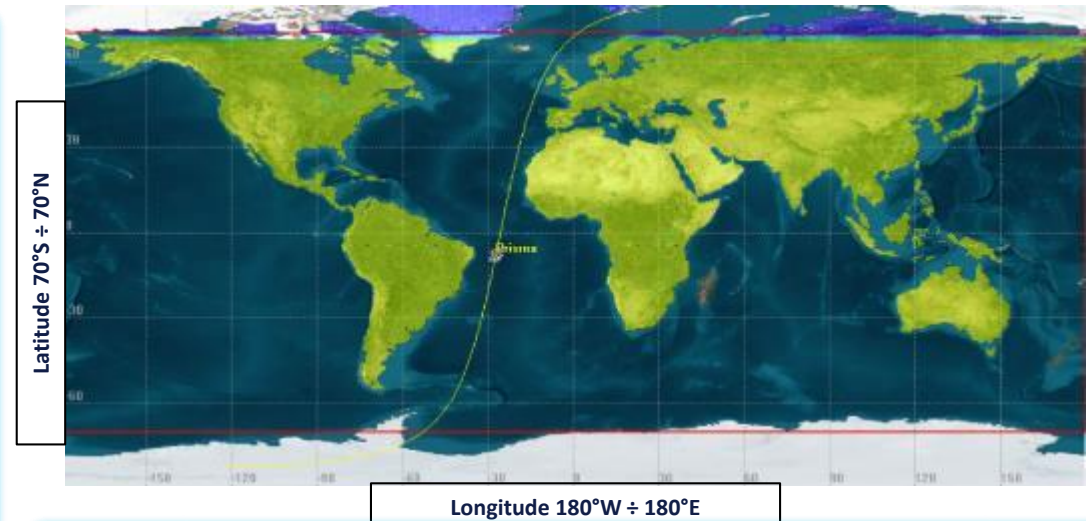


Mission Overview

PRISMA: PRecursores IperSpettrale della Missione Applicativa

- ❖ National EO hyperspectral Mission fully funded by ASI and realized by Italian Industries Consortium led by OHB Italia, Leonardo and Telespazio
- ❖ Pre-operational and technology demonstrator for
 - Space qualification of PAN/HYP payload
 - Development of PAN/HYP products up to Level 2D (BOA geocoded reflectance)
- ❖ Access to Users since May 2020 <https://prisma.asi.it/>
- ❖ Sensor operates in Pushbroom scanning mode recording the radiation reflected from the Earth surface (spectral cubes) in 400nm – 2505nm spectral window
 - 240 total bands in VNIR (#66, 400–1010 nm) & SWIR (#174, 920–2505 nm), partial spectral overlap
 - High spectral Resolution (better of 14 nm)
 - Medium spatial resolution (30m) and swath (30km)
 - PAN camera offers added capability with 5m resolution



❑ Primary mode – Manage user requests

- CALVAL sites (highest priority)
- Nominal requests from all registered users, subject to quota and a priority level (depends by the user type)
- Mission Manager can promote Nominal Requests already Accepted to Very Urgent, for insertion in next day plan

❑ Background mission – Optimize system resources usage

- Generated to fill-up resources still available after planning of users requests or for systematic acquisitions

Products and performances

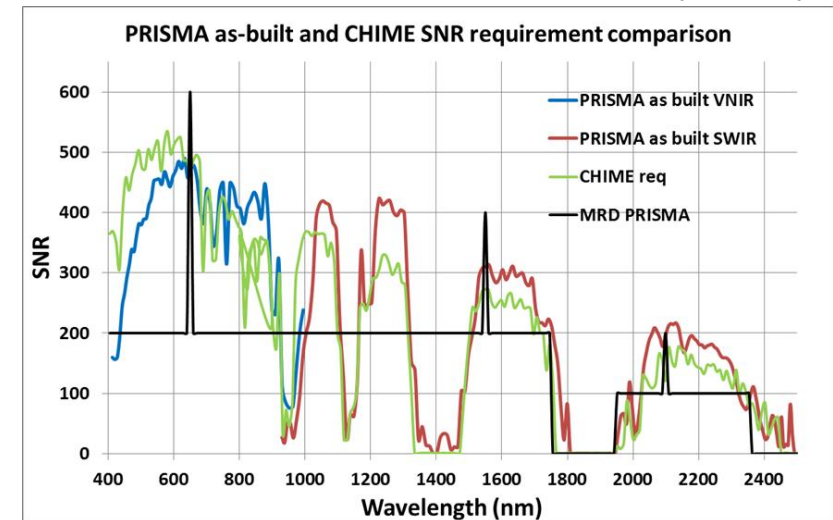
All Product are in **HD5-EOS** format and include HYP data cube and + PAN image + metadata

