GEOSAT

GEOSAT 2

products & services

GEOSAT 2 AT A GLANCE

GEOSAT 2 is a very-high resolution (up to 40cm resolution) multispectral optical satellite, fully owned and operated by GEOSAT. The GEOSAT 2 end-to-end system has been designed to provide a cost-effective yet highly responsive service to customers worldwide.

01

GEOSAT 2 SPACECRAFT

The spacecraft design is based on an agile platform for fast and precise off-nadir imaging (up to <45°), and it carries a push-broom very-high resolution camera with 5 spectral channels (1 panchromatic + 4 multispectral).

GEOSAT manages all uplink and downlink activities, as well as satellite control. GEOSAT 2 makes use of several ground stations located around the world to maximize redundancy and availability, and to guarantee at least one contact with the satellite at each orbit.

GEOSAT 2 payload includes 5-bands cameras, acquiring panchromatic and multispectral data simultaneously in visible and near infrared spectral range (RED, GREEN, BLUE, and NIR).

Band	Name	Spectral range (nm)	GSD (m)	Standard Ortho (m)	Enhanced Ortho (m)
1	NIR	770 – 892	4.0	3.0	1.6
2	Red	640 – 697	4.0	3.0	1.6
3	Green	532 – 599	4.0	3.0	1.6
4	Blue	466 – 525	4.0	3.0	1.6
5	Panchromatic	560 – 900	1.0	0.75	0.40

GEOSAT 2 standard pan-sharpened ortho product features a **0.75m** resolution, but up to **0.40m** resolution could be provided with the support of AI techniques in GEOSAT 2 super-resolution ortho product. The Ground Sampling Distance (GSD) is 1.0m for the Panchromatic channel and 4.0m for the Multispectral channels, considering Nadir observation conditions.

GEOSAT 2 capacity guarantees up to 200,000 Km2 per day, with strips of **12km** wide and up to **1,400km** long. Four different operations modes are available, i.e. single strip, multipointing, stereo collection for 3D modelling and tessellation (**24km** wide strip).

GEOSAT 2 IMAGERY

GEOSAT 2 images are available as either individual ortho-ready scenes or ortho scenes, optionally cropped and/or masked to the area of interest. These Ortho-ready and Ortho scenes can be also obtained from the GEOSAT API.

02

PS4_L1C SAMPLE

PS3_L1C SAMPLE

Different product types are available depending the user application and purpose.

All products are generated at 10 bits and can be provided with 8-bit depth upon request.

Pansharpening fuse the panchromatic band with the 4 multispectral bands to obtain a 4-band multispectral image featuring the radiometric values with higher spatial resolution.

ID	Product type	Description	Standard Ortho (m)	Enhanced Ortho (m)	Bit depth
PAN	Panchromatic	Single band	0.75	0.4	10 / 8
MS4	Multispectral	4-band (B,G,R,NIR)	3	1.6	10 / 8
PM4	Bundle	PAN + MS4	0.75 + 3	0.4 + 1.6	10 / 8
PSH	Pansharpened	4-band (B,G,R,NIR)	0.75	0.4	10 / 8
PS3	Pansharp True color	3-band (R,G,B)	0.75	0.4	8
PS4	Pansharp False color	3-band (NIR,R,G)	0.75	0.4	8
VAP	Value Added	Single band	3	1.6	10 / 8
STP	Stereo pair	Forward looking PM4 + Backward looking PM4	-	-	10

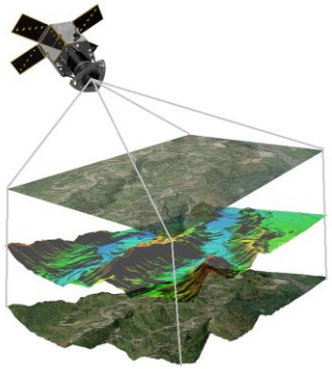
GEOSAT 2 image products are available on different processing levels

