

Overview of MAIA and PLATiNO-4 missions and the IRIDE hyperspectral framework

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Italian Space Agency

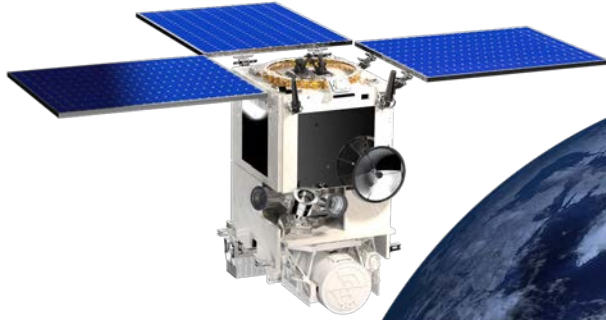
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ASI MAIA PLATiNO-2, PLATiNO-4 and IRIDE Hyperspectral

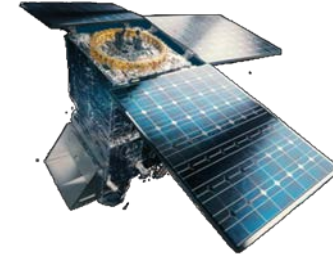
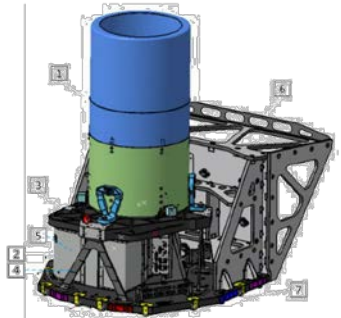
PLATiNO-2 MAIA

Launch planned
2026
Lifetime: 3 years



PLATiNO-4 Hyperspectral Payload

Developed by Leonardo
on ASI contract



IRIDE Hyperspectral constellation

Launch planned
2026
Lifetime: 3 years



PLATiNO-4 compact imaging spectrometer

PLATiNO-4 measures ground targets' spectral signatures in the **400–2500 nm wavelength range**. It is compatible with mini-satellites and **weighs less than 100 kg**, maintaining **performance comparable** with its larger predecessor **PRISMA**.

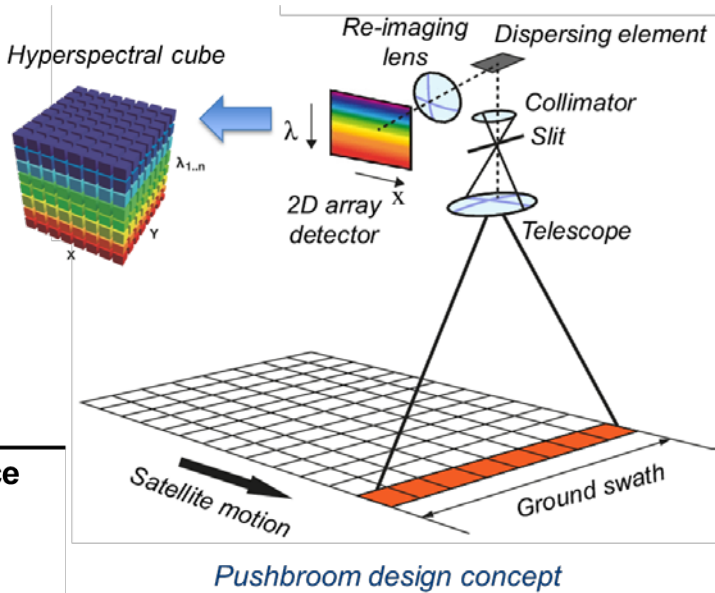
PLATiNO-4 exploits a **pushbroom design** and uses the mobility of the satellite to provide **along-track hyperspectral pictures** with **10 nm wide bands**.

Hyperspectral payload characteristics

Parameter	Specifications & Performance
SSO Orbit	Nominal Altitude of 515 km; LTDN 10:30
Optical Payload Operating Modes	Hyperspectral Optical (Pushbroom)
Acquisition Modes	Stripmap, Spotlight
Sampling Distance @ Nadir	~ 5m @ 519 km - PAN
	~ 20m @ 519 km – SPOTLIGHT
	~ 30m @ 519 km - STRIPMAP
Swath	Approximately 21 km @ 519 km
Spectral Range	Between 400 nm and 2500 nm

IRIDE Hyperspectral constellation

IRIDE programme is developing the first optical satellite constellation entirely developed in Italy, and Europe's **first hyperspectral constellation** based on a **pushbroom compact sensor design** and **4 satellites**.



