AXELSPACE

AxelGlobe Product Catalog

Discovering the Hidden Truths of our World

This past decade has witnessed dramatic progress in microsatellite technology, and these days more and more plans of microsatellite constellations are being announced. Governments are also actively encouraging the rapid expansion of space utilization, and the scale of the space industry is expected to exceed a trillion dollars by 2040. Microsatellite constellations will develop into an indispensable social infrastructure in the coming era. Space is indeed no longer a special place.

Axelspace has been committed to providing innovative space solutions utilizing microsatellites under the vision of "Space within Your Reach" since its establishment in 2008. So far, we have developed, launched and operated nine microsatellites in total, including commercial satellites to monitor icebergs in the Arctic Ocean for a Japanese private company and a technology demonstration satellite for the Japan Aerospace Exploration Agency (JAXA).

"Providing innovative space solutions utilizing microsatellites under the vision of 'Space within Your Reach' ..."

Besides private satellite projects, we started a data solution business named AxelGlobe by constructing a microsatellite constellation for Earth observation in 2015. AxelGlobe distributes optical images with a ground resolution of 2.5 m taken by 100 kg-class microsatellites called GRUS. As of 2022, five GRUS satellites are fully operational in orbit, and a high revisit rate of two to three days (varying depending on the latitude of a capture location) is achieved. Through the capability of high-frequency monitoring of the Earth's surface, AxelGlobe provides us with a perfect vantage point to see, in near real-time, various "truths" that are difficult to obtain by simply being on the ground. Such facts are essential to make practical downstream applications such as yield forecasts for agricultural products, early detections of illegal logging and wildfires, and rapid comprehension of the damages caused by disasters.

In order to better serve our customers with unique needs, we often work with partners all around the world. Many of our partners provide value-added service to customers by analyzing our data to extract insights, integrating our data into their proprietary products, and allowing seamless and stress-free access to necessary images. You can find various examples in this catalog.

"Correctly understanding what is happening on Earth will contribute to protecting people's lives and the global environment ..."

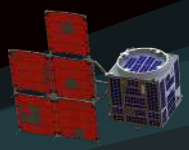
Correctly understanding what is happening on Earth will contribute to protecting people's lives and the global environment that sustains them. AxelGlobe will help you uncover the truth of our mother planet to accelerate your business for a better and more sustainable society.

We are looking forward to assisting you with our unique microsatellite solutions!

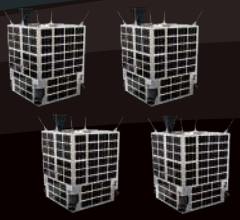
Yuya Nakamura

President and CEO, Axelspace

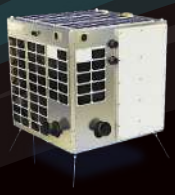
Weathernews
WNISAT-1R 2017

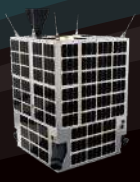


JAXA
RAPIS-1 2019



The University of Tokyo
Hodoyoshi-1 2014





AxelGlobe
GRUS-1A 2018

AxelGlobe
GRUS-1BCDE 2021

Weathernews
WNISAT-1 2013

Our satellite track record

AxelGlobe

Accelerate your business through AxelGlobe's satellite imagery

AxelGlobe is the data and solutions part of Axelspace. We offer not only a wide range of satellite images but we also focus on what matters most to accelerate your business. We have invested a lot of time on our R&D to offer comprehensive insights through analytics across different domains such as agriculture, forestry, maritime, defense etc.

AxelLiner

Realizing your idea for getting into the space business via microsatellites

AxelLiner makes achieving your space missions easier, faster, and more affordable. Through Axelspace's versatile satellite platform and automated satellite operation software, we can quickly customize according to your business requirements – all at a lower cost, with a fast development time, and few resources.

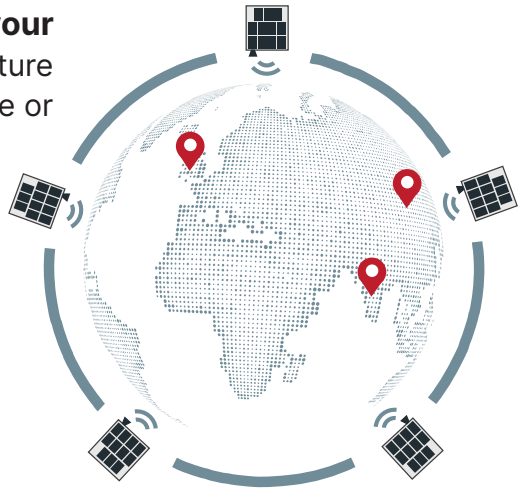
AG Products

AxelGlobe

Richat Structure, Mauritania

AG Tasking

We commit to a flexible one-time imaging of your area of interest. Anyone can easily request a capture of one or multiple locations within a selected range or period.

