# Introduction of Satellite x Al activities in Ridge-i

32<sup>nd</sup> IAF Workshop

27<sup>th</sup> Sep. 2025





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- 1. General information of Ridge-i
- 2. Current use cases of satellite data analysis in Ridge-i
- 3. Advanced use cases of satellite data analysis in Ridge-i

#### General information

Company Name Ridge-i Ltd. (Ridge-i)

**Location** 1-6-1 Otemachi, Chiyoda-ku, Tokyo

**History** July 2016 established

**Members** 

April 2023 listed on the Tokyo stock

exchange growth market

~ 90 (30~ members are Al Engineers)

Our Business Formulate business strategies

Develop solutions and provide licenses

Analyze Satellite data

Management Advisor: Toru Katsumoto

(Former Sony Group Vice President)

Technical Advisors: Yoshitaka Ushiku

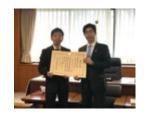
Toru Tamaki (Professor, Nagoya Institute of Tech.)

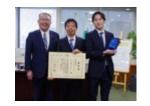
Shunsuke Ono

(Associate Professor, Tokyo Institute of Tech.)

Major Awards: 4th Space Dev. Award: METI Award

5th Space Dev. Award: MOE Award 6th Space Dev. Award: MLIT Award







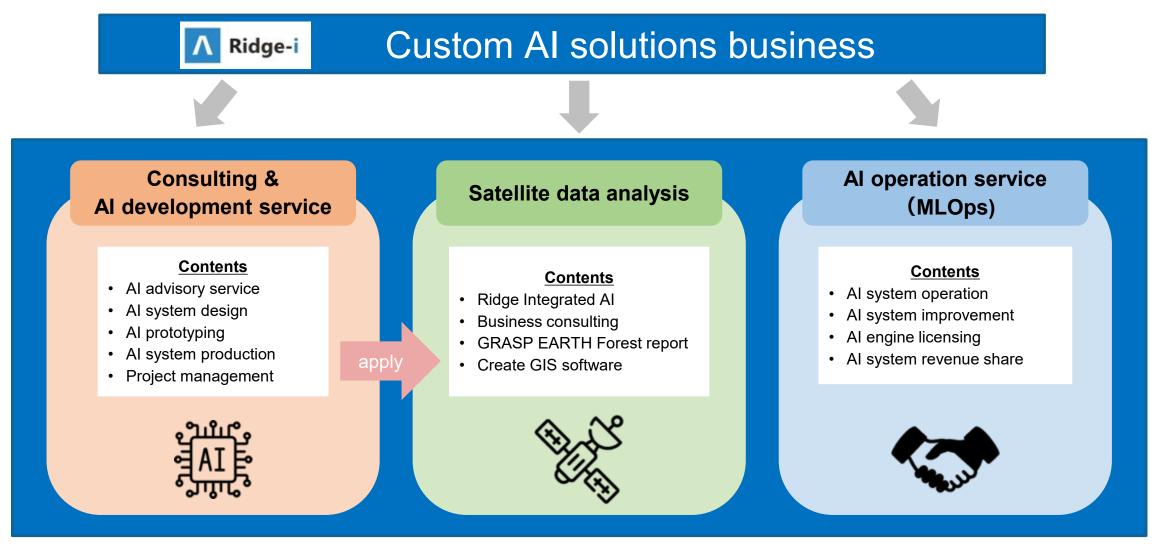
**Our partners** 





### Ridge-i business overview

Three main business

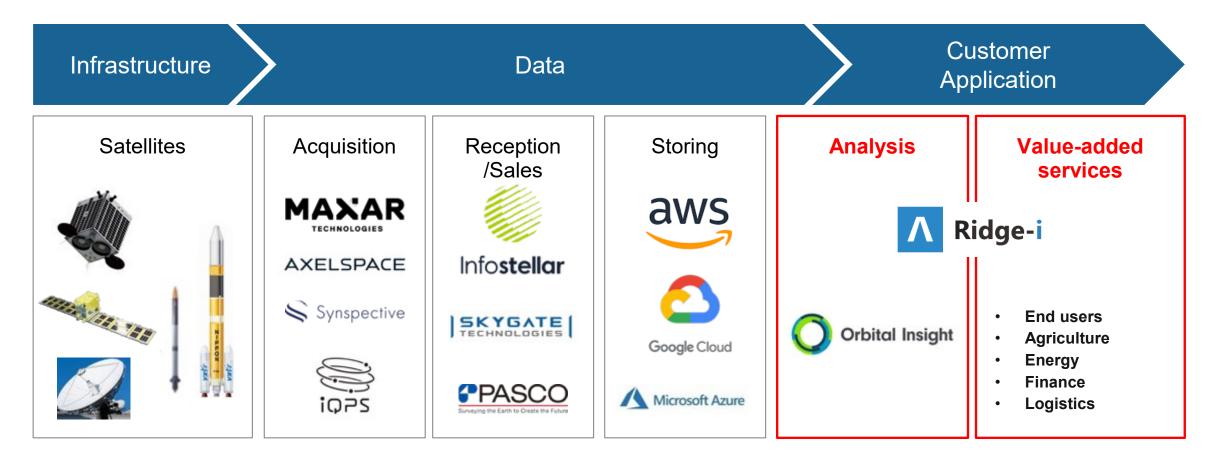


We would like to realize the sustainable society both with technology and business.

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### Satellite activities in Ridge-i

Ridge-i's position in the satellite domain



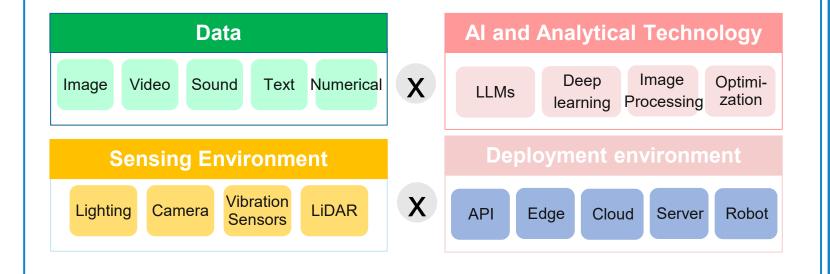
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### Our technical strength: Multimodal Al

Ridge-i's core Al technology 4th Generation Al "Multimodal Al"

#### What is "Multimodal Al"?

- Integrates images, voice, numbers, and text
- Makes unified decisions from diverse inputs
- Combines deep learning with sensitivity evaluation



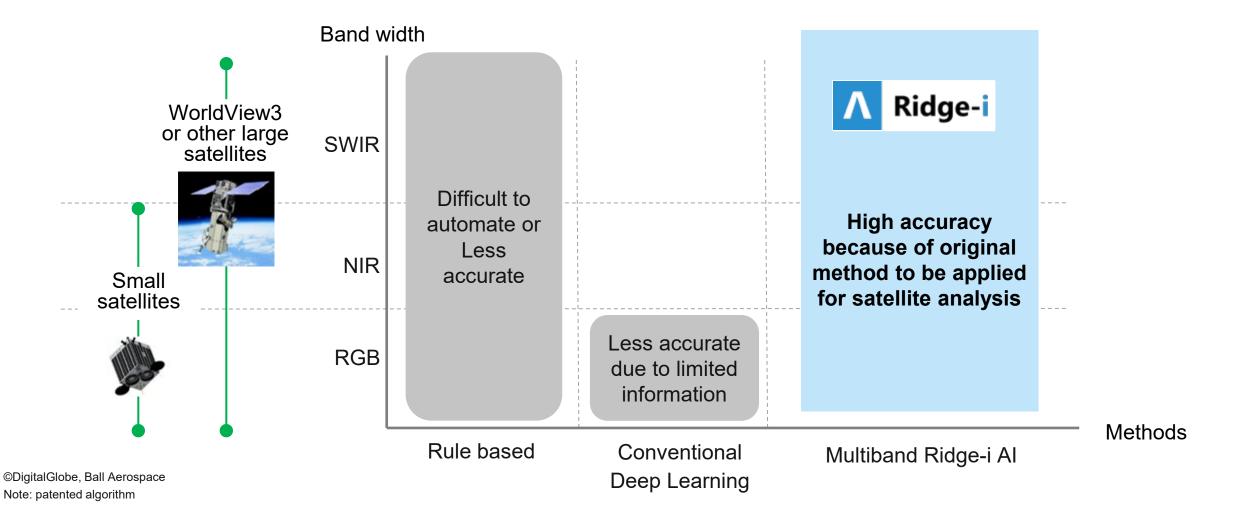
Multimodal Al solves problems that cannot be solved by a single model

Ridge-i has a strength in combining data

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### Satellite activities in Ridge-i

