JAPAN BOOTH

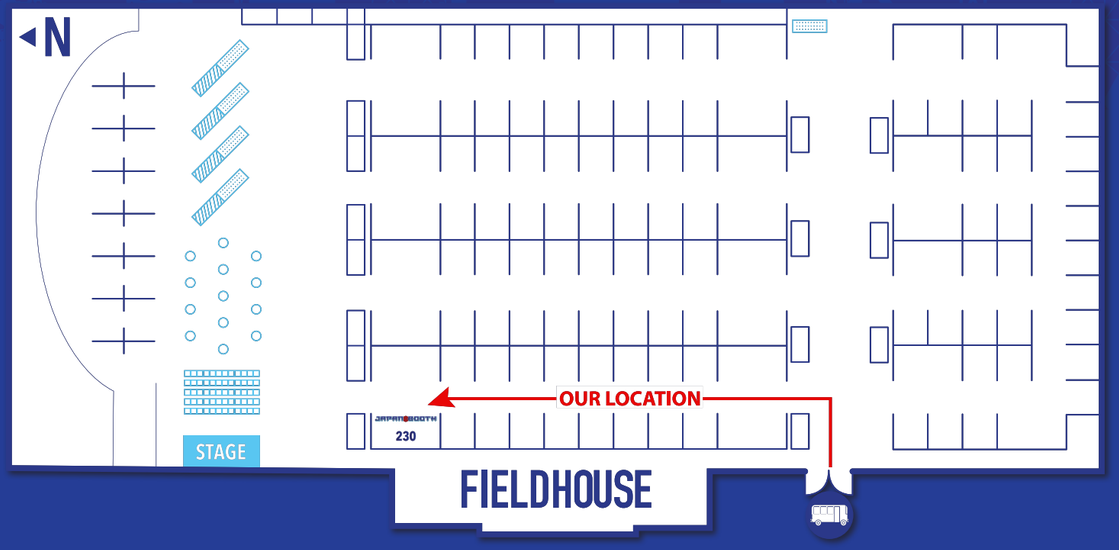
– MAGAZINE 2023 –

PRESENTING A CONSORTIUM OF SPACE INDUSTRY BUSINESSES LOCATED IN JAPAN

hosted by:

Japan Space Systems

PARTICIPANT COMPANIES



ABOUT THE JAPAN BOOTH

The space industry is experiencing a global boom and perhaps nowhere more so is that apparent than in Japan where scientists, engineers, and entrepreneurs are the driving force behind the world-renowned brands, universities, and growing numbers of start-ups that are at the forefront of technology with developing solutions that are shaping the future by increasing and maximizing access into space.

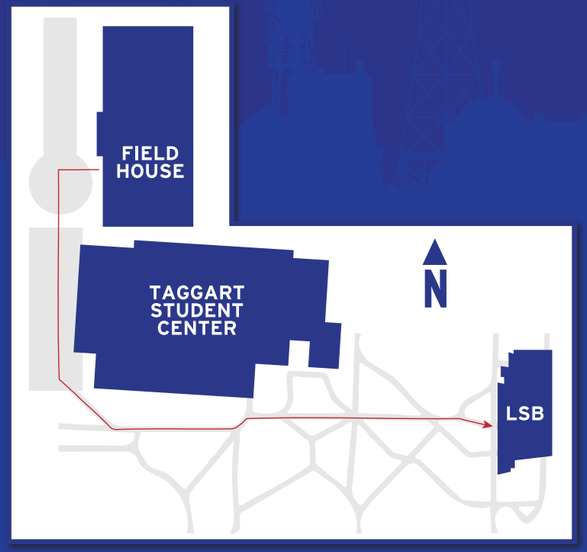
Here, at SmallSat 2023, Japan Space Systems have brought together some of the most innovative technologies being developed in Japan. Visit the Japan Booth, located inside the Field House, to meet engineers and scientists who are developing everything from thrusters, bus components, and lenses to launch solutions, data management and analysis, and so much more.

SIDE MEETINGS

The Japan Booth is proud to host Side Meeting sessions at this year's SmallSat Conference on August 8th and August 9th.

These sessions will feature select Japanese companies who will present and discuss their proprietary technologies ands capabilities for serving the dynamic needs of a rapidly growing Space 2.0 industry.

Each session is composed of participant companies ranging from innovative start-ups to industry-leading juggernauts with well-established flight heritage.



Whether your interest is in launch, spacecraft, or the communications sectors, or in precision component design, manufacturing, or materials fabrication, there is something of interest for all who attend.

TUESDAY, AUGUST 8, 2023

Japan Tech Show vol. 1

Life Science Building (LSB), Room 207

STARTS @ 9:45AM

Presenting Speakers

- Takasago Electric, Inc .
- ArkEdge Space Inc.
- Genesia Corporation
- IHI Aerospace Co., Ltd.
- Inforstellar, Inc.
- Ministry of Economy, Trade, and Industry (METI)

WEDNESDAY AUGUST 9, 2023

Japan Tech Show vol. 2

Life Science Building (LSB), Room 207

START @ 9:45AM

Presenting Speakers

- KYOCERA Corporation.
- ASPINA Inc.
- KIKUCHI SEKI CO., LTD.
- Kawasaki Heavy Industries, Ltd.
- CANON ELECTRONICS INC.
- Ministry of Economy, Trade, and Industry (METI)

ArkEdge Space

ArkEdge Space Inc. is a fast-growing Japanese start-up company specialized in the design, manufacturing, and rapid delivery of low-cost nanosatellites for both low earth orbit and deep space exploration missions.

Our 3U and 6U standardized and modular bus systems can accommodate any type of mission payload and adapt to its requirements. Our satellites come equipped with a proprietary LoRa communication payload enabling IoT applications worldwide, regardless of ground connectivity.

ArkEdge Space's 3U and 6U CubeSats can be operated alone or as part of a constellation, and can support a multitude of missions across a wide range of business applications, from geological survey to maritime safety, from disaster monitoring to agricultural improvement.

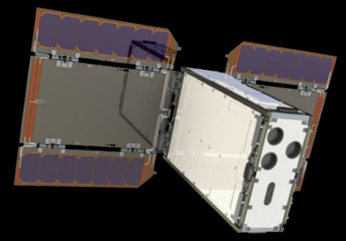
Having drastically reduced our production costs by streamlining our designs and optimizing our manufacturing process, ArkEdge Space is able to provide you with an unprecedented low-cost and quick delivery service, allowing you to get into space cheaper and faster.