ID	Processing Level	Description	Info
L1B	OrthoReady	Calibrated and radiometrically corrected scaled ToA radiance, not resampled	RPC + TIF + metadata
L1C	Ortho	Calibrated and radiometrically corrected scaled ToA radiance, orthorectified and resampled.	TIF + metadata
L1S	Enhanced OrthoReady	Calibrated and radiometrically corrected scaled ToA radiance, not resampled. Enhanced GSD from AI-based techniques	RPC + TIF + metadata
L1D	Enhanced Ortho	Calibrated and radiometrically corrected scaled ToA radiance, orthorectified and resampled. Enhanced GSD from AI-based techniques	TIF + metadata

GEOSAT 2 PROCESSING

Radiometric calibration is performed on periodically using CEOS pseudo-invariant calibration sites and optical sensor references. This process, together with an extract band registration, allows the generation of calibrated and radiometrically corrected GEOSAT 2 L1B products, with TOA radiances are being scaled to 10-bit unsigned integer values. Gain and bias coefficients defined for each band in the metadata could be applied to retrieve again those TOA radiance values.

$$Radiance = Gain * DN + Bias$$



Orthorectification process is accomplished throughout three steps: ground reference, rectification and validation. Collection of ground points (GCP) over configurable reference dataset (REF) + digital elevation model (DEM) refine the sensor model coefficients, correcting image distortions due to the Earth's topography and providing a rigorous sensor model that would be used for rectification. Final validation is performed by assessing the geometric error obtained.

Quality assurance and monitoring are of prime importance for GEOSAT. Orthorectification process generates the L1C product rectified to the desired projection and resampled resolution. GEOSAT provides to customers fully customization in terms of reference datasets, DEM, accuracy (RMSE), projection (EPSG), resampling and product formatting. By default,

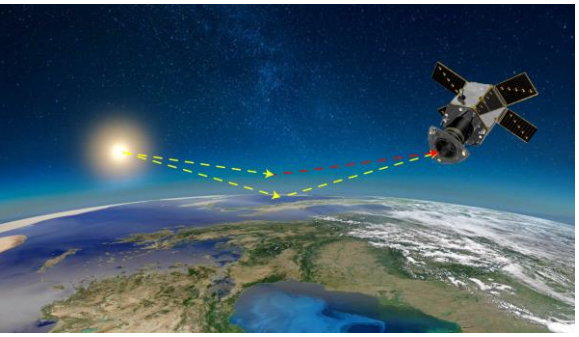
Projection	UTM WGS84
Resampling	Cubic convolution
Resolution	75cm (ONA 0-15°), 85cm (ONA 15°-30°), 1m (ONA >30°)
Reference dataset	Sentinel-2, Google Earth
Reference DEM	COPDEM, SRTM

Enhanced resolution (x2) products are achieved by means of machine learning techniques. Both radiometric and geometrical properties are maintained valid for Pansharpened (PSH) and Bundle (PM4) products, ensuring their validity in scientific applications. Other pansharpened (PS3,PS4) products are optimized for visual inspection, being best suited for general purposes. The quality of those processes have been verified by independent organizations.

Resolution	40cm (ONA 0-15°), 45cm (ONA 15°-30°), 50cm (ONA >30°)

GEOSAT 2 VALUE-ADDED PRODUCTS

Vegetation indexes are an important parameter of agricultural and forestry development analytics. GEOSAT 2 provides the data precision and miles-away control features to adopt the handy technology. Indexes such as NDVI, GNDVI, RECI, SAVI and MSAVI, among others, are available on request.