Systematic or On demand (in high complementarity with PRISMA2, CHIME, SBG observations)

Systematic coverage of Italy every 27 days: Sw: 21 km, GSD~30m (STRIPMAP)

PLATiNO-4/IRIDE Standard Products

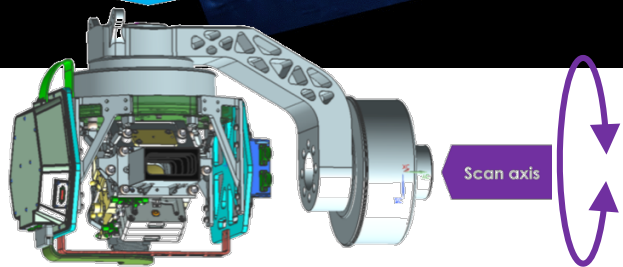
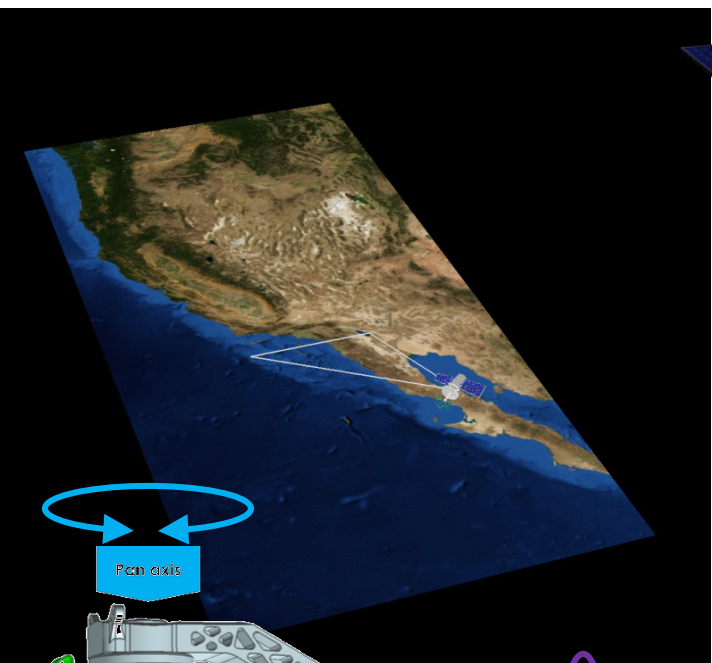
Level 0 processing discriminates image, housekeeping and calibration data;

Level 1 Top-of-Atmosphere Spectral Radiance;

Level 2 At-ground Radiances and Reflectances, which are geometrically corrected and geo-coded.

The MAIA mission is a joint partnership between NASA and ASI

MAIA instrument contains a pushbroom spectropolarimetric camera on a two-axis gimbal providing multiangle viewing, frequent target revisits, and inflight calibration.



MAIA instrument provided by NASA JPL



PLATiNO Platform
provided by ASI

MAIA will explore linkages between exposure to different types of PM and human health.

Daily-averaged total PM₁₀, total PM_{2.5}, and speciated PM_{2.5} will be mapped in selected areas on a 1-km grid

MAIA Standard Products

Data Product	Contents	Spatial Grid	Temporal Info
L1 Georectified Imagery	Map-projected radiance and polarization data	250 m	Time/days of target overpass
L2 Cloud Mask	Cloud confidence and quality indicators	1 km	Time/days of target overpass
L2 Aerosol Product	AOD, fractional AOD by size/shape/absorption, size distribution, refractive index	1 km	Time/days of target overpass
L2 PM Product	PM ₁₀ , PM _{2.5} , sulfate, nitrate, OC, EC, dust PM _{2.5}	1 km	24-hr averaged/ days of target overpass
L4 PM Product	Gap-filled PM ₁₀ , PM _{2.5} , sulfate, nitrate, OC, EC, dust PM _{2.5}	1 km	24-hr averaged/ daily
Ancillary Geographic Product	Land use information	125 m - 1 km	Static
Surface Monitor/Geostatistical Information Product	Surface monitor PM data and meteorological data at monitor sites	Point data	Days when surface monitor data are collected

MAIA and Hyperspectral data synergy

MAIA provides large-scale AOD and PM observations and tracking exploiting high revisit;

PLATiNO-4 and IRIDE hyperspectral data:

- Improves spatial resolution of synergy products;
- Enables retrieval of additional PM and aerosol species information offering detailed spectral signatures.



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Thank you for your attention

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