Our satellites

6U Standard Bus

ArkEdge Space is ready to support customers' satellite businesses by not only adopting the modularization of the 6U satellite bus for versatility, low cost, and short delivery time, but also by providing integrated services from satellite design and development to on-orbit operation and ground station data acquisition.

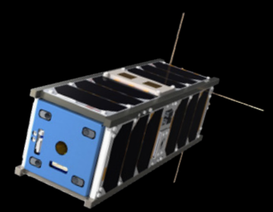
By 2025, we will demonstrate multiple satellites for IoT communications, earth observation, and satellite VDES. We are also working on the development and demonstration of a constellation for lunar activities.



3U Standard Bus

Our 3U is equipped with a 100m GSD multi spectral camera and a sub-camera, along with a data storage and relay (S&F: Store & Forward) system for the acquisition of weak radio signals.

Flight Heritage: RWASAT-1, OPTIMAL-1



Solutions line-up

ArkEdge Space provides global and seamless services that contribute to the cost reduction of information collection, logistics digitalization, and efficiency improvement in agricultural land, forests, and maritime areas through the utilization of our nano-satellites.

Smart Agriculture

Crop Growth,
Climate, Water Level,
Ground Conditions

Environment/SDGs

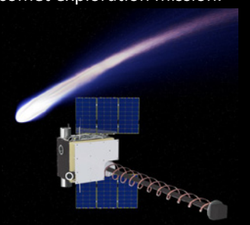
Carbon Sink Monitoring,
Fire Detection

Logistics Efficiency

Location, Speed,
Route of Ships,
Containers, and Trucks

Deep Space Exploration

ArkEdge Space has been selected for JAXA's research and development project on communications and positioning for lunar activities, and is participating in the operation of EQUULEUS launched by the ARTEMIS 1 rocket. Furthermore, ArkEdge Space will contribute to human scientific development by developing a child spacecraft for Comet Interceptor, an ESA-led comet exploration mission.



Company information

What we do is...

- Design, manufacturing, and operation service of spacecrafts (nano- satellites), ground stations and related components.
- Software development, education and consulting services.

Year of Establishment: 2018
Location: 3A DOME ARIAKE HEADQUARTER,
1-3-33 Ariake, Koto-ku, Tokyo, JAPAN

Takayoshi Fukuyo

President and CEO

fukuyo-sec@arkedgespace.com

ArkEdgeSpace

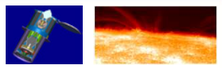
Genesia Corporation

**Our primary scope of business is R&D,
manufacturing and sales of high value-added optical systems such as;**

- **Optical systems (UV/VIS/IR) for aerospace equipment**
  - Many imaging units equipped on Earth observation satellites, interplanetary spacecrafts, astronomy satellites and International Space Station, etc.
- **Optical systems (UV/VIS/IR) for high-energy plants**
  - Optical units for nuclear fusion experimental reactors
- **Hyper/Multi-spectral imagers**
  - Developments of imaging systems with LCTF (Liquid Crystal Tunable Filter)

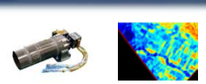
**Genesia's Observation equipment
in the field of satellite and space exploration
= Examples of equipment inserted into orbit =**


ASTRO-F/AKARI

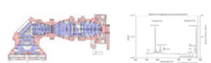

SOLAR-B/HINODE


HAYABUSA-2 NIRS3


Hodoyoshi - 1


RISING-2 HPT


CLASP


ISS/IMAP

Satellite Name (Year of Launch)
OMOTENASHI (2022)
Myanmar micro-satellite (2021)
ISS-JBCS (2020)
Micro Dragon (2019)
RISESAT(HODOYOSHI-2) (2019)
NEXTSat-1 (2018)
DIWATA-2 (2018)
CLASP (2015)
PROCYON (2014)
HAYABUSA-2 (2014)
RISING-2 (2014)
HODOYOSHI-1 (2014)
STSAT-3 (2013)
ISS-IMAP (2012)
CIBER-1 (2008, 2010, 2012, 2013)
SERVIS-II (2007)
SELENE(KAGUYA) (2007)
SOLAR-B(HINODE) (2006)
ASTRO-F(AKARI) (2006)
INDEX(REIMEI) (2005)
SERVIS-I (2003)

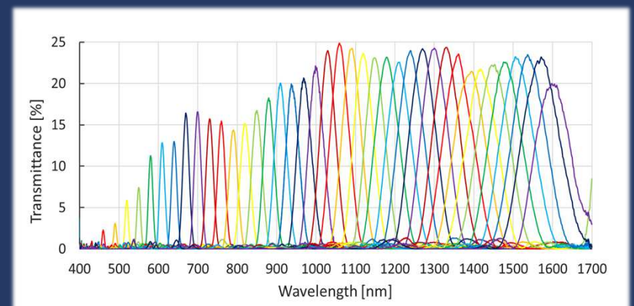
Space optics for Hyper/Tunable multi-wavelength onboarding micro/nano sat applications

From UV region to beyond Thermal IR

Liquid Chrystal Tunable Filter (LCTF)

LCTF is an optical filter that electronically controls liquid-crystal to transmit a selectable wavelength of light. Its rapid tuning capabilities over a broad spectral range allows for numerous applications using one system without the need for multiple filters.


Space - grade LCTF



Transmission Profile of LCTF

Key Features of Camera with LCTF

- Light Weight & Compact
- Broad Spectral Range (e.g. 400nm-1600nm)
- No need to carry multiple filters
- Low-Cost
- Multipurpose: Marine Debris Detection, Mineral Detection, Vegetation Mapping, Advanced Precision Agriculture and more!


Camera with LCTF

Website URL : http://www.genesia.com

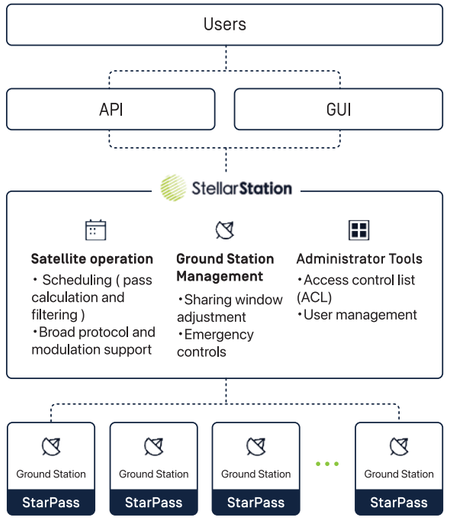
Contact Point : sales@genesia.co.jp

Address : 3-38-4-601 Shimo-Renjaku Mitaka Tokyo 181-0013, Japan

Infostellar

Making Ground Segments Simple

At Infostellar, we specialize in software-driven space communications. Our mission is to support the space community by leveraging cloud-based technologies and providing a Ground Segment as a Service (GSaaS) solution that offers universal access. Our unique and innovative solution, StellarStation, is built on our proprietary platform and serves as the foundation for our services.