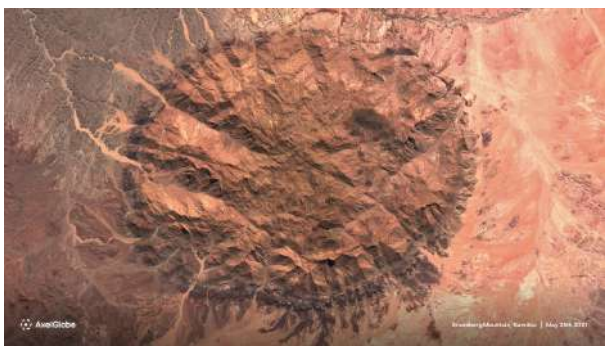


Key Features:

- ✔ Ease and flexibility of request
- ✔ Cloud cover forecast inclusion
- ✔ Platform & API accessible

How to subscribe to AxelGlobe Tasking Service

1. Define the area of interest
2. Select the term of interest
3. Access data via AG platform or API



AG Monitoring

We enable monthly, multiple imaging options for single or multiple areas of interest. Frequent observations of any place on earth from space can now be done either on a short or long-term basis.

Key Features:

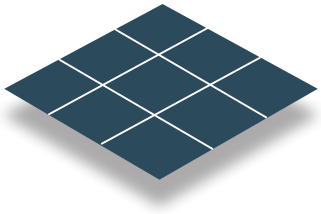
- ✔ Ease and flexibility of request
- ✔ Cloud cover forecast inclusion
- ✔ Platform & API accessible

How to subscribe to AxelGlobe Monitoring Service

1. Define the area of interest
2. Select the term of interest
3. Choose subscription plan
4. Access data via AG platform or API

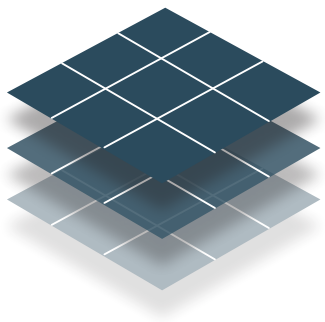
SUBSCRIPTION PLANS

Low Frequency
(1 image /month)



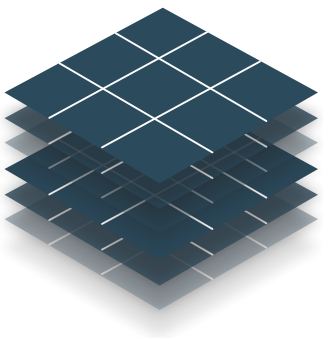
Use of low temporal imaging of areas of interest requiring monthly monitoring

Mid Frequency
(3-5 images /month)



Use of mid-temporal frequency imaging of areas of interest requiring several days to two weeks apart of monitoring

High Frequency
(6 or more images /month)



Use of high-temporal imaging of areas of interest requiring three to five day-interval monitoring

AG Emergency

We value the need for obtaining time-sensitive ground information of the ground. With a near real-time turnaround, AxelGlobe Emergency Capture service can be used in critical decision making, such as disaster monitoring and response.

Key Features:

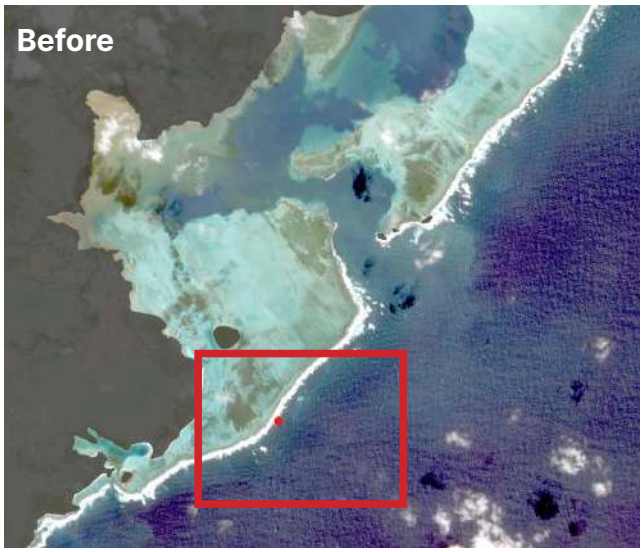
- ✔ Ease and flexibility of request
- ✔ Cloud cover forecast inclusion
- ✔ Platform & API accessible
- ✔ Priority tasking