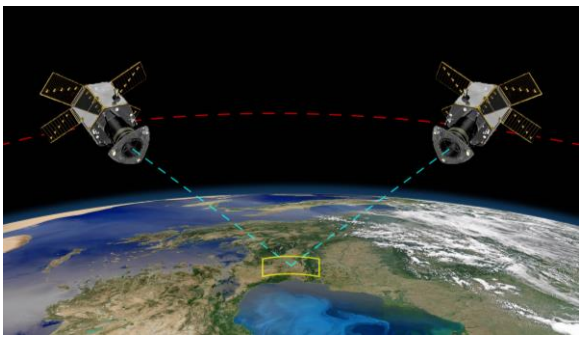
Atmospheric effects such as atmospheric absorption and scattering, sensor-target illumination geometry may influence the TOA (Top of Atmosphere) radiance collected by optical high-resolution sensors, therefore the use of atmospheric models significantly improve the results of **BOA (Bottom of Atmosphere) radiance** assessment.

Atmospheric correction models such as 6S, based on radiative transfer theory, provides patterns which describe properly different atmospheric conditions. When applied to vegetation indexes, results considered offer a better understanding of crop conditions.

The agility of the satellite offers the ability to acquire multiple-view images of the same targets along the orbit. This capacity allows to collect stereo-pairs, which are used to extract high-quality **DSM/DEM** (Digital Surface Model /Digital Elevation Model).

GEOSAT 2 **Stereo-pairs** are provided by default on Bundle (PM4) Ortho-ready (L1B) imagery.

Both forward and backward scenes are processed and delivered. Other processing levels could be provided if required.



DEM is a raster grid of elevation values that represent a surface, and are useful for many applications such as mapping, orthorectification, and land classification. Often used to create contour or perspective maps in urban planning applications, a dedicated team ensures high-quality of the product by collecting manual ground control and tie points.

GEOSAT 2 PRODUCT

GEOSAT is fully dedicated to deliver high quality information products & services for actionable insights on time and on specification. Our services are tailored to customer needs. Let us know your goals and a targeted solution would be proposed considering suitable EO data.

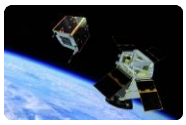
03

VHR IMAGERY.

Up to 40cm pansharpened imagery and 1,6m scientific level enhanced resolution on each MS band.

EXTENSIVE ARCHIVE.

GEOSAT 2 has 8+ year archive that provides you the perfect dataset to monitor development over time in any area in the world.



QRT | NRT TASKING & DELIVERY.

Our 24/7 service provides rapid response to events. Intelligence information is possible for emergencies through effective solutions

ANALYSIS READY DATA.

Our 10+ experienced team validates the data quality and ensures the delivery of reliable solution that accelerate decision-making in a great variety of fields and applications.

CHANGE DETECTION.

Our sensors feature a great capacity for multitemporal revisits in a short period of time and provide high quality, multi-source, multiresolution satellite imagery.

ANALYTICS.

Through machine learning we support the detection and classification of elements with measured confidence and tailored outputs based on the application (urban, forestry, maritime, raw materials, logistic, etc.)

SUPPORT TO SATELLITE MISSIONS.

All capabilities at your fingertips. 10+ years of experience operating satellites, processing images and performing quality analysis.

TAILORED EO SOLUTIONS.

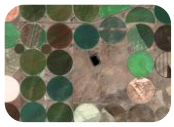
A wide range of customizable products & services benefit customers and partners around the world, giving them solutions that help them improve their businesses and thus our planet.

DEDICATED SERVICES

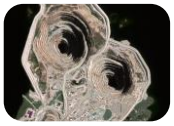
Based on specific requirements and characteristics defined by each market, dedicated solutions have been envisioned to provide a successful support aimed at customer satisfaction.

DEFENSE, SECURITY & EMERGENCY RESPONSE. Measuring and monitoring human activity is a topic of major and increasing interest. For humanitarian or defense purposes, efforts are expended – by governmental as well as commercial actors – to remain aware of what is going on. GEOSAT provides IMINT services to support this task, anywhere and anytime.