StellarStation Benefits

Easy and one-time setup. Get access to global Ground Stations.

An API and/or GUI interface is available to control data transmission and reception, making pass reservations (ground station reservation), etc.

Never think twice about integration with StellarStation

StellarStation's single API dramatically reduces the work of scaling your ground segment. Simply integrate with our network once - and get access to every station in it.

Stay flexible.

Seamlessly use additional ground stations during peak demand, LEOP or emergencies. Switch to a new set of communication channels and ground stations if needed.

Key features of StellarStation

Simple

Single integration and validation effort for satellite operators to access our global network of ground stations from a variety of our partners.

Scalable

With access to our global network of ground stations, it is quick and easy to expand coverage and capacity as needed.

Flexible

With StellarStation, satellite operators select from a range of ground stations based on location, availability, and cost.

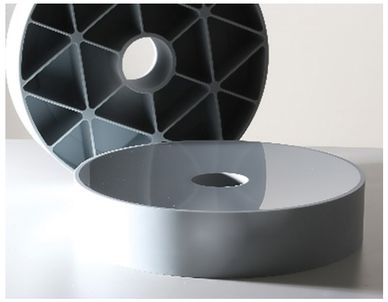
Secure

Industry-standard best practices in security and system availability

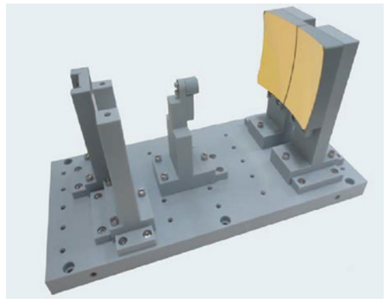
Contact

Tokyo HQ 32F Shinjuku Nomura Building, 1-26-2 Nishi-Shinjuku, Shinjuku-ku, Tokyo 163-0532
UK Office The Garden Suite, 23 Westfield Park, Redland, Bristol, United Kingdom BS6 6LT
US Office 4275 County Line Road - Suite 20, Chalfont, PA 18914 USA

http://infostellar.net/
info@istellar.com

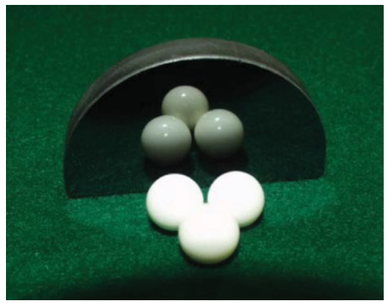


Low Thermal Expansion Cordierite
Superior mechanical strength enables lightweight mirrors with less deflection.



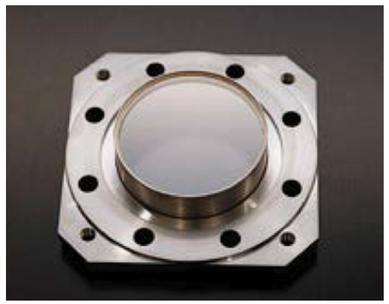
Cordierite Optical System
Low thermal expansion mirror and structural parts are both made from one material: Cordierite.

Cordierite Telescope
With superior mechanical properties, Cordierite is suitable for structural parts.



SiC Mirror and Structural Parts
Kyocera develops SiC mirrors and structural parts for use in outer space.

Li Ion Battery Seal
Assembled metallization technology for a ceramic and metal parts.



Sapphire Monitoring Window
Usable under an ultra high strength vacuum.

Scan here to visit our website and learn more about our fine Cordierite low thermal expansion ceramic.

THE NEW VALUE FRONTIER

KYOCERA

Light Weight

Approx. 70% Weight reduction via ribbed structure design with high rigidity

Structural Components

Cordierite is applicable to structural components by its superior mechanical property

Low Thermal Expansion

Dense cordierite ceramic with extremely low thermal expansion rate

CTE = 0 +/-20ppb at 22°C

Masa Kamiura
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Shinobu Nagata
(US Contact)
shinobu.nagata@Kyocera.com

HISTORY

For more than 60 years, Kyocera has endeavored to develop innovative new solutions and apply technological expertise in advanced materials to create valuable products that facilitate human progress.

In its four primary markets - Information & Communications, Automotive,Environment & Energy, and Medical & Healthcare - Kyocera is committed to creating value that exceeds customer expectations. The Kyocera brand promises performance in the areas of technological strength, superior quality, and reliability.

The Kyocera Group is comprised of 286 subsidiaries with a global workforce of over 76,000 employees, and consolidated sales revenue totaling 1.62 trillion yen (approx. USD 14.6 billion) FY2022.

BUSINESS

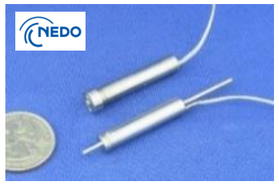
Kyocera is one of the world's leading manufacturers of high precision, high quality ceramic components and products. Kyocera manufactures over 200 varieties of ceramic materials for a wide range of applications with cutting edge technology and services designed to meet each customer's needs.

In the field of aerospace exploration, Kyocera has made numerous contributions through its superior quality materials, exemplified by the low thermal expansion ceramic material 'Cordierite' and components such as telescope mirrors, terminals for lithium-ion batteries, tank penetration flanges, and much more.

Takasago Fluidic Systems (TFS)

○ Products

Thruster Valves for Space

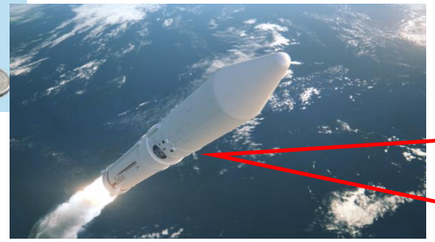


・Micro Thruster Valve HVA/HVD Series

→ 2MPa pressure-rated for HVA, 10MPa for HVD
→ 8g weight for HVA, 12g for HVD
→ For small satellites / thruster systems

・20N-class Thruster Valve HVC Series

→ 2.8MPa pressure-rated
→ Frictionless moving core



Takasago's HVC valve has been **qualified** for RCS system on the **JAXA's EPSILLON launch vehicle**

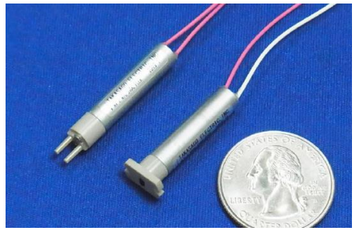
HVC valve will have the first flight with next EPSILLON launching !