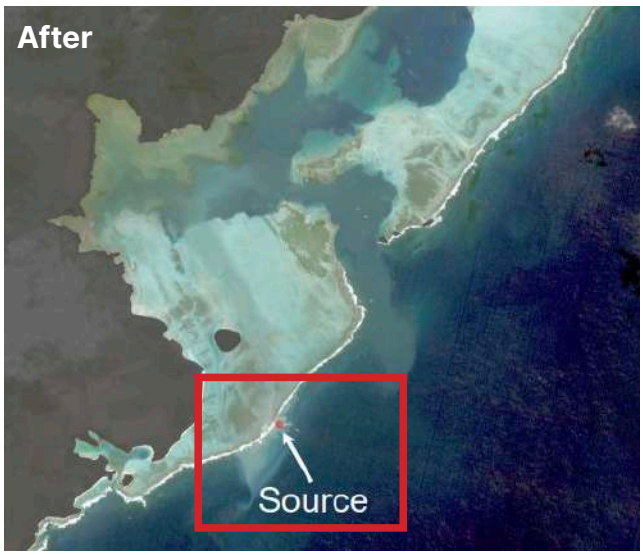
Flooding

Intelligence

Volcanic Eruption

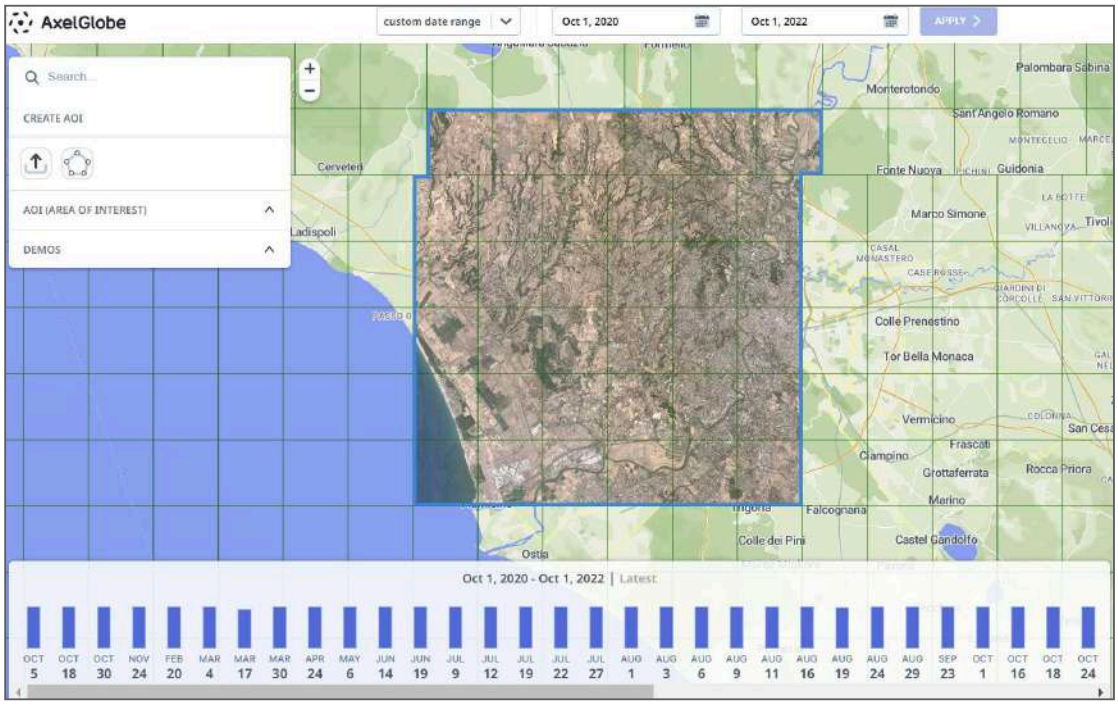
Before and After Oil Spill Event



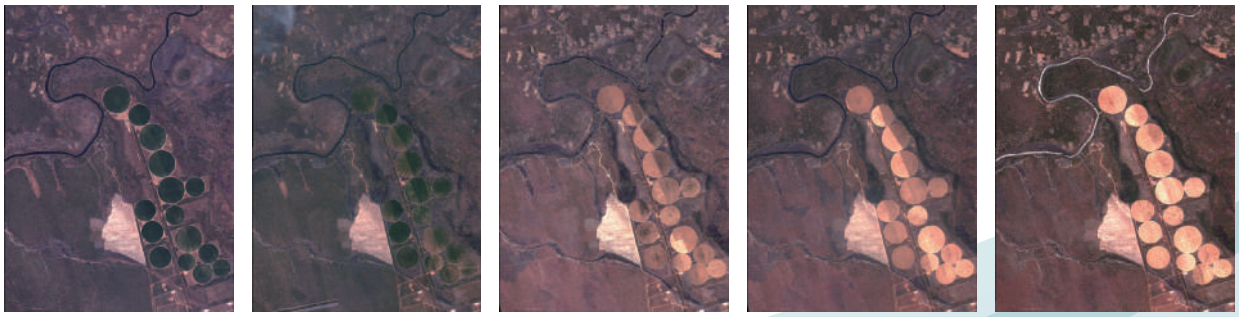


AG Archive

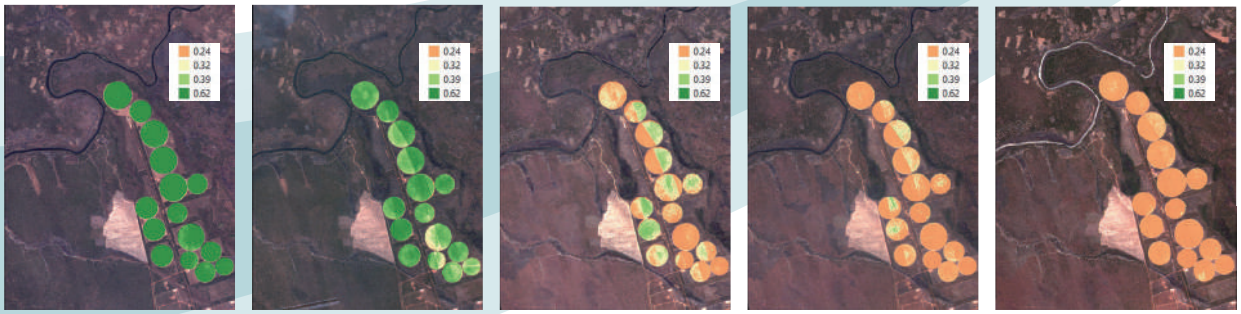
We make archive datasets more accessible and cost-effective.
With a collection of multi-temporal imagery acquired over the years, users can freely search and select datasets of their areas of interest from multiple periods.



