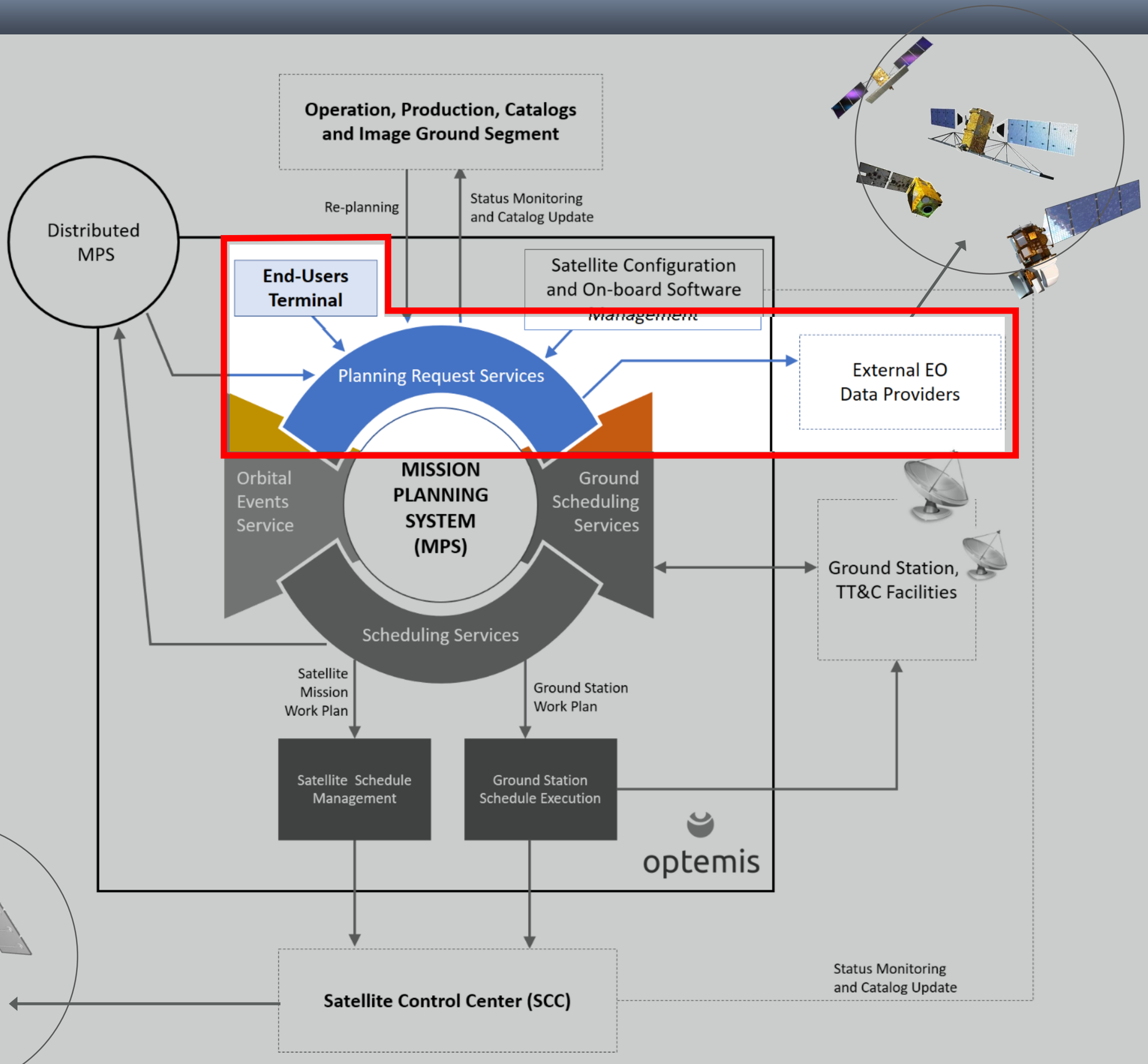


optemis

[**O**peration **P**lanning **T**ool for **E**arth-observation **MIS**sion]

OPTEMIS System




Operation, Production, Catalogs and Image Ground Segment
Re-planning
Status Monitoring and Catalog Update
Distributed MPS
End-Users Terminal
Satellite Configuration and On-board Software
Management
Planning Request Services
External EO Data Providers
Orbital Events Service
MISSION PLANNING SYSTEM (MPS)
Ground Scheduling Services
Scheduling Services
Ground Station, TT&C Facilities
Satellite Mission Work Plan
Ground Station Work Plan
Satellite Schedule Management
Ground Station Schedule Execution
optemis
Satellite Control Center (SCC)
Status Monitoring and Catalog Update

Concepts and Objectives of the tool

1. Integrated system for acquisition tasking, requesting. Optimize the use of space resources.

2. More automatic workflow, one-stop service for users. Users can track and follow-up the status of their work automatically.