Other Valves for Space

・10MPa High Pressure Gas Valve HVB

→ Our first flight heritage valve on the ALE-1, ALE-2 Satellites

© ALE

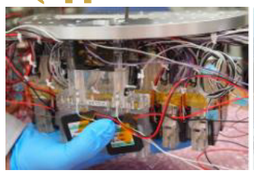


・Ultra-Small Solenoid Valve NV/NLV Series

→ One of the world class smallest valve, Dia.5.7 X Height 27 with less than 4g weight
→ very suitable for experimental device

Other Items for Space Experimental Units

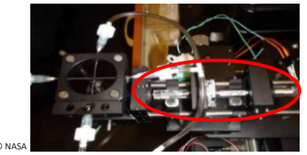
(Application Examples)



© JAXA

Miniature valves (32 units) and pumps (16 units) used in JAXA observation rocket for a space experiment of crystal nucleation

© JAXA



© NASA

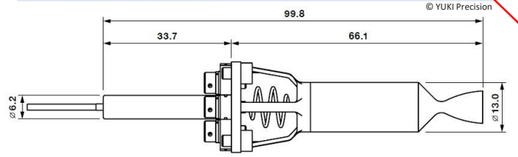
Micro syringe pump used in the ISS for NASA/OASIS project

JAXA's automated cell culture media exchange unit "Auto-Ex1" has been used in the ISS.

Thrusters

→ YUKI Precision and Takasago have developed a small thruster (31g weight including valve) with Green Propellant "90% HPT"
→ suitable for attitude control, de-orbit, etc. to be used in a small satellite or Cubesats

© YUKI Precision



Thrust : 0.2N
ISP : 150 – 155sec
Supply Pressure : 0.9MPa
Power Supply : 3V/0.4W for holding, 12V/6.5W for opening
Heater Power : 0W (cold start OK)

(This item was developed with subsidy from Japanese Government)

○ Contact

Masahiko Inoue

m-inoue@takasago-elec.co.jp

Hello! We are always excited about attending this conference.
Please meet us and find the real miniature products of Takasago and YUKI !

○ For More Information

URL: https://www.takasago-fluidics.com/

Contact Point: (phone) +81-(0)70-6580-2404

Address: 66 Kakitsubata Narumi-cho, Midori-ku, Nagoya, Aichi 458-8522 Japan

Over 8-year Operations of Micro-satellites

Canon Electronics does not only develop satellites and components but also operate satellites 500 km above the globe. The quality of our products has been proven by over 8 years of operation in space. We have been building close relationships with our customers through the development of space technology.

Imaging technology in space

Customizable Imaging Systems based on your purpose

Combining Canon cameras with customized optical telescopes allows satellite imagery based on your needs. The use of high-resolution photography and area sensors that can detect vehicles enables capturing still images of moving objects and fixed point observation videos.

Before
Typhoon Hagibis

After
Typhoon Hagibis

Highly flexible attitude control system

The attitude control system (ACS) is also suitable for taking telephoto images of celestial bodies by stabilizing the attitude for a long period of time. In addition, the ability to quickly change the satellite's attitude makes it possible to acquire mosaic images.

Orion Nebula

The Moon and Mars

World-class high resolution night images

Using the Canon's ultra-high-sensitivity CMOS sensor enables capturing high resolution night images. Daytime images can also be taken by switching neutral density filter, which allows comparing day and night images from the same camera.

Paris,daytime(left)
and night(right)

SPACE TELESCOPE

	Aperture 87mm	Aperture 200mm	Aperture 400mm
			
Focal length [mm]	809	1860	3720
F number	9.3	9.3	9.3
Image Circle [mm]	Φ11	Φ16	Φ43.27
FOV [°]	0.78	0.49	0.67
Dimensions [mm]	95×95×160	Φ260×H400	Φ500×H700
Mass [kg]	<1	6	20

- Originally designed high-performance Cassegrain system with correction lenses
- Ultra-precision mirror processing by Canon
- Equipped with focusing actuator
- Uses ultra-low thermal expansion glass-ceramics and radiation-resistant optical glass
- Equipped with a space camera using Canon's CMOS image sensor
- Φ87 mm can support CubeSat 2U dimensions

Canon

Small Satellites & Components

CANON ELECTRONICS INC.

IHI AEROSPACE Co., Ltd.

IHI AEROSPACE is Japanese leading manufacturer of propulsion systems for launch vehicles and spacecraft. Our robust product line of thrusters, tanks, and integrated propulsion systems can seamlessly integrate to fit any design, development, manufacturing, operational, or mission specification. Whether you require monopropellant, cold-gas, bipropellant, or an electric propulsion system, IHI AEROSPACE has the perfect flight-qualified propellant solution for you.

Also, IHI AEROSPACE has EPSILON, dedicated and rideshare launch vehicle of Japan. You will have launch service for your satellite according to customer's request.

Propulsion Systems

Propulsion Subsystems

IHI AEROSPACE is No.1 manufacturer in Japan of spacecraft propulsion systems and has developed a large number of propulsion subsystems since 1964. Flight proven propulsion systems include hydrazine monopropellant propulsion systems, cold gas propulsion systems, and bipropellant (hydrazine/MON or MMH/MON) propulsion systems.

As a latest flight-proven bipropellant subsystem, IHI AEROSPACE developed propulsion system for the International Space Station cargo spacecraft, HTV(H-II Transfer Vehicle). Also, being under development for next generation cargo HTV-X and Martian Moon eXploration (MMX) spacecraft.

Scan to download our propulsion subsystems brochure

Pressurant and Propellant Tanks

IHI AEROSPACE has developed a wide range of propellant tanks and pressurant tanks for launchers and satellites since the start of development in 1964. Over 250 propellant tanks have been flown and been successfully operated.

IHI AEROSPACE's product line covers a wide range of tanks from 3 to 1494 liters in volume and from diaphragms to surface tension channel mesh propellant management devices (PMDs).

[552 liters] [169 liters]

Scan to download our propellant tanks brochure

Bipropellant Thrusters

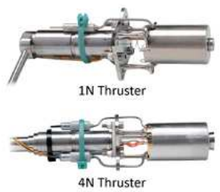
IHI AEROSPACE's development of our apogee engines with N2H2/NTO propellant began in 1980. Since then, their excellent performance and reliability have been well recognized by US satellite manufacturers. Also, our bipropellant thrusters are supplied to main engine of Cygnus spacecraft. Over 350 hydrazine/MON3 thrusters have been flown and been successfully operated.