FINANCE & INSURANCE. Satellite Imagery & Remote Sensing are a key source of information to monitor finance and insurance activities. Geosat helps companies in faster and better decision making through personalized EO services with analytic reports & studies, insurance processing support, food security and environmental impact assessment.



AGRICULTURE. GEOSAT gives you a global geographical scope and enhanced range of scientific-quality agricultural Very High Resolution (1.6m) data and information with a variety of resolutions, spectral bands and sensor types. We also offer value-added products which allow you to calculate crops health indexes, such as NDVI, EVI, CVI and GNDVI.



ENERGY & NATURAL RESOURCES. GEOSAT can reveal actionable insights for various energy and mining applications. Identification mining and processing projects as input to evaluation of investment needs and related financing opportunities for critical raw materials. Services provide also monitoring of environmental impact and increasing safety.

LAND & INFRASTRUCTURE MANAGEMENT. We supply geo-information to support satellite mapping and urban planning. Offering a wide range of high-quality land administration and mapping data. In addition to imagery, GEOSAT has a broad portfolio of value-added products, such as change detection, 3D models and Digital Elevation Models (DEM)

ENVIRONMENT & CLIMATE CHANGE. Only when measured, actions could be taken if needed. Continuously monitoring our natural resources makes sustainable management possible and it's the best way to protect our environment for the future. We provide reliable, regular monitoring for a wide range of environmental pressures such as deforestation, land degradation, desertification and illegal logging.

GEOSAT 2 CATALOGUE & ORDER

GEOSAT catalogue is available as web interface or API. Searching in the GEOSAT catalog may consider filters for location, time, collections, metadata properties, or scene identifiers. GEOSAT 2 scenes returned can be subsequently ordered by specifying the desired product type and processing parameters.

04

Following STAC specifications, API defines a JSON-based interface to browse and query from GEOSAT 2 collections any scene that may match customer preferences, i.e. certain date range or viewing conditions. Ordering and Download capabilities allows to request any products identified at GEOSAT Catalog by means of friendly interface and to visualize or download them from a direct link.

In case there is not suitable data fulfilling the selected criteria, or new data is preferred, a request for tasking could be submitted through the API. First, a feasibility study will be performed based on the requirements provided by the customer. Once a set of collection opportunities confirmed by GEOSAT, the mission will be tasked to perform those finally selected by the customer.

Based on OGC standards, different web services are available at GEOSAT for visualization and catalogue browsing such as WMS, WMTS and WFS.

Further to these interfaces, GEOSAT provides a Customer Service Desk available

- For standard orders, during working days (8 – 18 UTC)
- For emergency orders, working 24/7/365.

Deliveries terms are agreed with customers based on their preference. By default, for once-off deliveries a direct link to the product is provided, whereas cumulative deliveries of products within a campaign are located at a dedicated SFTP account.

Please contact info@geosat.space for further information.