3. Interoperable system, different users can request, access and provide the data.

4. Index for every available resources that can be used for each situation.

DATA PROVISION - ONLINE SERVICES FRAMEWORK

Sentinel Asia

REQUESTING

LOGIN

Coordination Information

GLIDE, Request Info.

Target Area

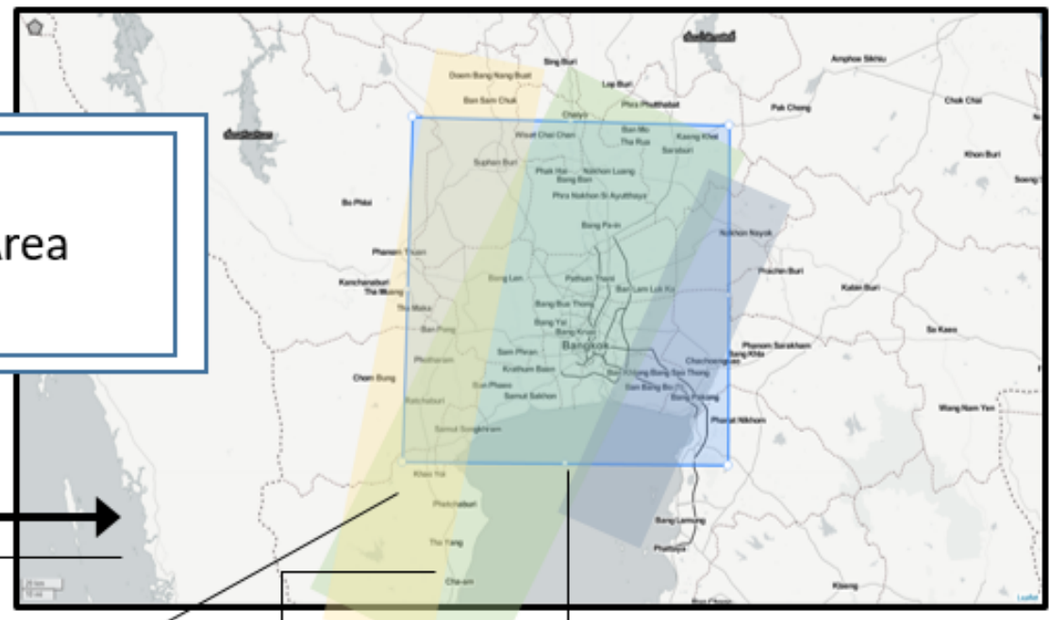
Validation

YES (ACTIVATE)

NO

SA Secretary

Tasks Distribution, Data Fetching System



Requestor

- Date, Time, Sensors for Upcoming Data
- Online Tools, Procedures, Help Info.
- Available Default Products
- Tutorials
- **All Disaster Support Information**