Our strength in satellite image analysis domain



### Three typical AI tasks for analysis

#### **Object Detection**

Detect the position and number of predefined targets



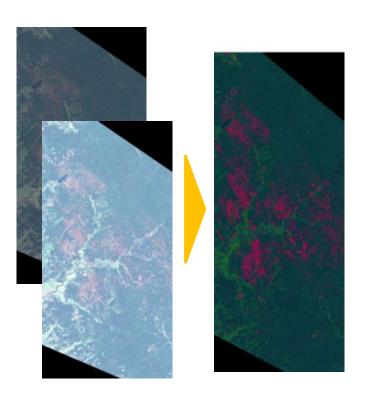






#### **Change Detection**

Detect changes by using two or more time series data



### Image processing

Remove noise from satellite images such as shadow or clouds

#### Shadow removal





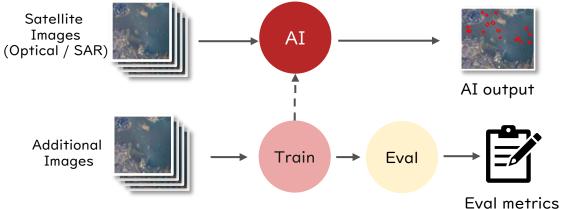
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### Trainable Satellite Image Analysis Product

~ Ridge SAT Image Analyzer ~

#### Ridge SAT Image Analyzer

✓ A specialized product for satellite images that can train and infer machine learning models to detect and extract arbitrary objects.



#### **Features of Ridge SAT Image Analyzer**

- ✓ <u>Training and inference are available both in the cloud and on-premises</u>
  Even highly confidential data can be processed without risk of information leakage. Additionally, this solution resolves complex licensing issues of satellite data.
- ✓ Operable with a single command There's no need to learn specialized satellite image techniques.
- ✓ <u>Flexible customization</u>
  It easily integrates with commercial GIS software like QGIS and ArcGIS. It is containerized for easy integration with in-house software. Combined analysis with non-satellite data is also possible.

# $\nabla$ Solar panels detection $\nabla$ Imagery©Maxar Technologies. Processed by Ridge-i $\nabla$ Ships detection $\nabla$ Copernicus Sentinel data [2025] ©ESA detection

(SAR image)

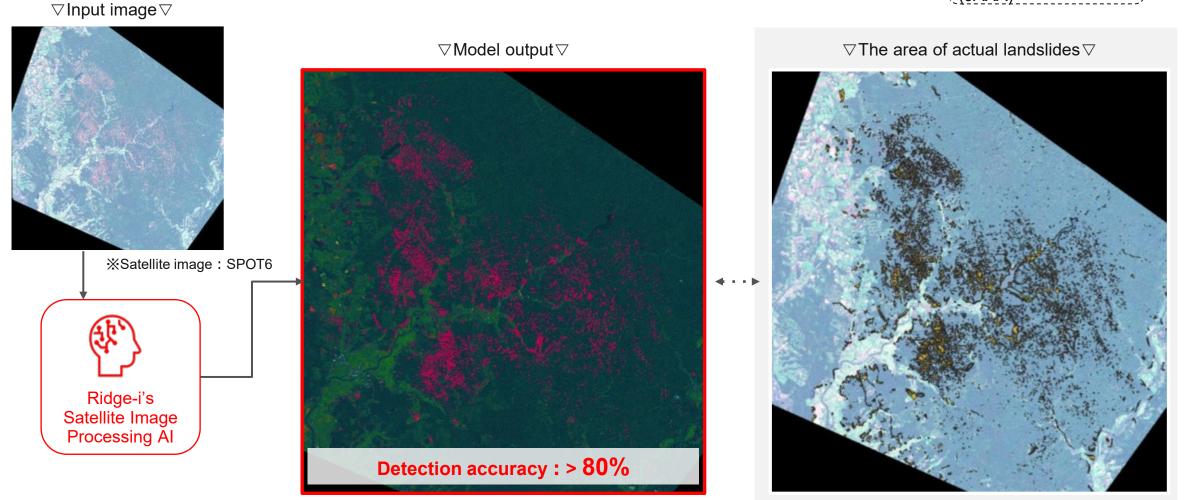
## Disaster monitoring application ①

Landslide areas detection



Our deep learning-based model rapidly and accurately detected landslide areas from the Hokkaido Eastern Iburi Earthquake, achieving a mean IoU of over 80%.