490N Thruster 120N Thruster

Scan to download our bipropellant brochure

Monopropellant Thrusters

More than 1,000 hydrazine monopropellant thrusters manufactured by IHI AEROSPACE have been flown since the start of development in 1964. Its thrust ranges from 1N(0.2lbf) to 50N(11lbf).



1N Thruster

4N Thruster

Scan to download our monopropellant brochure

EPSILON Launch Service

SPEC	Epsilon
Capability	SSO (Alt 350-700[km]) **600+**[kg] LEO (Alt 500[km], inclination31.1[deg]) **1400+**[kg]
Accuracy	Altitude ±15[km] or less (Actual: **1.2[km]@F4**) Inclination ±0.15[deg] or less (Actual: **0.08[deg]@F5**)
Multiple Satellite Launch	**Available**

EPSILON: Begin space access with flagship launch vehicle of Japan

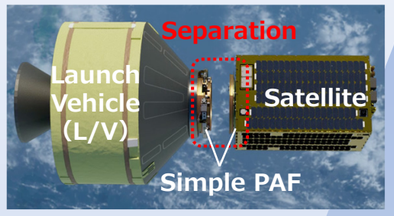
- ✓ Suitable for small satellites
- ✓ Dedicated and Rideshare launch is available.
- ✓ Satellite delivery to launch site by X-10 to launch

Please see more detail from QR code.

Simple PAF
(Payload Attach Fitting for small satellite)

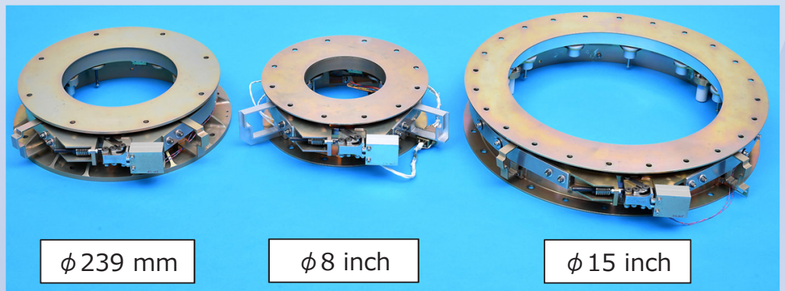
Kawasaki
Powering your potential

The features of Simple PAF
- A general Marman Clamp Band
- **Low cost** and Short delivery time
- Mass of Satellite is up to **250kg**
- Low Shock (Less than **200G**)
- Easy-to-use (**Non-Pyro**)
- Electrical Interface (**compatible with Pyro**)



When the satellite reaches the orbit, the separation mechanism is activated to separate the satellite.

The Simple PAF is a structure that connects a small satellite up to 250 kg to the Launch Vehicle.



Mechanical I/F Diameter Lineup

Kawasaki has developed and operated small to large PAF for H-IIA Launch Vehicle, and has used these results for Simple PAF.

Simple PAF Specification Overview

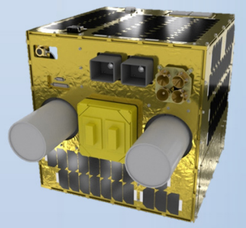
Type		Simple PAF 8M	Simple PAF 15M	Simple PAF 239M
Mechanical I/F with Satellite	Pitch Diameter	203.2mm(8in)	381.0mm(15in)	246.0mm
	Number of bolts	12	24	8
	Bolt standard	NAS 6204: 1/4 in Hex Head Bolt		
Electrical I/F with satellite		Separation confirmation SW: 2 or 3 (optional) UMB: Optional		
Satellite frame mass		0.4kg*1	0.9kg*1	0.6(TBD)kg*1
Mechanical I/F with L/V	Pitch Diameter	203.2mm(8in)	381.0mm(15in)	271.0mm
	Number of bolts	12	24	8
	Bolt standard	NAS 6204: 1/4 in Hex Head Bolt		
Electrical I/F with L/V		Two operating lines: standard Separation confirmation SW: 2 (optional) UMB: Optional		
Satellite release spring		3 or 6	3, 6 or 12 Pieces	3 or 6
Band tightening force		6 kN or 8.4 kN		
Total mass		2.4kg*1	3.2kg*1	3.5kg*1

Note *1: Excluding some devices (Satellite emission spring, Limit SW, Umb connector)

Space Products

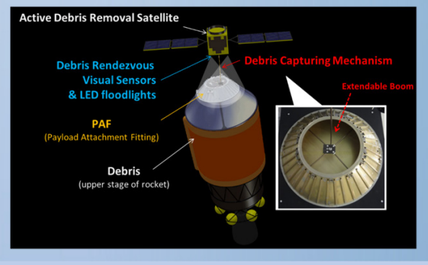
Kawasaki
Powering your potential

Space Debris Removal


Launched in 2021, Now operating

DRUMS (Debris Removal Unprecedented Micro-Satellite)


Ground Station for satellite communication



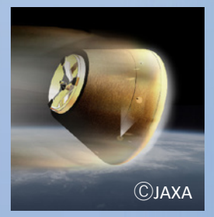
Manned Space Technologies & Robotics


Provided by JAXA/NASA
Airlock for Japanese Experiment Module


THC (Temperature and Humidity Controller) for Japanese Experiment Module


©JAXA/KHI
Sampling System Manipulator for MMX(Mars Moon eXploration)

Thermal Protection Systems

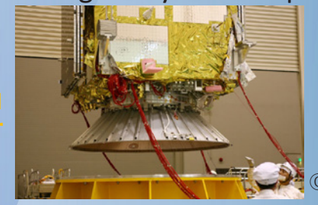


Thermal Protection System for HTV Small Re-entry Capsule

Sample Return Capsule for MMX(Mars Moon eXploration)

Payload Fairing & Payload Adapter

©JAXA



Payload Attach Fitting for H-IIA Launch Vehicle

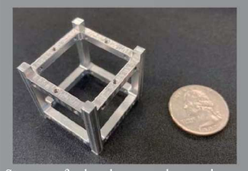
Payload Fairing for H3 Launch Vehicle

Contact
Hiroki Onikura
onikura_hiroki@khi.co.jp
Michiaki Matsumoto
matsumoto_michiaki@khi.co.jp

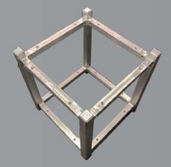
Machined structure developed by KikuchiSeiki

Size: W6U Material: A6061-T6
Dim.:100mm×222.6mm×340.5mm 1.052kg
Vib.Freq(Hz): 1st 368 Hz, 2nd 388 Hz, 3rd 487 Hz
Max.von Mises stress: 5.8Mpa
MS: 30
Delivery record: Industrial technology innovation center of ibaraki prefecture

Size: 3U Material: A6061-T6
Dim.: 100mm×100mm×340.5mm 0.486kg
Vib.Freq(Hz): 1st 211 Hz, 2nd 425 Hz, 3rd 510 Hz
Max.von Mises stress: 21.6Mpa
MS: 12
It is the result of joint research with the University of Tsukuba.