DPN

- Satellite Tasking
- Status Tracking
- DATA from Satellites

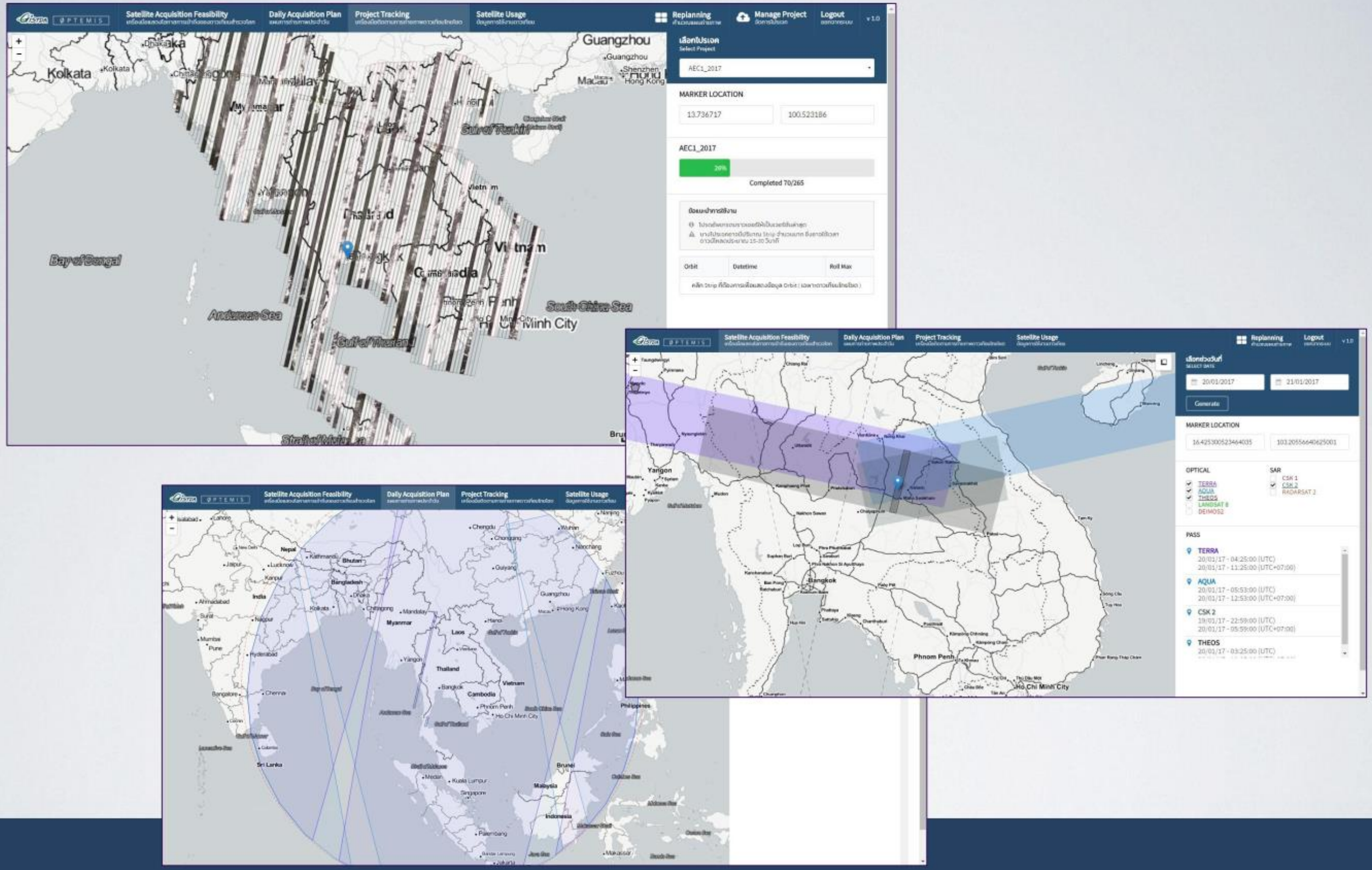
Other Data Sources

- USGS (Landsat)
- Copernicus
- MODIS, CEOS, etc.

SENTINEL ASIA CLOUD

- Activity logs
- Inventory, Toolboxes, Etc.
- Disaster Data Management and Archiving System