Japan Aerospace **Exploration Agency** (JAXA)



### Disaster monitoring application 2

Ridge-i case study: Oil spills detection (Quick data analysis for environmental pollution)

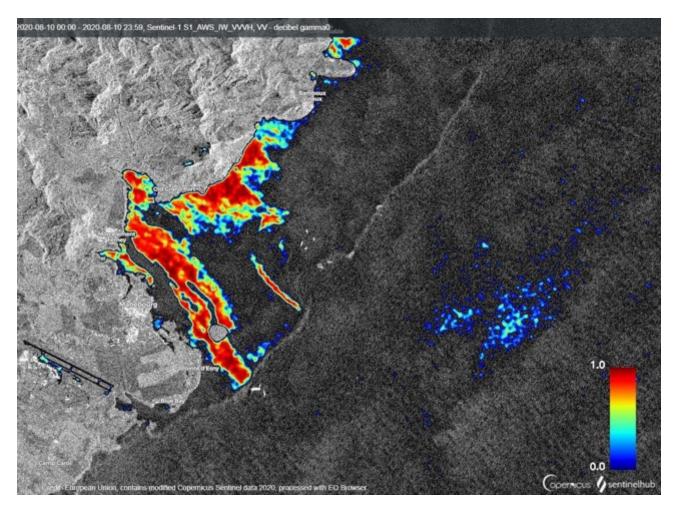


#### **Background**

- Developed a model to output heatmap to visualize the areas affected by the Wakashio oil spill off Mauritius (2020).
- Due to the COVID-19 pandemic, on-site visits were not possible, and the incident drew media attention partly because the tanker was Japanese.

#### **Summary**

- Conducted time-series SAR analysis to estimate polluted areas
- Delivered results in a media-friendly format, enabling wide coverage on web news
- Demonstrated our approach of designing outputs with end-use in mind to maximize impact



Copernicus Sentinel data [2025] ©ESA

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## Cost-effective Time Series Change Detection Solution

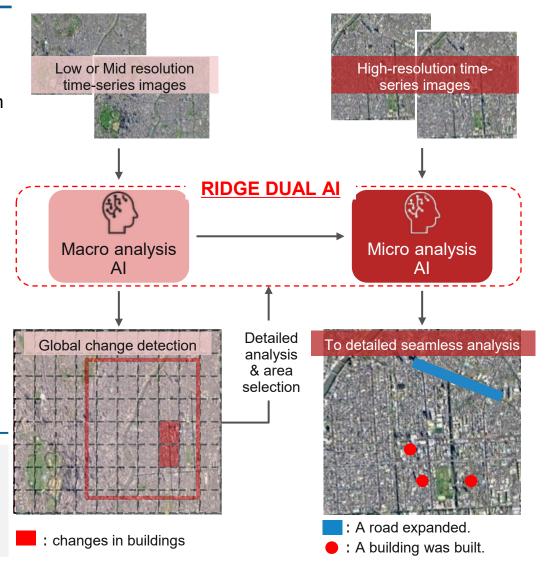
~ RIDGE DUAL AI ~

#### Challenges to be solved

- Large-scale change detection requires balancing cost and resolution of satellite images
- Acquiring many high-resolution images is costly, while low-resolution images lack detail
- Ridge Dual AI solves this with a two-step process:
  - 1 Macro analysis AI: low-cost, low-resolution images for broad change detection
  - (2) **Micro analysis AI**: high-resolution images for detailed object-level analysis
- Enables rapid and cost-effective understanding of geographical changes
- Supports multi-modal comparisons (e.g., old maps vs. new satellite images) for broader applications

#### Major Achievement

- ✓ Awarded the 6th Space Development and Utilization Award, Award (2024) use of largescale object change detection AI in analyzing geographical changes and conflict
- √ Visualized building collapses due to the Myanmar civil war using satellite images (broadcast on NHK Special in 2022)
- ✓ Used by the Geospatial Information Authority of Japan for updating electronic base maps (2023) Expected to significantly reduce the time and human costs of map updating



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### Change Detection Use Case 1





#### Background

- In Myanmar, a civil war led to the burning of civilian houses in rural areas
- A Japanese broadcaster (NHK) planned a documentary but could not conduct on-site reporting
- They requested satellite image analysis to ensure accurate and fair coverage

