

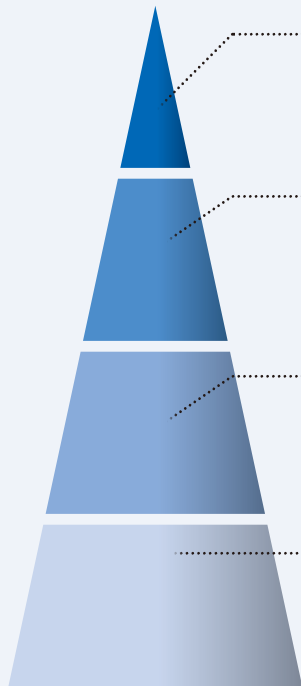
TAMAGAWA NEWS

Vol. **33**

2025. Jan

- **New Product : i-FORJ**
- **TAMAGAWA Group Corporate Philosophy**
- **The GPS/AHRS is approved for use in commercial aircraft by the Ministry of Economy, Trade and Industry.**
- **The two Throttle Quadrant Assemblies have obtained FAA Part-145 approval.**

Tamagawa



Mission Our reason for being
Build tomorrow's world by "measuring" and "moving".

We as Tamagawa group challenge to boundless possibilities as a member of society.

Vision What we want to be

- **Beneficial Production** Connect technological pursuit and social needs, and provide products serving society.
- **A reliable company** Put our best effort for each customer to build long lasting and good relationship.
- **Living with community** Realize more attractive local community through company's sustainable development.

Value What we value

- **Empower through diversity** Be a "exciting" company gathering diverse people and challenging with own strength.
- **Respect for others** Elevate each other through dialogs, and build trustworthiness through gratitude to others.
- **With all five senses** Value on "Genchi Genbutu" principal to solve and improve issues.

Action How we behave?

- **Righteousness** Work with pride
- **Industrious** Act with own initiative
- **Progress** Make it even better



i-FORJ Integrated Fiber Optical Rotary Joint

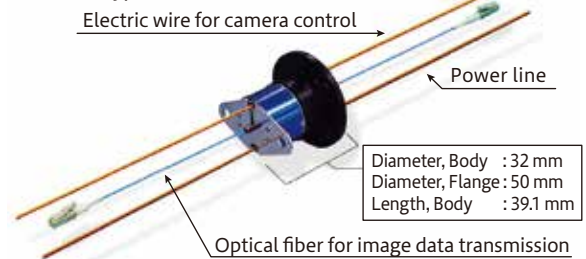
"i-FORJ" is a device that combines a fiber optic rotary joint with a slip ring for electrical wires. It enables the transmission of video data captured by a camera through fiber optics, along with electrical wiring (for power supply and camera control signals), even when the camera rotates continuously 360 degrees, without the wires becoming tangled. This makes it possible to supply video data without any issues due to rotation.

The development of i-FORJ started for surveillance camera which installs 4K video camera. And we could achieve a half size of original model in order to apply other application.

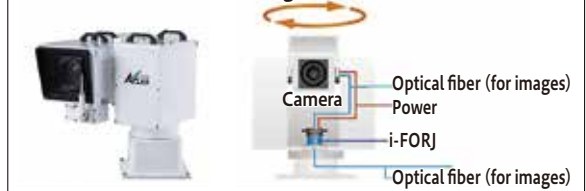
i-FORJ also complies with MIL-STD-810 specification and good solution for Electro Magnetic Interference.

i-FORJ is expected for surveillance cameras, crane cameras, industrial robots, remote surgery robots and various optical data transmission equipment.

■ i-FORJ (Type : MU2970)



■ Sample image of remote surveillance camera 360 degrees rotation



FORJ part

Wavelength	850 nm/1,300 nm
Mode Type	Multi-mode
Core DIA./Clad DIA.	φ50 μm/φ125 μm
Insertion Loss	≦ 1.5 dB(Reference)
	≦ 3.0 dB(Guaranteed)
Operation Temp.	-45 to + 85 °C
Environmental Condition	MIL-STD-810 compliant
Weight	Approx. 10 g(Including fiber & connectors)
Life Time	1,000,000 revolution @600 min ⁻¹
Option	Single mode is available. ※ Using mode conversion adapter.