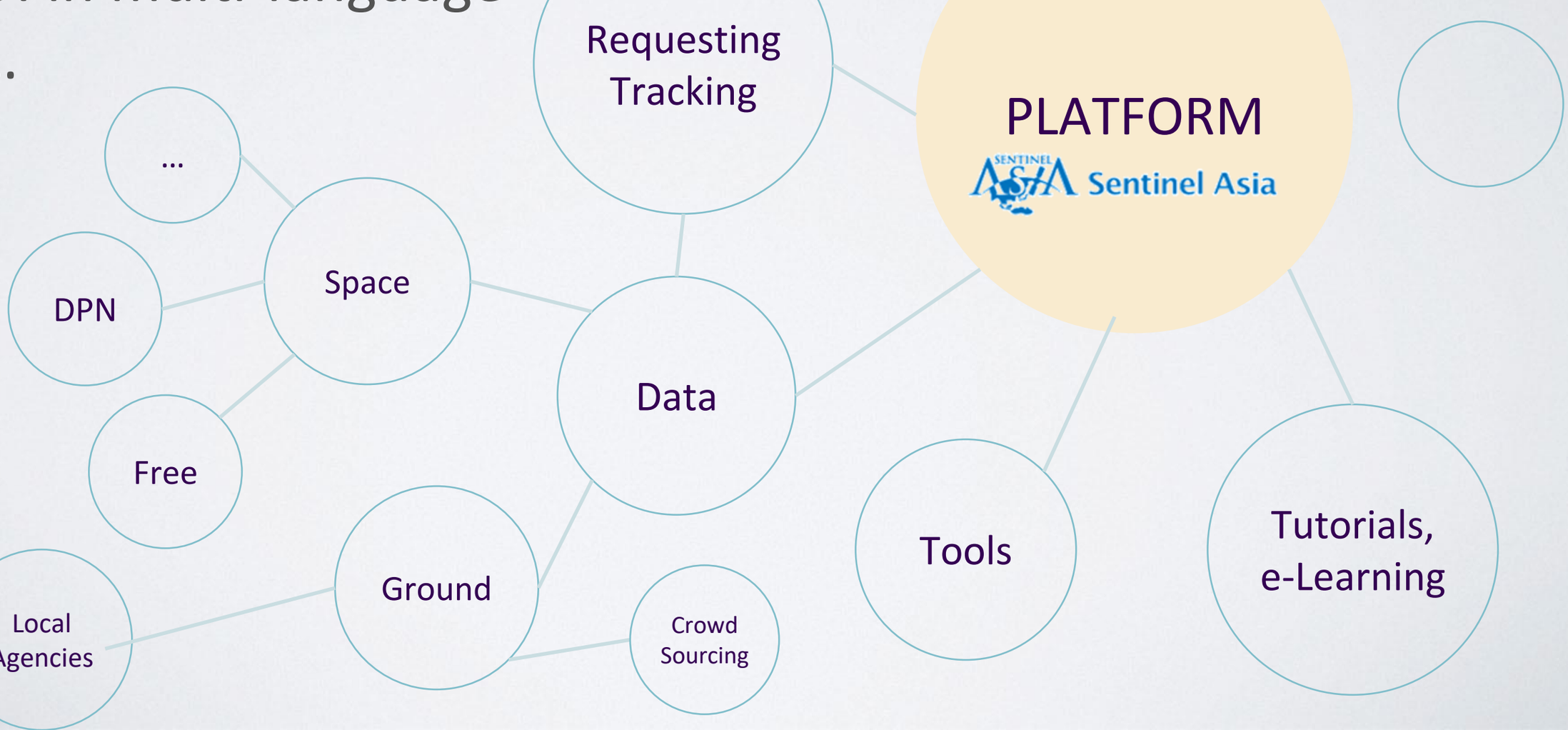
VAP nodes



Satellite Acquisition Feasibility
Daily Acquisition Plan
Project Tracking
Satellite Usage
Replanning
Manage Project
Logout
v 1.0
เลือกโปรเจค
Select Project
AEC1_2017
MARKER LOCATION
13.736717
100.523186
AEC1_2017
20%
Completed 70/265
Orbit
Datetime
Roll Max
Kolkata
Guangzhou
Bay of Bengal
Andaman Sea
South China Sea
Gulf of Thailand
Ho Chi Minh City
Yangon
Bangkok
Phnom Penh
Ho Chi Minh City
เลือกช่วงวันที่
SELECT DATE
20/01/2017
21/01/2017
Generate
MARKER LOCATION
16.425300523464035
103.20556640625001
OPTICAL
TERRA
AQUA
THEOS
LANDSAT 8
DEIMOS2
SAR
CSK 1
CSK 2
RADARSAT 2
PASS
TERRA
20/01/17 - 04:25:00 (UTC)
20/01/17 - 11:25:00 (UTC+07:00)
AQUA
20/01/17 - 05:53:00 (UTC)
20/01/17 - 12:53:00 (UTC+07:00)
CSK 2
19/01/17 - 22:59:00 (UTC)
20/01/17 - 05:59:00 (UTC+07:00)
THEOS
20/01/17 - 03:25:00 (UTC)
Nepal
Bhutan
Bangladesh
India
Myanmar
Laos
Thailand
Cambodia
Vietnam
Philippines
Brunei
Malaysia
Indonesia
Sri Lanka

Future Work and Perspectives

- Index system for all available satellites
- Tutorials (multi-language)
- Work status tracking, Project tracking
- Big data, Statistics
- UI in multi-language
- …



Conclusion and Perspectives

- In this presentation, the framework of the OPTEMIS platform is presented.
- With a correct tool, to **sharing, collaborating and harmonizing satellite resources** is easily achievable.
- EOS satellite mission is very expensive**, optimized mission planning** should be highly considered.
- OPTEMIS can be used to **manage and facilitate** multiple satellites acquisition planning. **Speed-up the workflow** and let the end-users **use the satellite resources efficiently.**
- Current workflow of the Sentinel Asia could be improved as a part of Sentinel Asia step 3.
- We would like to propose, contribute and collaborate with SA members to improve and develop Sentinel Asia mechanisms to foster and promote the cooperation in accordance with the plan of SA.

THANK YOU FOR LISTENING

optemis

GISTDA

Sentinel Asia

optemis@gistda.or.th