Structure for hands-on work experience for elementary school students
Material: A6061-T6
Dim.: 30mm×30mm×30mm

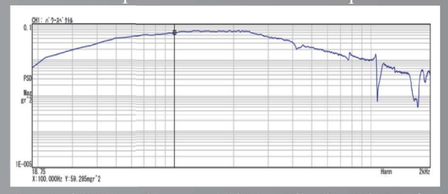


Size: 1U Material: A6061-T6
Dim.: 100mm×100mm×100mm 0.151kg
Vib.Freq(Hz): 1st 400 Hz, 2nd 407 Hz, 3rd 504 Hz
Max.von Mises stress: 4.1Mpa
MS: 182.8
Delivery record: Industrial technology innovation center of ibaraki prefecture

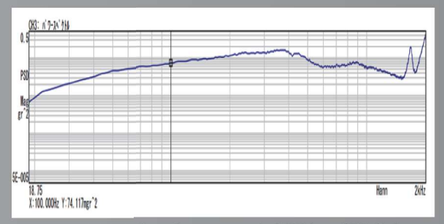
< Vibration Test >

ex. 3U CubeSat Structure during Processing

< Exsample of Accelerometer Output >



Output of CH1 Accelerometer (g2/Hz) at Vibration Tale Interface



Output of CH3 Accelerometer (g2/Hz) at 3U Cubesat

It is the result of joint research with the University of Tsukuba.

Project Leader
Masahiro Kikuchi
Managing director

We can provide structures for CubeSats ranging from 1U to 24U,
made from a single block of aluminum with precision machining.
We pursue both high rigidity and lightweight design in our frames.
Our frames are designed using the latest 3D modeling and optimization software,
Inspire1, and can be customized to meet specific requirements.
Our production lead time can be as short as one week.

Satellite structure

Company Profile

Head Office
2-12-11 Oomika-cho, Hitachi-shi, Ibaraki

Second Plant
4-13-21 Oomika-cho, Hitachi-shi, Ibaraki

Mukaiyama Works
1047-5 Mukoyama, Naka-shi, Ibaraki

Utsunomiya Office
Room 202, Level Comp II, 600-34 Nishihara, Utsunomiya-shi, Tochigi

TEL +81-29-295-8511
FAX +81-29-298-8820
WEB http://www.kikuchiseiki.com
EMAIL eigyou@kikuchiseiki.com

History

2023: Began the Cubesat structural development business
2019: Launched a business in the space industry
2015: Began the aerospace industry and received its first order
2013: Acquired JIS Q 9100 certification (August 31, 2013)
2009: Expanded the large-scale machinery processing factory
1995: Built the Mukoyama factory and consolidated production bases
1983: Built a second factory and began unit assembly
1976: Established "Kikuchi Seiki Co., Ltd."
1966: Converted to a parts processing business
1961: Established as a press die manufacturer

JAB MS CM023
BSK ISO BSKA0198

Main business items.

- Manufacturing of parts for the power and energy industry
- Precision machining of parts for industrial machinery
- Machining of engine parts for aircraft
- Design and manufacturing of large-scale jigs and fixtures for the aerospace industry
- Development of structures for ultra-compact artificial satellites

Comprehensive large-scale metal processing achieved through a wide range of machinery and quality assurance systems.

Our main focus is on precision machining of high-quality parts using our large-scale five-axis machining centers and turning centers. We are capable of managing the entire production process, including design, material procurement, sheet metal fabrication, heat treatment (annealing), machining, surface treatment (painting), assembly and precision adjustment.

Maximum processing range
3500mm x 6500mm x height 1500mm Maximum weight 30t

Neoa-10:φ1250mm×740mm
Neoa-12:φ1400mm×1500mm
Neoa-20:φ2000mm×1500mm Maximum weight 8t

KIKUCHI SEIKI CO., LTD.

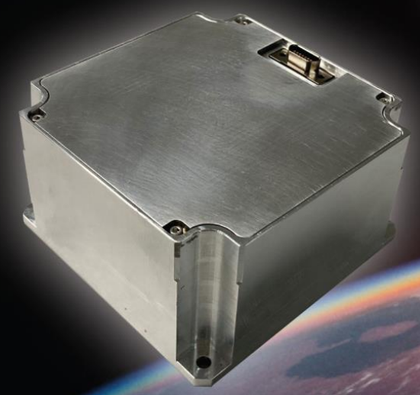
ASPINA
Engineered to Inspire

ASPINA Inc.
6065 Bristol Parkway, Culver City, CA
90230 U.S.A.
Tel: +1-310-693-7600
E-mail: us.info@aspina-group.com

Chris Jones:
Business Development Manager
chris.jones@aspina-group.com

Dean Emori:
Director of New Business Development
daisuke.emori@aspina-group.com

Reaction Wheels for Small Satellites



Strength

- Short lead time
- Reasonable cost
- Low disturbance
- Light weight
- Low power consumption
- Collaboration with Japanese government / industry leaders

Reaction wheel

	Specification		
Application	**100kg class small satellites**	**200kg class small satellites**	**500kg class small satellites**
Development Status	1st launch expected in 2025	In-development	In-development
Maximum Angular Momentum	≥0.35Nms	≥1Nms	≤20Nms
Maximum Output Torque	≥15mNm	≤30mNm	≤200mNm
Mass	Approx. 1kg	Approx. 1.5kg	≤6kg
Envelope	100 x 100 x 80mm	150 x 150 x 80mm	≤250 x 250 x 120mm
Operating Temperature Range	-20 to 50°C	-20 to 50°C	-20 to 50°C
Radiation (TID)	20krad	20krad	20krad
Supply Voltage	18V to 30V	24V to 34V	28V to 34V
Maximum Power Consumption	<15W	<42W	TBD
Control Mode	Speed or torque	Speed or torque	Speed or torque
Command/Telemetry	RS485	RS485	RS485
Design Life	5 years	5 years	5 years

Above specifications are under development and subject to change.
Specification of Reaction Wheel for CubeSat Coming soon!