Global archive datasets are now searchable and downloadable through the AG Platform



Analyze the past to make sense of the present



AG Mosaic

We provide an on-demand satellite imagery mosaic for different mapping purposes. With area coverage ranging from tens to millions of square kilometers, users have the flexibility to request mosaic generation per chosen period of interest.

AG Mosaic of
Tokyo Prefecture, Japan

Key Features:

- Flexible mosaic generation through period selection
- Seamless
- Color-corrected

How to order AxelGlobe Mosaic

1. Define the area of interest
2. Select the term of interest
3. Send order request
4. Access data via AG Platform or API

The best images captured with the least cloud cover are selected from the chosen period of interest. Seamlines are automatically removed in-between images, along with the normalization of the color, to create a spotless imagery mosaic for visual or analytic use cases.

Raw data

Seamline removal

Color correction

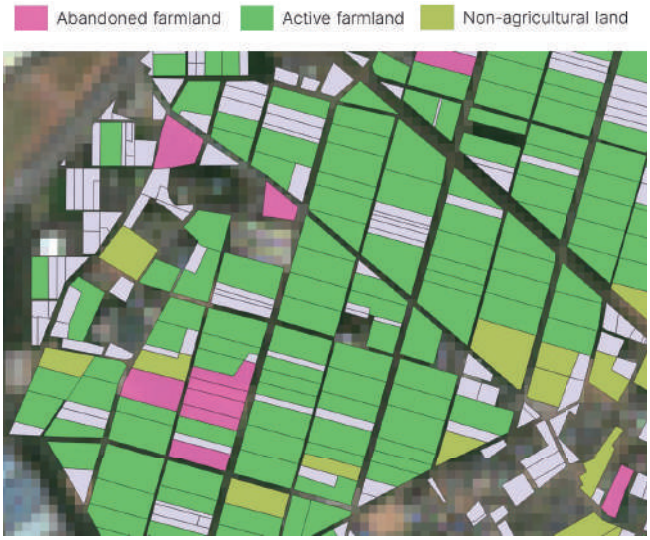
AG Solutions

AxelGlobe

Sukkur, Pakistan

We empower different kinds of industries and local governments by enabling smarter decision making through satellite image-derived insights across a wide range of applications. We adopt a holistic approach to creating solutions by using GRUS-1 imagery in combination with different kinds of geospatial datasets from different sources.