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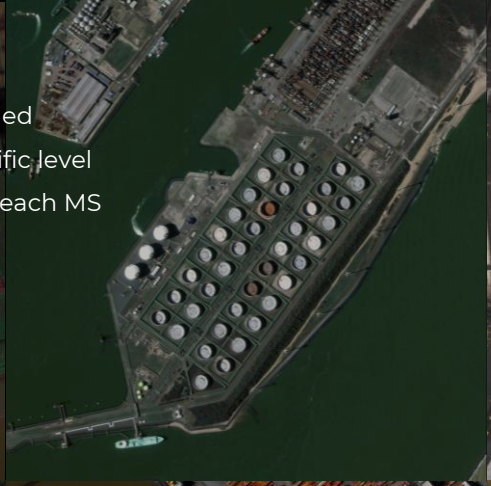
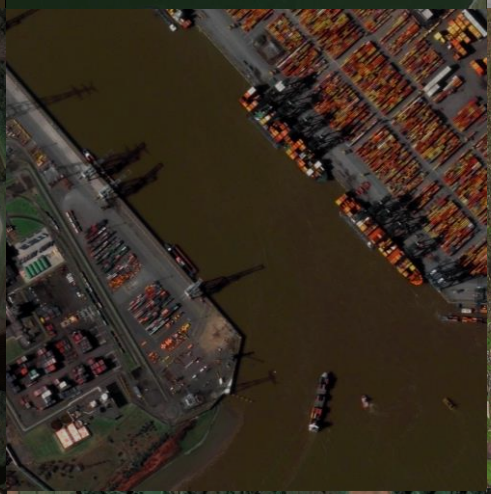
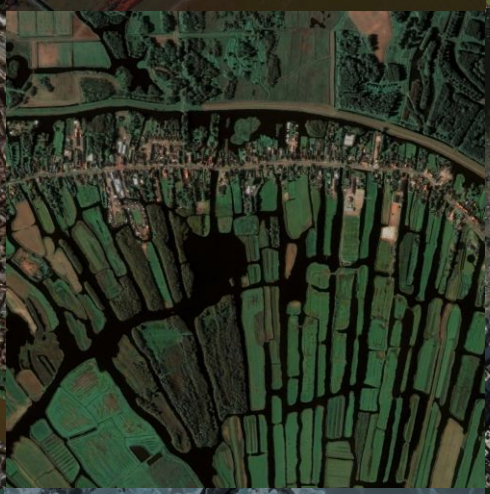
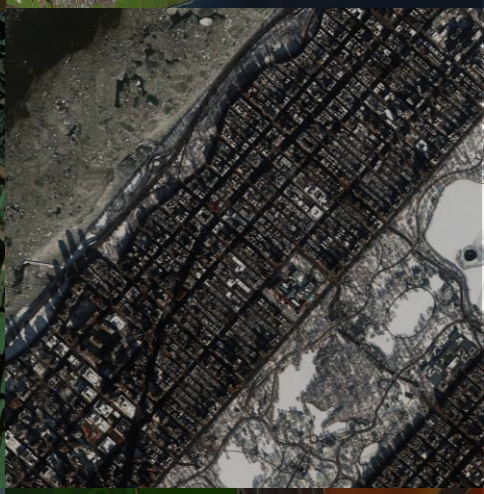
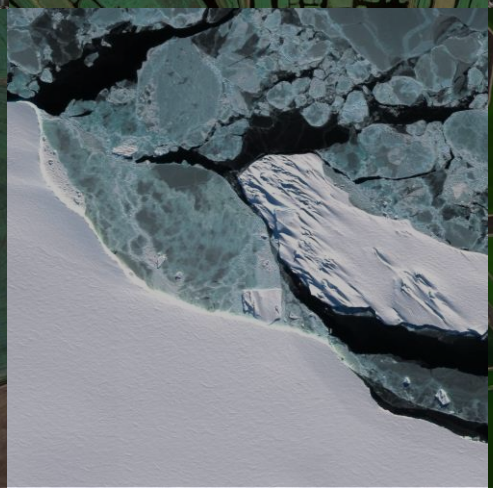
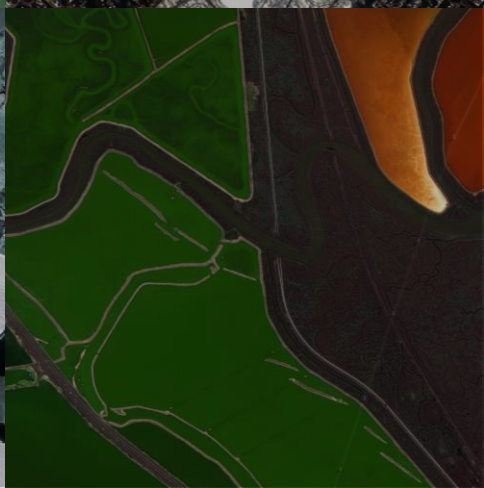
Up to 40cm pansharpened imagery and 1,6m scientific level enhanced resolution on each MS band.

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