※FORJ (No slip ring) is also available. (Type : MU2969)

Slip ring part

Number of Lines	4 lines
Voltage	≦ DC24 V
Current	2 A×2 lines and 1 A×2 lines
Insulation Voltage	500 V
Electric Noise	≦ 1Ω
Max. Speed	600 min ⁻¹
Weight	Apporox. 85 g(Including electrical wires)
Life Time	1,000,000 revolution @600 min ⁻¹

GPS/AHRS

It is the first equipment for commercial aircraft equipped with software to obtain specification approval from the MLIT.

The attitude and heading reference system 'GPS/AHRS' (Global Positioning System / Attitude and Heading Reference System), equipped with the GPS receiver developed by our company, has obtained the first specification certification from the Ministry of Land, Infrastructure, Transport and Tourism (MLIT) as equipment for commercial aircraft with software.

GPS/AHRS is a device that outputs the attitude (pitch, roll) and heading (yaw) of a moving aircraft or similar, by combining data from 3 MEMS gyroscopes and 3 accelerometers (each with 3 axes) with GPS receiver data, using composite navigation operation. It accurately detects the aircraft's attitude and the direction.

Composite navigation operation refers to the computation that uses data from GPS and the difference between the signals from the MEMS gyroscope and accelerometer. This process estimates the errors of the MEMS gyroscope and accelerometer using a Kalman filter, thereby improving the accuracy of the attitude and heading angle data derived from the MEMS gyroscope and accelerometer.



GPS/AHRS

Equipment specification approval document

Specifications

Type	TA7879
Modes	GPS/hybrid mode(GPS aiding)
	MAG/hybrid mode(Magnetometer aiding)
	DG mode(Gyroscope, Accelerometer only)
Attitude	0.1° (Static)
	1.0° (Dynamic)
Heading	1.0° (Static)
	6.0° (Dynamic)
Reliability	> 32,000 hour MTBF

Certifications	TSO-C201
	DO-334
	DO-178C LEVEL C
	DO-254 LEVEL C
Interfaces	DO-160G
	ARINC 429
	Discrete I/O
Size	RS-422(Maintenance)
	W90×D235×H124 mm(Excluding protruding parts)
Power	< 10 W with 28 VDC
Weight	< 1.95 kg(4.3 lbs.)

TAMAGAWA SEIKI Receives Part 145 Certification from the FAA

TAMAGAWA SEIKI has received its Part 145 Repair Station Certification from the FAA (Federal Aviation Administration) dated March 30, 2024.

Some commercial aircraft components require suppliers to conduct teardown, inspection and repair tasks on their own responsibility. Under the Part 145 certificate, TAMAGAWA SEIKI is now authorized to perform those activities and issue Airworthiness Approval Tag (FAA Form 8130-3).

TAMAGAWA SEIKI added a dedicated line for Part 145 Repair at First Plant and organized a thorough system to keep high quality. Certification applies to two-part numbers for Throttle Quadrant Assembly, a Lever to control Engine outputs, built in Business Jets, and then we plan to expand its certified repairable product lineup.

Aircraft components that are developed, manufactured and sold by TAMAGAWA SEIKI are installed in a large number of aircrafts in service and keep high quality.

TAMAGAWA SEIKI continues to guarantee high quality and contribute to aviation safety with regards to the Products that become repairable by this certification.



Throttle Quadrant Assembly



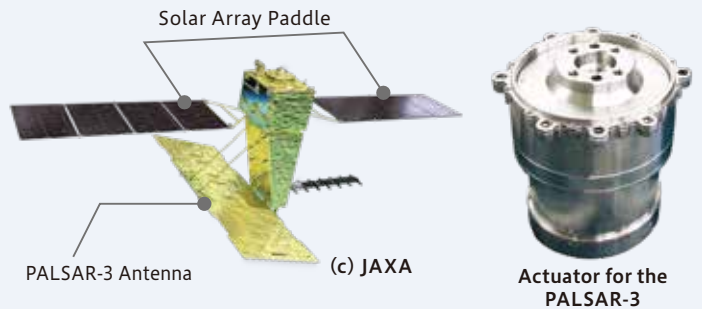
14 CFR Part 145
Air Agency Certificate from FAA

Launched by the third H3 rocket Products from TAMAGAWA SEIKI were installed on the advanced radar satellite “Daichi 4 (ALOS-4)”

On July 1, the advanced radar satellite “Daichi 4 (ALOS-4)” was launched by the third H3 rocket. This satellite is the successor to the Earth Observation Satellite 2, “Daichi 2 (ALOS-2),” which was launched in 2014.