Agriculture



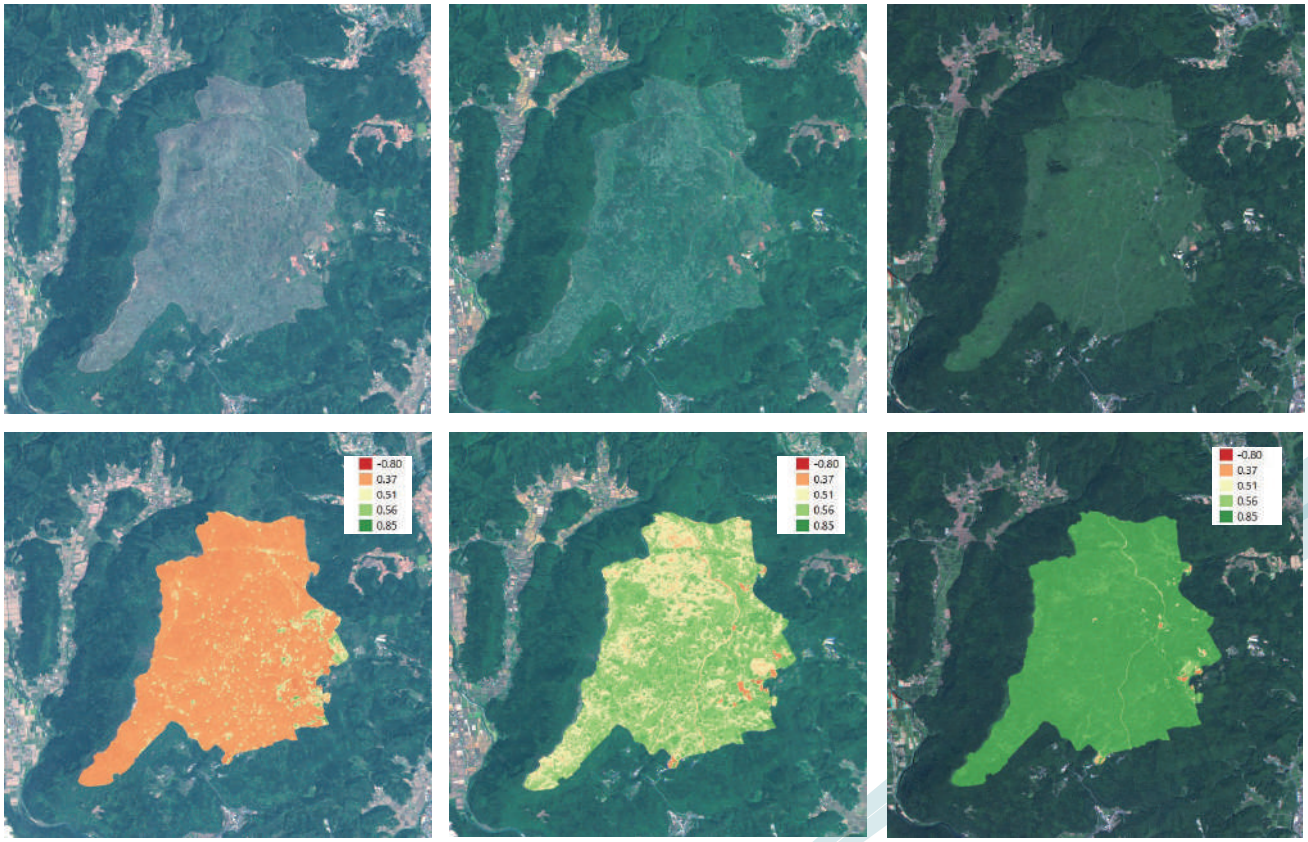
Yearly abandoned farmland mapping

Multi-temporal planting status classification and monitoring

Disaster Management & Response

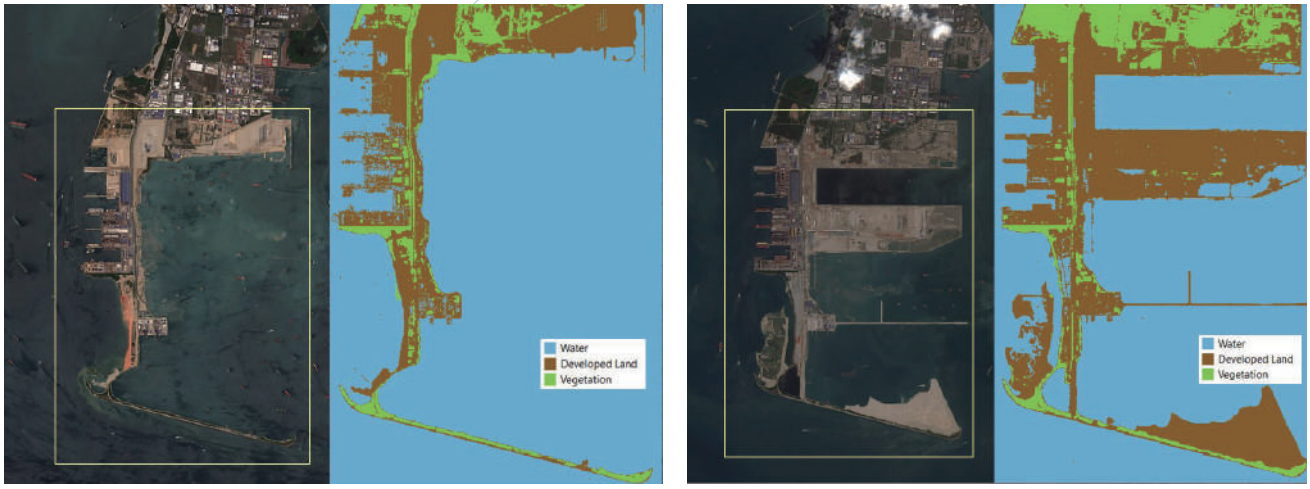
Flooding disaster detection and mapping

Forestry



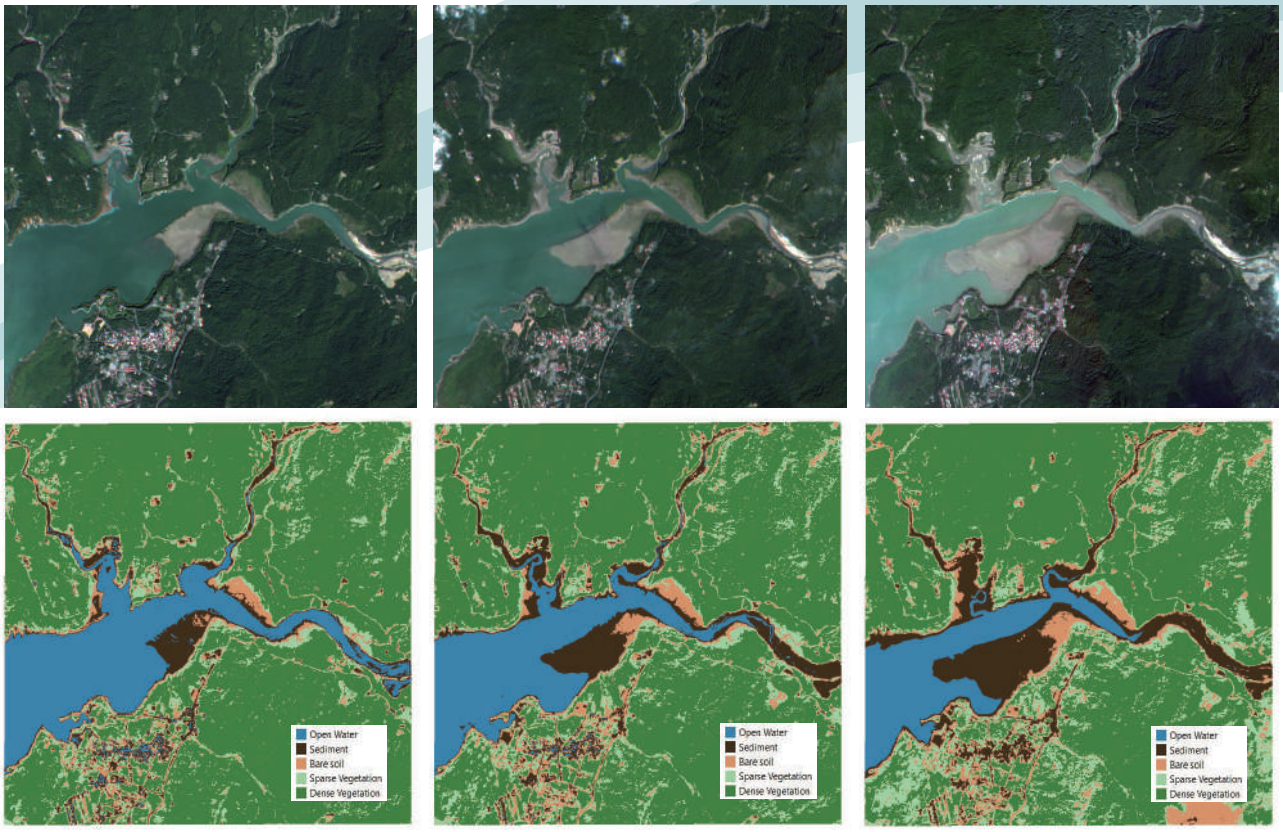
Multi-temporal forest change detection and monitoring

Engineering & Construction



Monitoring of engineering construction progress (construction life cycle)

Environmental Monitoring