- ❖ **Level 1: Top-of-Atmosphere Radiance** radiometrically corrected and calibrated in physical units (incl. Cloud mask; Sun-glint Mask; Classification Mask; Calibration and characterization data)
- ❖ **Level 2B: Geolocated at Bottom-of-Atmosphere Radiance**
- ❖ **Level 2C: Geolocated at Bottom-of-Atmosphere Reflectance** (incl. Aerosol Characterization Product (VNIR); Water Vapour Map Product (HYP); Cloud Characterization)
- ❖ **Level 2D: Geocoded version of the level 2C products**

Absolute HYP **radiometric accuracy** better than **5%** (TOA or BOA)

MTF (@Nyquist) **0.3 for HYP** and 0.2 for PAN

Geometric localization errors (CE90) better than **200m** (15m with GCPs)



System can acquire **223 spot (30x30 Km) images/day** (200.000 Km²) and **process 200 images/day up to L2D**

Average response time (from user order to product ready) is **7.5 days** (measured)

Images can be acquired **worldwide** with illumination conditions **Solar Zenith Angle < 70 deg**

PRISMA Data Policy & Exploitation

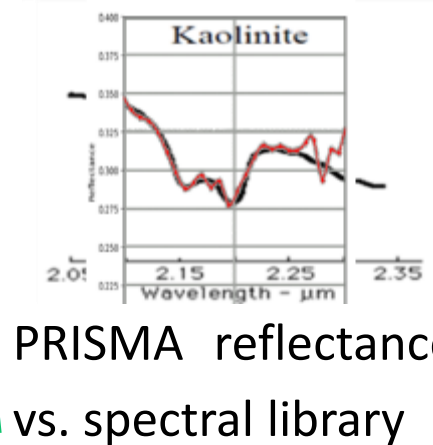
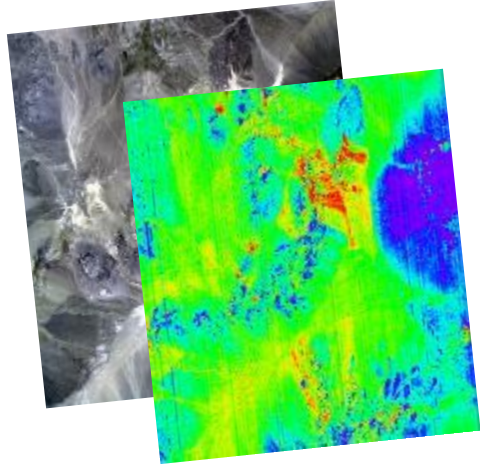
- ❖ A simple policy has been approved by ASI: Free of charge & quasi-Open data to all for the 2021 year duration (renewable)
- ❖ This will allow
 - ❑ to lower the PRISMA data access barriers (to new acquisitions and archived data too)
 - ❑ to expand the PRISMA user community
 - ❑ to simplify the data exploitation
 - ❑ to build customer loyalty to PRISMA data
 - ❑ to gather a feedback from users, unbiased by external factors like user nationality, data price, etc

- ❖ A «quasi-Open» policy
 - ❑ Full support to National security needs
 - ❑ User Registration and Licence explicit acceptance **is required**
 - ❑ Each User will be allowed to use only a portion of the system resources, through **Priority and Quota** mechanisms
 - ❑ Products use is allowed for scientific research, R&D of new applications, prototype services **but NOT for commercial purposes**
 - ❑ Products are **costless** for the users
 - ❑ Products **cannot be redistributed**

- ❖ Exploitation with Science and User Community deep involvement
 - ❑ PRISMA Advisory Group for data Exploitation supporting the definition/updating of the mission exploitation scenario
 - ❑ International Collaborations: CNES, DLR, ESA, NASA-JPL mainly on CALVAL domain
 - ❑ Training & Outreach (Workshops, Education events,...)
- ❖ System improvement project foreseen in 2022

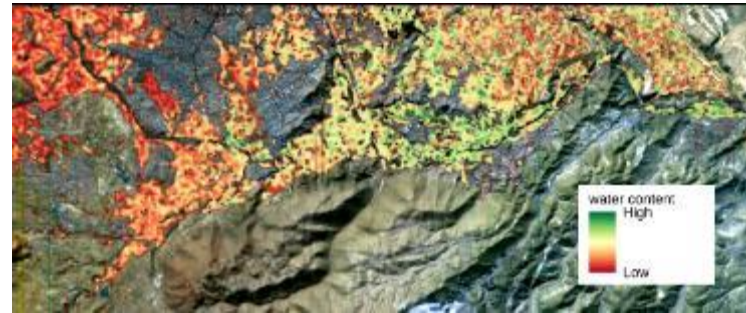
PRISMA data usage demonstration

Kaolinite map on Cuprite Hill (US)