Compressor / Blower for Human Space Habitation

- Compact
- Low noise & vibration
- Oil-less

- Compact, light weight
- Low noise & vibration
- High Pressure

Compressor

	Specification
Nominal Voltage	24V
Ambient Temperature	5 to 40°C
Rated Pressure (1atm)	140kPa (20psi)
Rated Flow (1atm)	20L/min
Mass	1.8kg
Size	128 x 128 x 115mm
Acoustic Noise Level	60dB(A)

Blower

	Specification
Nominal Voltage	24V / 36V
Ambient Temperature	0 to 50°C
Rated Pressure (1atm)	10kPa
Rated Flow (1atm)	200L/min
Mass	300g
Size	Ø62mm x 58.5mm (excluding outlet port)
Acoustic Noise Level	65dB(A)

Above specifications are for medical use. Customization for Space use is available.

RICERCA SECURITY

Satellites are orbiting with *software* risks. Mitigate them with software-based *testing*.

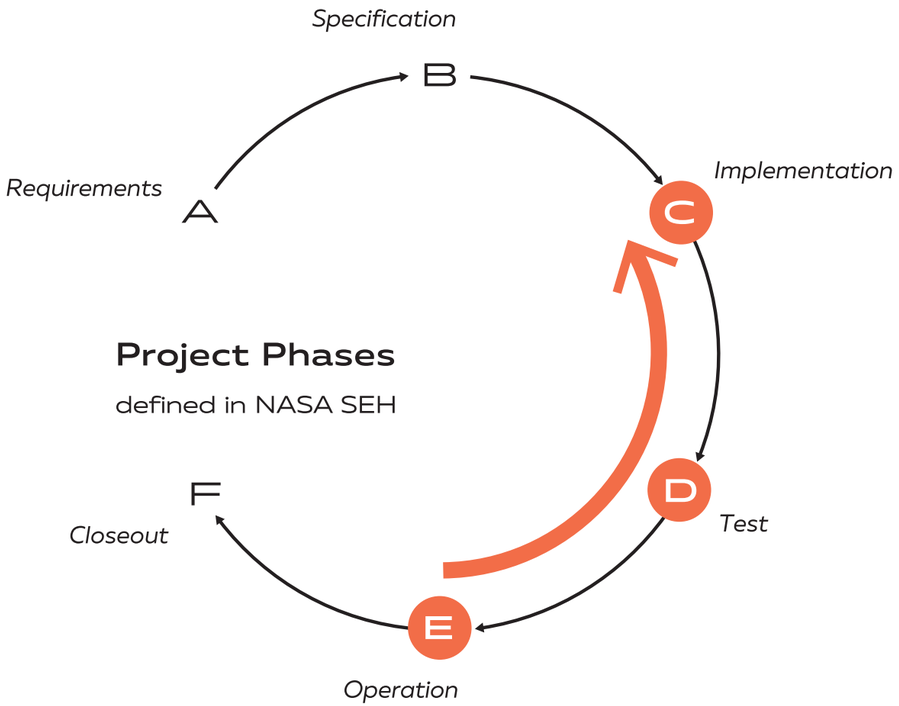
Our Expertise

Vulnerability Assessment

Since founding, our team has been performing vulnerability assessments across various environments and architectures, ranging from large-scale E-Commerce websites to embedded systems. In embedded systems, we faced the constraints of hardware development that can be also applied in the space. We can make proposals tailored to the space system development process.

Research & Development

With the support of the Japanese government, we are conducting research on vulnerability detection automation and triage. This research also targets embedded systems. Moreover, our papers were accepted at top-notch cybersecurity conferences.



Shift-left Testing With Our Security Technology

C Penetration Testing

We propose penetration testing for developers involved in satellites with proper FDIR practices. The goal is to simulate an unexpected failure from the attacker's perspective and confirm if it can be resolved through FDIR.

D Fault Injection

Do you need a test facility to trigger failures? There is an alternative software-based approach that is quick, effective, and reasonable. We utilize our emulator to trigger bit-flips caused by radiation, circuit disconnection, and so on.

E Attack via Telecommand

This year, researchers have shown that attacks against satellite firmware are practical and possible by exploiting the vulnerable TC left in their system (*).

We assess if the system correctly tolerates the potential attacks by employing white-box source code analysis.

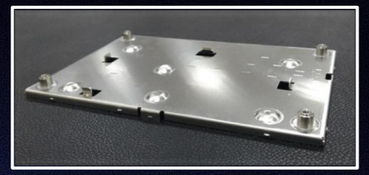
(*) https://jwillbold.com/paper/willbold2023spaceodyssey.pdf

About Us

Ricerca Security, Inc.
Tokyo, Japan
https://ricsec.co.jp/

Meet us online

Did these challenges/solutions ring a bell?
Feel free to contact us through our website.



Metal Stamping

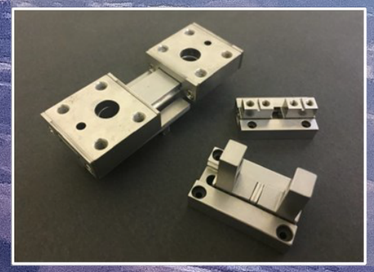
We have extensive experience in the production of differently shaped stamped parts STUD caulking for in-vehicle applications.Space-saving parts,We can also produce 3D curved surfaces, drawn parts, and anodized aluminum decorated parts.

Mounted on the back side of meters, etc.

Torque Hinges

We offer space-saving hinges with high quality, high functionality, high torque, and high durability for information equipment such as notebook PCs, cameras, household appliances, and in-vehicle equipment.

Used for open/close movable shafts of display sections, etc.



LIAGUIDE

Strokes are capable of gripping workpieces of various sizes by magnetic force.We offer high quality and high durability products.

SHIKATA

SHIKATA CO., LTD

www.shikata-k.co.jp

JAXA

Explore to Realize

We are here!
Not in Japan Booth
No.98 booth is small but shining like super nova!

TSC Main – Floor 2

JAXA-SMASH

JAXA SMAll Satellite rusH (JAXA-SMASH) Program

JAXA' s R&D program to realize small-satellite missions (≦50 kg) that challenge innovative technologies through trinity collaboration, utilizing Japanese commercial launch services

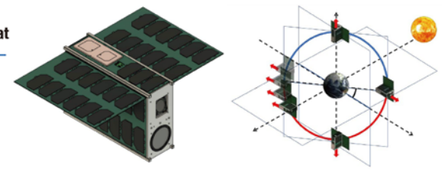
First public call for small-satellite missions (May 2022)
4 selected and joint R&D started

VERTECS
Visible Extragalactic background RadiaTion Exploration by CubeSat

Kyushu Institute of Technology

Astronomical 6U satellite for observation of visible extragalactic background light to study cosmic star formation history

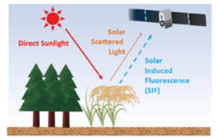
Press Release



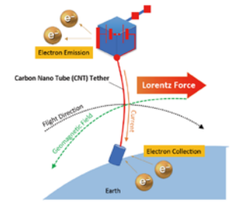
GreFSat
Green Food system support Satellite

The University of Tokyo

Observing plant hyperspectral data from space and extracting the critical indicators for crop yield like canopy nitrogen content.