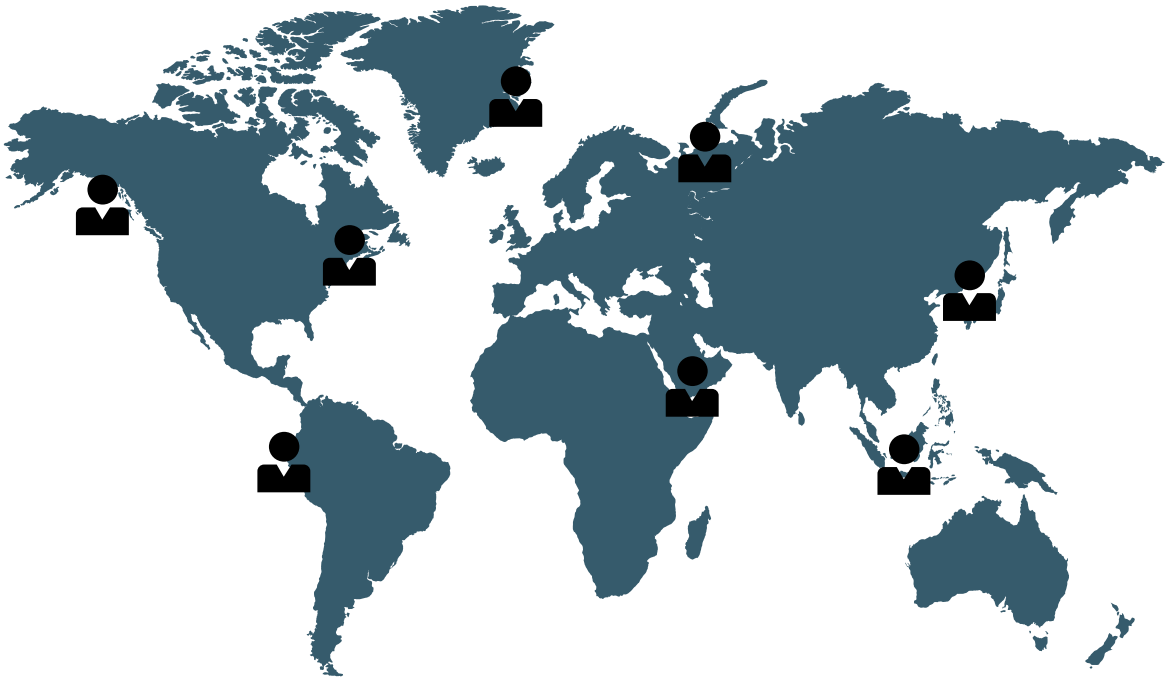


Watershed monitoring through multi-temporal quantification of sedimentation

Maritime and Defense

Automatic ship detection and counting

Global & Local Partnerships and Remote Sensing Consultants



In-house Dev Team

Service Consulting Team

In-house Analytics Team

In the company's pursuit to offer the best solution in the least amount of time, we provide an in-house data-to-analytics service for a more flexible and efficient operation.

