
CONAE

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La Agencia Espacial Argentina

SABIA-Mar Mission Status

IOCS Meeting 2025

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CONAE

SABIA-Mar mission

Main Objective

Ocean Color information over open oceans and coastal zones of South America, with 2 days of revisit in Argentinean coastal areas, to provide information and value-added products for:

- Primary productivity of the seas
- Carbon cycle
- Ocean and coastal ecosystems, maritime habitats and biodiversity
- Fishery management and Water quality

Scenarios

Global (800 m)

Regional
South America Coast
(200/400 m)

MAIN PRODUCTS

Water Leaving Radiance
Chl-a concentration
Kd(490)
PAR
Turbidity

THE SATELLITE

Sun-synchronous Polar orbit
702 Km height
99.8 min period
10:20am local time DN
2 days revisit
9 days repeat cycle
600 kg mass
5 years lifetime

Instruments

VISible-Near InfraRed
NIR-ShortWave InfraRed
15 bands from 412 to 1610 nm
High Sensitivity Camera
Pancromatic 400 to 700 nm
Data Colletion System
GNSS receiver

Ground Stations

Córdoba
Tolhuin

Educational & Public Outreach

Public Outreach program
Webinars
Teaching aids

SCIENCE TEAM

Research

Algortihms development
Calibration and Validation
Added value products
Data distribution for free

SABIA-Mar Cameras

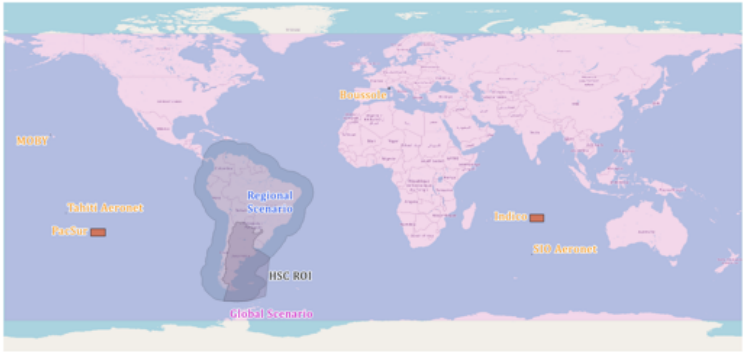
Ocean Color Cameras:

- **VIS-NIR**: optical and near infrared camera (412-865nm), 200m (regional) and 800m (global) spatial resolution at nadir, swath 1495km.
- **NIR-SWIR**: near infrared and short wave infrared camera (750-1640nm), 400m spatial resolution at nadir (only regional), swath 1495km.

Complementary Instruments:

- **HSC**: panchromatic High Sensitivity Camera for night lights detection.
- **DCS**: Data Collection System, is an UHF receiver on board, ARGOS compatible, to collect data coming from ground platforms.
- **AGR-T** (Austral GNSS Receiver Technological): technological payload compatible with the on-board computer. The aim of the project is to develop a high reliability Global Navigation Satellite System (GNSS) receiver for low earth orbit (LEO) satellite missions.

SABIA-Mar Mission Scenarios



- Regional: Coastal zone of South America coming to about 650 km offshore, in addition to Inland Waters in South America, with spatial resolution of 200m/400m. For regional studies and monitoring of Vitória-Trindade Ridge and Malvinas Islands regions 1000 km coverage is requested.
- Global: 800m of spatial resolution.
- Regions of interest for HSC adquisitions.
- Regions of interest for VIS-NIR and NIR-SWIR post-launch calibration with spatial resolution of 200m/400m

Products summary

SABIA-Mar will **operative produce the main mission products**:

- Ocean Color (VIS-NIR & NIR-SWIR): $[L_w]_N$, Chl-a, FHL, $K_d(490)$,Turbidity, PAR.
- Night boats detection (HSC)
- Products will be generated in netCDF4 format with CF and ISO metadata.
- Levels of processing that will be generated: L0, L1, L2 and L3.
- Latency: 3hs Near Real Time (NRT) for Chl-a and Nigth Boats Detection; 24hs (+reprocessing) for all L2 products.
- Free data policy (depending on data level).