Altitude Keeping with CNT Tether
STARS Space Service Inc.



ARICA-2
AGU Remote Innovative Cubesat Alert system -2

Aoyama Gakuin University

Demonstration of the real-time alert system of transient astronomical sources, such as gamma-ray bursts, using commercial satellite network services.

JAXA

Business Development and Industrial Relations Department
Japan Aerospace Exploration Agency (JAXA)

JAXA-SMASH website

ABOUT US

Japan Space Systems develops space systems with the aim of using geospatial information to enhance conservation capabilities, secure natural resources, protect the environment, and grow the economy so that we can all live in a better world. Along with partner agencies who participate in international cooperation efforts and research, we develop technology and human capital towards promoting advancements in space technologies.

OUR ACTIVITIES

- Promote the research, development, standardization, and utilization of space systems.
- Promote international commercialization, expansion, improvement, and competitiveness of space systems.
- Promote international cooperation of space systems.
- Promote the use and development of space technology and its associated human capital.
- Promote and maintain support for the Quasi-Zenith satellite system.

https://www.jspacesystems.or.jp/en/

CASE STUDY

Satellite Data Analysis to Curb Illegal, Unreported and Unregulated (IUU) Fishing in Indonesian Waters

BACKGROUND ▶

With an area of 1,864,873 square miles, Indonesia's Exclusive Economic Zone (EEZ) is the world's sixth largest of the kind. Fisheries within Indonesia's EEZ are active and producing an estimated 31.43 billion USD, which accounts for approximately 2.65 % of Indonesia's GDP. Regulating fishing activities in such a vast and open area of water is a very difficult task to manage. In fact, recent estimates indicate that even a single illegal, unreported and unregulated (IUU) trawler or fishing vessel could cost Indonesia as much as 1.2 million USD annually, with the total estimated number of IUU vessels fishing Indonesia's EEZ being responsible for up to nearly 390 million USD each year.

PROJECT ▶

Beginning in 2021, Japan Space Systems (JSS) partnered with the Indonesian government towards developing a solution that would enhance Indonesia's monitoring of its EEZ to better enable enforcement of its fisheries regulations. The solution developed involved using the PALSAR-2, a synthetic aperture radar sensor aboard Japan's ALOS-2 satellite. However, because a pixel of data for the PALSAR-2/ScanSAR captures an area much larger than that of a typical fishing vessel, JSS devised a test to demonstrate PALSAR-2/ScanSAR's capability to effectively monitor and track smaller watercraft suspected of IUU activities.

TEST RESULTS ▶

During the test, performed 06/12/2022, not only was the PALSAR-2 able to quickly scan an area of 47,973 square nautical miles within in a single image, but it easily detected and identified the specified target vessel; proving the solution to be both a cost-effective and technologically effective methods for monitoring, tracking and preventing IUU fishing activities in Indonesian waters.

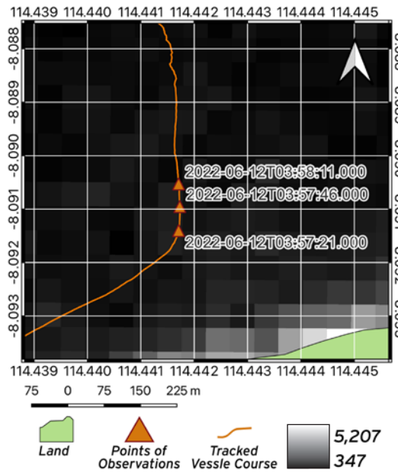
ACKNOWLEDGMENTS

Thanks to the Ministry of Marine Affairs and Fisheries of the Republic of Indonesia for their cooperation and coordination efforts along with the local Indonesian fishermen from Perancak, Bali who participated in this project.

Special acknowledgment to the Japan Aerospace Exploration Agency (JAXA) for providing access to the data sets acquired by PALSAR-2 for this project.

Funding for this case study was provided by the Japan International Cooperation Agency (JICA).

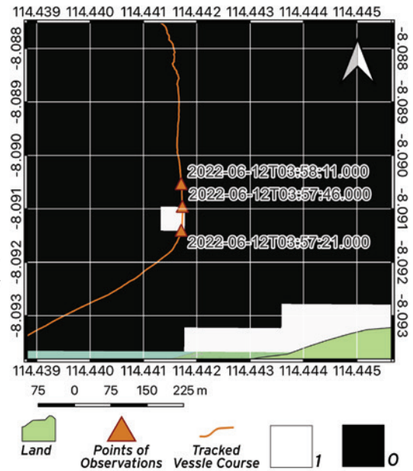
PALSAR-2/ScanSAR Power Image



Range

Azimuth

Results



Calculations Used

$$I_T = c(< I > + \sigma_I)$$

I_T: *the threshold value*

c: *constant (empirically selected)*

$< I >$: *the mean image itensity or amplitude*

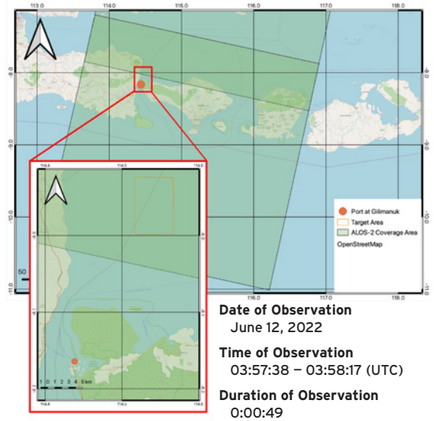
σ_I: *standard deviation*

NOTE | the threshold value was set by using the mean value and standard deviation of the data. HH-polarization was used.

Project Target Vessel

This Indonesian flagged ship, the "KNM. INKA MINA 332," was the vessel targeted and tracked by the PALSAR-2 for this case study. Measuring 17.6 meters in length and weighing 33 gross tons, the KNM. INKA MINA 332 is representative of the majority of smaller fishing vessels that participate in fishing and trawling in Indonesian waters.

This figure depicts the location of the area observed for this test along with the date and time of the observation.



Date of Observation
June 12, 2022

Time of Observation
03:57:38 – 03:58:17 (UTC)

Duration of Observation
0:00:49

PROJECT LEAD
Shinsaku Nakamura

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