Fast growing network of Global & Local Partners

AxelGlobe has started establishing partnerships with more than 50 companies worldwide. This enables the company to venture into integrating different technologies and solutions, at the same time expanding its reach globally.

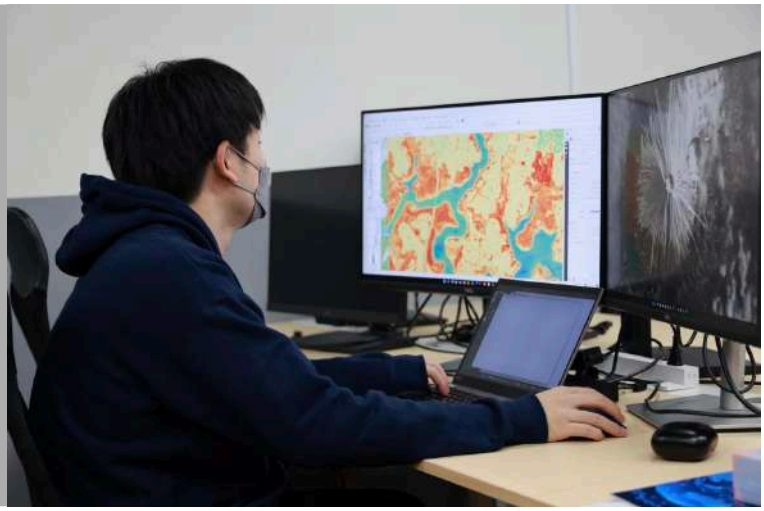
We strive to give our customers the best solutions through agility, speed, and continuous improvement

Adapting to your needs

On day one, we will assemble a team of experts covering business, design & technology and work with users to come up with various solutions to address your specific needs.

Rapid prototyping

With in-house analytics and a pool of remote sensing consultants, we collaborate to rapidly prototype solutions to lessen the risks and accelerate time to market.



Fast Feedback Loop

We prioritize being able to improve and iterate quickly based on user research, data insights and customer feedback rather than trying to spend long hours perfecting our solutions early in the process.

Voices of our Customers & Partners

Tim Neale
Managing Director

DATA FARMING

"We partnered with Axelspace to bring new products to our customers... Axelspace captured around 1 Million hectares from the end of Nov to Dec."

RESTEC
Remote Sensing Technology Center of Japan

Hideyuki Sakaguchi
General Manager Solution Department I

"We are very pleased to announce our collaboration with Axelspace in 2021. We will continue to provide their satellite imagery and also combine it with our analysis technology to solve social problems around the world."

Dr William Crowe
CEO and Co-Founder of HEO Robotics

HEO ROBOTICS

"Access to their cameras will have a substantial impact on our ability to provide in-space services. We will be able to enhance our ability to quickly monitor satellites and easily integrate our software into the day-to-day operations of satellite owners."

ExactFarming

Anna Kudinova
Chief Executive Officer

"We connected with Axelspace in 2021 to find a better alternative on what we currently use to develop our Solutions."

Professor Lloyd Chingambo
Founder and Executive Director

LLOYDS FINANCIALS LIMITED

"Partnering with Axelspace brings with it lots of opportunities for us. Their technologies, remote sensing capabilities and satellites will make Lloyds Financials very strong and support Zambia."

Achievements

Axelspace has been committed to providing innovative space solutions utilizing microsatellites under the vision of "Space within Your Reach" since its establishment in 2008. Below are some of the achievements and awards presented to Axelspace in the past two years.

Rapis-1 won the 30th JSASS Technology Award

Axelspace had been commissioned by JAXA to design, develop and operate RAPIS-1, and the satellite had successfully completed about a year-long in-orbit experiments after the launch.

Beyond 5G Next-Generation Small Satellite Constellations

Axelspace started "Research and Development of Radio-Optical Hybrid Communication Technology for Beyond 5G Next-Generation Small Satellite Constellations" with the University of Tokyo, Tokyo Institute of Technology and Kiyohara Optics Inc. The project is planned and funded by the National Institute of Information and Communications Technology (NICT) in 2021.

Japan Venture Awards 2022

First Place - SDGs Innovation HUB Business

Nikkei Excellent Work/Service Award 2021

Technology Management and Innovation Award (Minister of Internal Affairs and Communications Award)

GRUS Specifications

GRUS is a next-generation remote-sensing microsatellite, the building block of Axelspace's Earth observation constellation. Even with its mass of around 100 kg, it will enable us to obtain images with 2.5 m ground resolution.