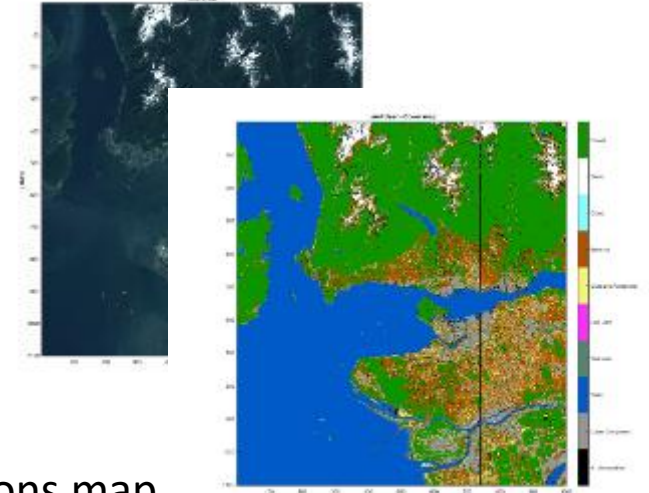


PRISMA reflectance vs. spectral library

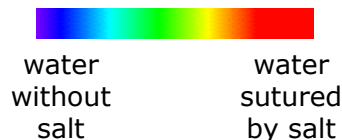
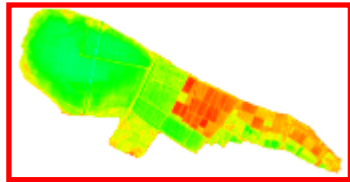
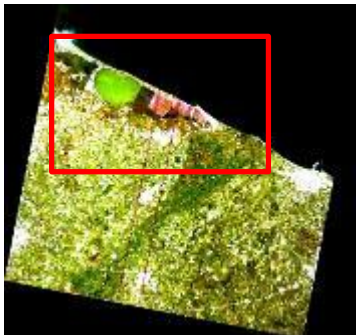
Vegetation Water content map



Land cover map



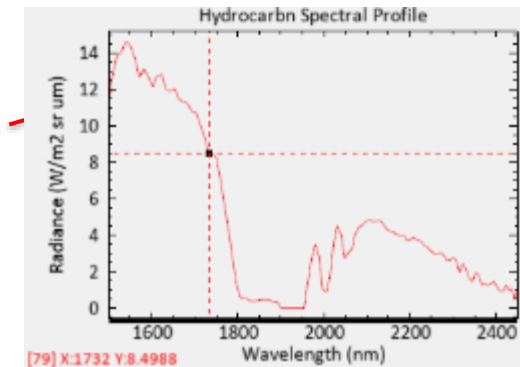
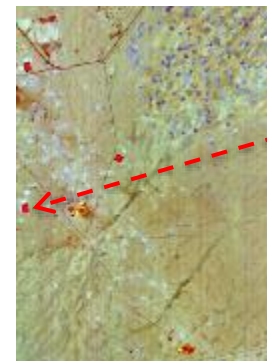
Water properties and salt features on Margherita di Savoia (IT)



Turbidity map on Lake Trasimeno (IT)