Products levels summary

L1 Products:

- L1A: Raw and geolocation data.
- L1B: TOA radiance/reflectance.
- Calibrations methods planned: Lunar, solar, vicarious, cold sky, side-slither.
- Files: Granules of 5 minutes.
- Native spatial resolution: 800m Global, 200/400m Regional.

L2 Products:

- Normalized Water Leaving Radiance and Remote Sensing Reflectance, Chlorophyll-a concentration, FHL, Turbidity, Kd(490), PAR, night boat detection.
- Chl-a and HSC available in Near Real Time for Argentinian sea.
- Files: Granules of 5 minutes.
- Native spatial resolution.

L3 Products:

- All L2 variable will be aggregated.
- Binned and mapped format.
- Temporal:Daily, 8-days, monthly, seasonal.
- Spatial resolution Regional: 460m
- Spatial resolution Global: 2.32 and 4.6km.
- Each product in separated file.

Spectral bands and applications

ID	λ_{req}	Application	
		Main (L2 Products)	Potencial
B0	412	Lw, Chl-a, PAR	CDOM, NDBI
B1	443	Lw, Chl-a, PAR	
B2	490	Lw, Chl-a, PAR, Kd490	SDI
B3	510	Lw, Chl-a, PAR	
B4	555	Lw, Chl-a, PAR, Kd490	Cyanobacteria, NDWI
B5	620	Lw, Chl-a, PAR	Cyanobacteria
B6	665	Lw, Chl-a, PAR, Turbidity, FHL	Cyanobacteria, NDVI, SDI
B7	680	Lw, FHL	OTCI
B8	710	Lw, FHL	Cyano, OTCI
B9	750	Atmospheric Correction	OTCI
B10	765	AC, Clouds detection	OTCI, SDI, NBR
B11	865	CA, Lw, Turbidity	NDVI, NBR, NDSI, NDWI
B12	1044	CA, Turbidity	NDBI, NDSI
B13	1240	CA, Turbidity	NDBI, NDSI
B14	1610	CA, Turbidity	NDBI, NDSI
BHSC	Pan	Night boats detection	Demographic and power grid

CA=Correcciones Atmosféricas, Lw= Water Leaving Radiance, FLH= Fluorescense Line Hight, PAR= Photosinthetically Available Radiation, KD490= Difusse Atenuation Coefficient, Chl-a= Chloropyhll-a, CDOM= Color Disolved Organic Matter, CI= Cyanobactrial Index, NDVI=Normalized Difference Vegetation Index NDWI=Normalized Difference Water Index, NDBI=Normalized Bare Ice index, OCTI=Terrestrial Chlorophyll Index, SDI=Soil Discrimination Index, NDSI= Normalized Difference Snow Index, NBR=Normalized Burn Ratio.

Value-added Applications

SABIA-Mar products will be a valuable source of information to be used on:

- Blue economy: Fisheries, aquaculture, marine biotechnology.
- Primary productivity.
- Algae blooms monitoring.
- Decision making.
- Ocean circulation and dynamic research.
- Climate and global trending.
- Land use monitoring.

Based on OLI (L8) image.

Value-added Applications

... And also related with human health and emergencies:

- Toxic algae blooms.
- Sediments plums.
- Water quality indicators in coastal zones.
- Support for emergencies and decision (e.g. shellfish recollection or fishing ban).
- In-land waters quality monitoring.

Based on MODIS images.

Value-added Applications

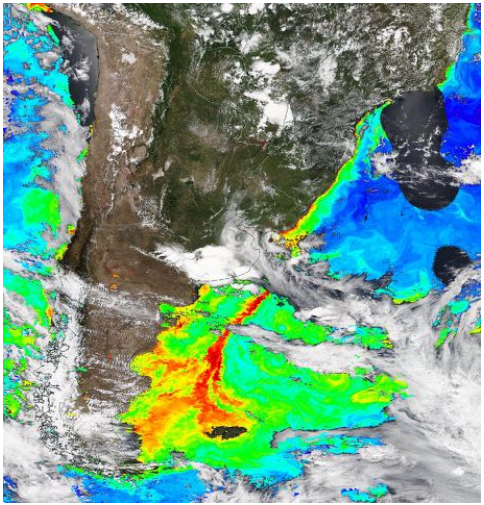
Night lights detection over the sea surface, related to fishing boats:

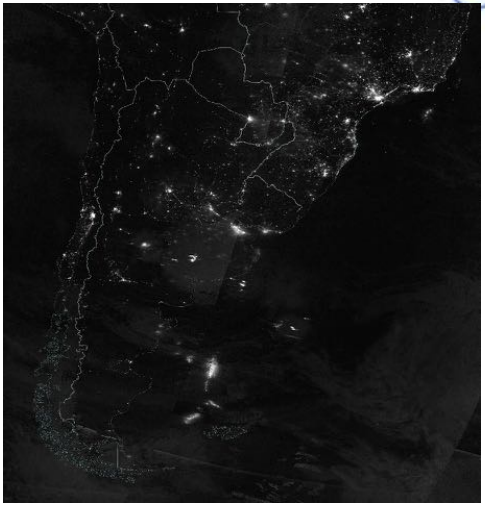
- Sea surveillance and navigation support.
- Research on the exploitation of fishing resources.

Night light monitoring over land can be related with demographic monitoring and studies related with power grid in big cities.

Based on VIIRS image.

Chl-a and fishery are related...





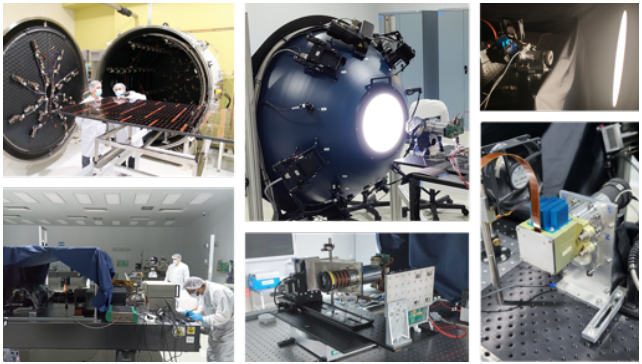
Based on NOAA-20/VIIRS, 23 February 2025.

SABIA-Mar Community

Up: SABIA-Mar Users Workshop, October 2022.
Down: IOCCG-28 Committe Meeting, April 2024.

Up: SABIA-Mar / Amazonia 1-B (Brazil) Joint Mission, Nov 2025. Down: Eumetsat HyperCP / ThoMAS Course, Dec 2024.

SABIA-Mar Pre-Launch activities



Pre-Launch Characterization campaign on-going, most of tests done: Dark current, linearity, Absolute gain, Inte-pixel response, SNR, Saturation Level, MTF, Stray Light, Spectral response, Polarization sensitivity, stability, pixel lines-of-sight. FFOV, IFOV.

First (Dec, 2024) and second (Nov, 2025) Workshop on SABIA-Mar Pre-Launch Characterization

¡Muchas gracias!

Back Up

Spectral Bands Required

Camera	Swath	Band	λ_0 [nm]	FWHM [nm]	GSD Regional [m]	GSD Global [m]	L_{typ} [W m^{-2} µm^{-1} sr^{-1}]**	L_{max} [W m^{-2} µm^{-1} sr^{-1}]**	S/N*
VIS/NIR	1496km	B0	412	10	200	800	79	602	1000
		B1	443	10	200	800	68	664	1000
		B2	490	10	200	800	52	686	1000
		B3	510	10	200	800	45	663	1000
		B4	555	10	200	800	34	643	1000
		B5	620	10	200	800	21	570	1000
		B6	665	10	200	800	16	536	1000
		B7	680	7.5	200	800	15	517	1500
		B8	710	10	200	800	12	489	1000
		B9†	750	10	200	800	10	447	600
		B11†	865	20	200	800	5.9	333	400
NIR/SWIR	1495km	B9†	750	10	400	-	10	447	600
		B10	765	10	400	-	7.8	430	600
		B11†	865	20	400	-	5.9	333	400
		B12	1044	20	400	-	3.7	236	400
		B13	1240	20	400	-	0.88	158	250
		B14	1610	60	400	-	0.29	82	250
HSC	700km	BHSC	400-700	300	400	-	[nW/^{2}/sr]** 20	1800	10

† Bands 9 and 11 are repeated in both cameras.
* @L_{Typ} at GSD:1000 m.

¡Muchas Gracias!

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