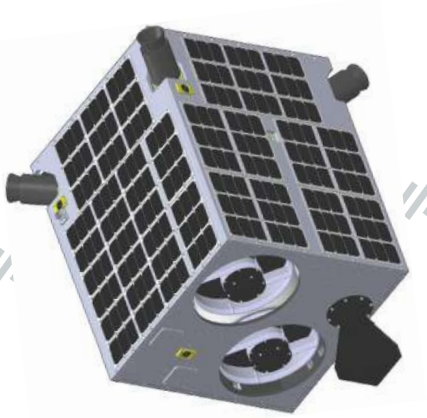


IMAGE BANDS		PRODUCT NAME		
Spectral Band Name	Wavelength Range	True Color Image (TCI)	Multispectral Image (MSI)	
		PSM (Pan-sharpened)	PAN (Panchromatic)	MSI (Multispectral)
Panchromatic	450-900 nm		Layer 1	
Blue	450-505 nm	Layer 3		Layer 1
Green	515-585 nm	Layer 2		Layer 2
Red	620-685 nm	Layer 1		Layer 3
Red Edge	705-745 nm			Layer 4
Near Infrared	770-900 nm			Layer 5
Number of bands		3	1	5
Spatial resolution		2.5 m	2.5 m	5 m
Bit depth		8-bit unsigned integer	16-bit unsigned integer	16-bit unsigned integer

True Color Composite

Pansharpened Imagery

Spatial resolution: 2.5 m

False Color Composite

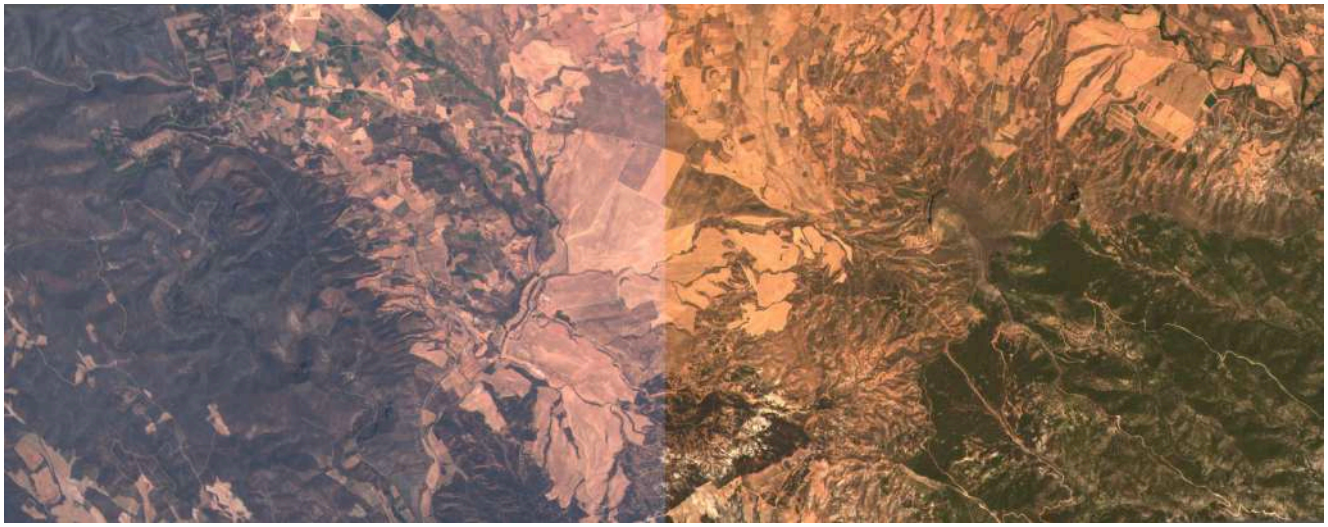
Multispectral Imagery

Spatial resolution: 5 m

Product Levels

	Geometric Processing			Radiometric Processing		Ancillary Data		
	Georectification	Panshar-pening	Tiling	Radiometric calibration	Atmospheric correction	UDM	Cloud Mask	Metadata
L1C	✔	✔	✔	✔		✔	✔	✔
L2A	✔	✔	✔	✔	✔	✔	✔	✔

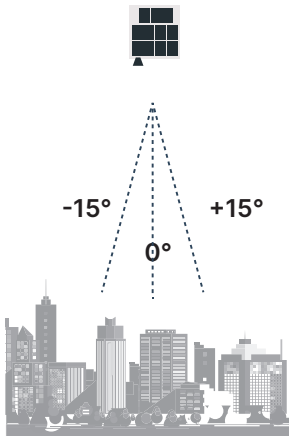
L1C - includes radiometric and geometric corrections with pixels aligned to an orthorectified basemap and calculated as TOA reflectance.
L2A - includes radiometric and geometric corrections with pixels aligned to an orthorectified basemap and calculated as BOA reflectance.



Comparison of L1C (left) and L2A (right) image products captured by GRUS-1E Zaragoza, Spain

Capture Operations

Viewing Angle



-15°to +15°

Capture Swath

up to 55 km swath

Orbit

Sun-synchronous orbit

Axelspace Corporation

Established in August 8, 2008

Yuya Nakamura, President and CEO

Main Office Location :
Clip Nihonbashi Building, 3-3-3 Nihonbashi-Honcho,
Chuo-ku, Tokyo 103-0023 Japan

Capital Stock : 7,122 Million JPY
(Including capital reserve)

AXELSPACE