#### Summary

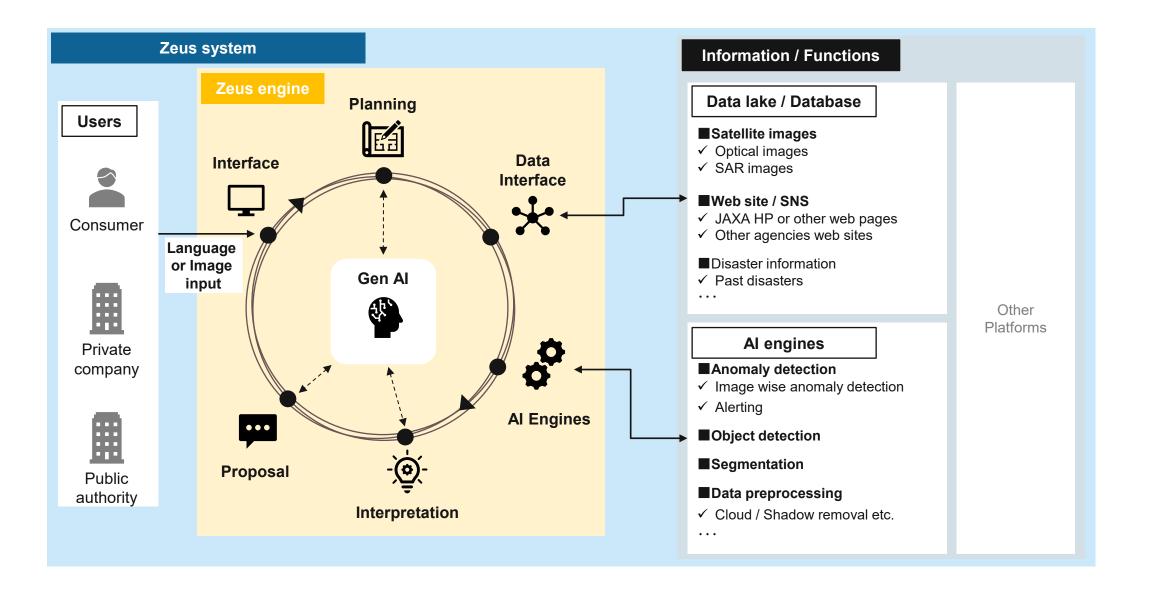
- Using RIDGE DUAL AI and Ridge SAT Image Analyzer, we counted destroyed houses over a twoweek period
- Achieved >90% accuracy compared with manual counting
- Results were broadcast nationwide in Japan



© NHK

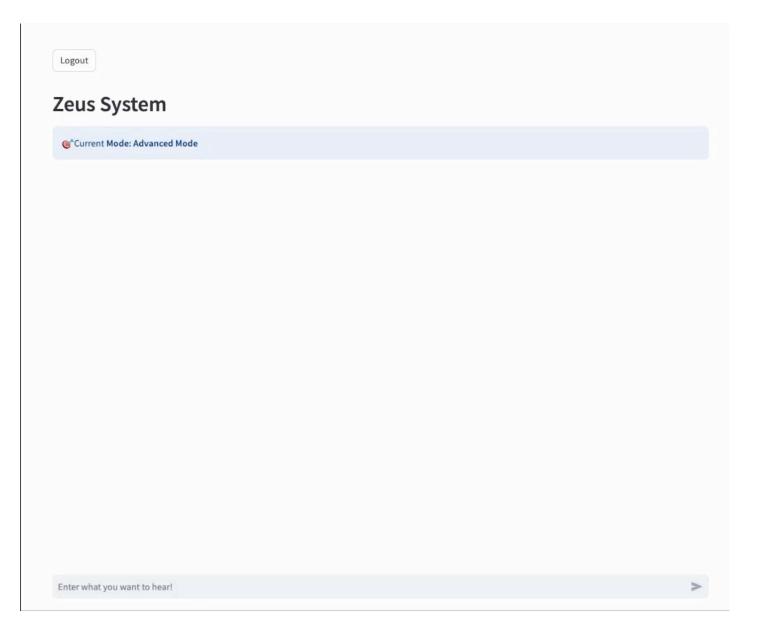
#### End to End automatic reporting system

Zeus system (Gen-Al based multi language analysis platform)



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# Satellite activities in Ridge-i Al on TOP



#### User query:

Tell me the number of ships in Singapore on Aug 2025

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### **Summary**

- 1. Ridge-i introduces AI by working backward from user needs
- 2. With the trainable Ridge SAT Image Analyzer, customers can easily build their own AI models
- Change Detection (RIDGE DUAL AI) enables cost-effective large-scale monitoring
- 4. Developing next-generation solutions leveraging LLMs
- 5. Open to collaboration with researchers and industry partners

# Thank you for your attention!