Hydrocarbons map



Processing
courtesy of



Mission statistics

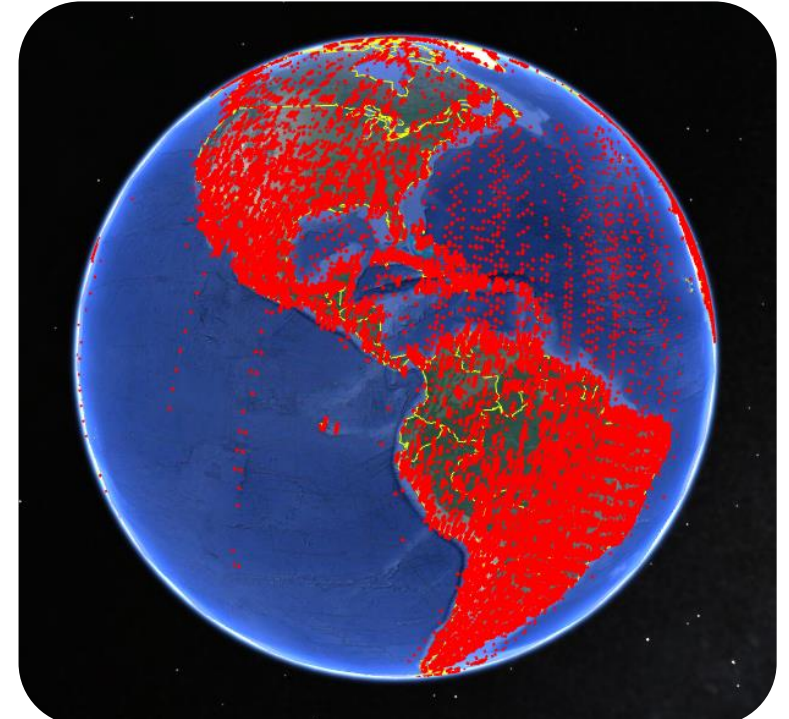
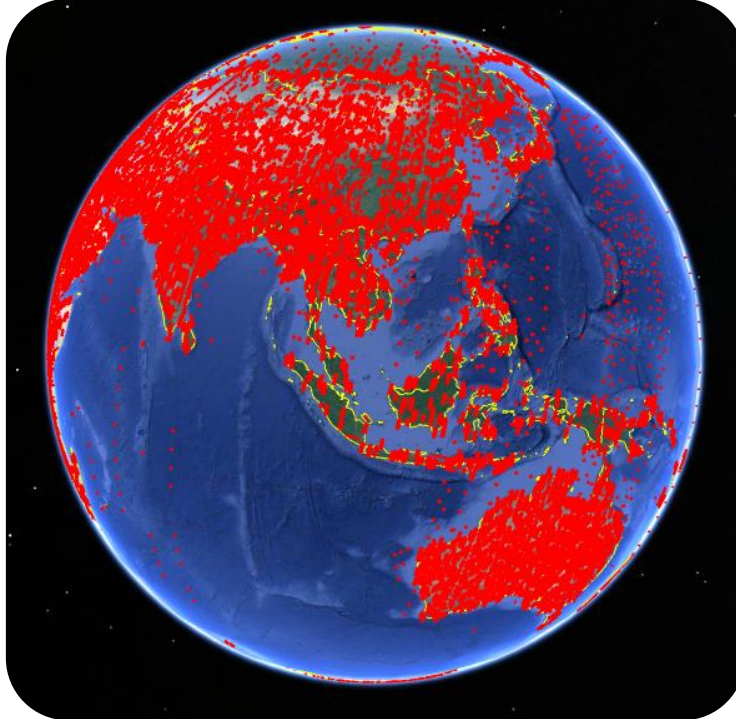
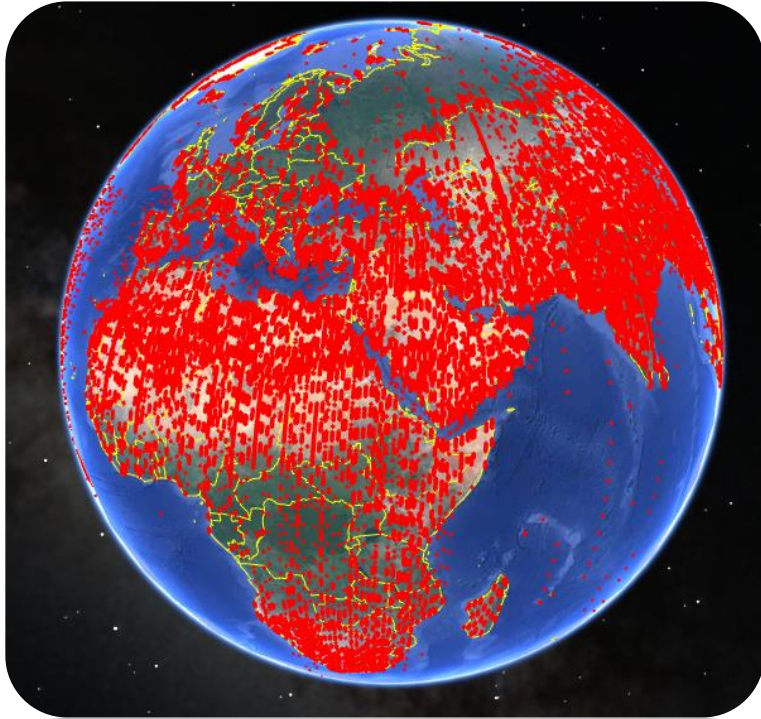
- 1 / 3 of the ~600 users comes from Italy
- 10 nations covers 70% of the users
- 10 thematic areas covers 1 / 3 of all applicative usages
- Half of the users are scientists
- Institutional + commercial is 20% of user community

Italy	31,6%
India	11,7%
Germany	7,4%
United States/USA	6,5%
China	3,0%
France	2,8%
Australia	2,4%
Canada	1,9%
United Kingdom	1,9%
Senegal	1,7%

Agriculture	6,9%
Geology	3,9%
Land Cover	3,9%
Land Use	3,4%
Forests	2,9%
Coastal areas	2,8%
Biodiversity management	2,5%
Biophysical Parameters	2,5%
CALVAL	2,5%
Mineral mapping	2,4%

Science	54,3%
Institutional	10,8%
Commercial	7,8%
Non-Profit org	3,5%
Spin-off /Start-up	3,2%
Other categories	20,3%

Mission statistics



70k images (including those from the background mission) all over the world @31.12.2020