For the PALSAR-3 (L-band synthetic aperture radar) antenna drive system on “Daichi 4,” three actuators from our company were selected.

The PALSAR-3, using digital beamforming technology, maintains the high spatial resolution (3 m) of “Daichi 2” while expanding the observation width by four times (200 km). Additionally, while “Daichi 2” could observe all active volcanoes in Japan only about four times a year per volcano, “Daichi 4” increases this observation frequency to once every two weeks. This improvement will play an important role in disaster mitigation efforts by enabling early detection of abnormal phenomena, such as volcanic activity, ground subsidence, and landslides, in addition to understanding



the situation after a disaster occurs.

PALSAR-3 is a sensor that obtains information by emitting radio waves onto the Earth's surface and receiving the reflected radio waves. Our actuators are used in the mechanism that deploys and holds the antenna for this sensor.

TAMAGAWA VIETNAM held a groundbreaking ceremony for a new factory in Vietnam

TAMAGAWA VIETNAM held a groundbreaking ceremony on May 17 at the construction site in the Amata City Halong Industrial Park, Quang Ninh Province, Vietnam. The ceremony was attended by guests from the Quang Ninh provincial government, Amata

City Halong Companies, and other dignitaries, with around 60 attendees. A traditional Vietnamese groundbreaking ceremony was held to pray for the safety of the construction and the development and prosperity of the company.



▲ Scenes of construction (October)

In early September, Typhoon No. 11 directly struck Vietnam, causing significant damage, including the collapse of the industrial park's power grid and the construction office at the factory site. However, recovery work proceeded quickly, and the project is now back on schedule, with production expected to begin in March 2025.



▲ Groundbreaking ceremony



Exhibition participation information

Taiwan Automation Intelligence and Robot Show 2024 (TAIROS 2024)

On August 21 to 24, the Taiwan Automation Intelligence and Robot Show (TAIROS 2024) was held at the Nangang Exhibition Hall in Taipei, Taiwan. Our company exhibited jointly with Extion Co., Ltd. from Taiwan.

With the concept of factory automation, we showcased products such as the new TBL-i6 α AC servo motor, optimized for robots, as well as TBL-i mini, battery-less encoders, torque sensors, and other products. We had a large number of visitors and received many inquiries.

This event provided a great opportunity to make our name known in the Taiwan market. We would like to express our gratitude to all the customers who visited our booth.



▲ Scenes from the exhibition hall

Exhibition participation information

Automechanika Frankfurt 2024

On September 10 to 14, “Automechanika Frankfurt 2024” was held in Frankfurt, Germany, and our company exhibited within the Nagano Prefecture Pavilion. This exhibition is one of the largest global trade fairs focused on the aftermarket for automotive parts and systems, with 172 countries and 108,000 visitors attending. We showcased products such as the brushless resolver “Singlsyn,” R/D converter, and IMU, which are used in HEV and BEV. In collaboration with our group company, TAMAGAWA EUROPE GmbH, we promoted our products and also had a valuable opportunity to grasp market trends in the German automotive industry.



▲ We exhibited within the Nagano Prefecture Pavilion

Flying Car Technologies Exhibition & Conference

During October 9 to 11, the specialized exhibition “Flying Car Technologies Exhibition & Conference” was held at Tokyo Big Sight. Our company exhibited the GPS/AHRS (GPS-Attitude and Heading Reference System), which has received specification approval from the Ministry of Land, Infrastructure, Transport and Tourism, as well as a high-output, high-density motor for eVTOL propulsion, at the booth of the Certification Technology Consortium for Aircraft System (CerTCAS). Additionally, at the seminar venue, Koichi Tomita from our Spacetrronics Research Institute gave a lecture on “Certification of Equipment for Next-Generation Air Mobility” as part of an introduction to CerTCAS activities.



▲ We exhibited within the booth of the Aircraft Equipment Certification Technology Consortium

Japan International Aerospace Exhibition 2024

From October 16 to 19, the “Japan International Aerospace Exhibition 2024”, one of Japan's largest comprehensive exhibitions for aviation and space, was held at Tokyo Big Sight, with over 37,000 visitors attending. Our company exhibited at the booth of the Nagano Prefecture Industrial Promotion Organization, showcasing aviation related products such as high-output, high-density motors for eVTOL propulsion, landing gear actuators, as well as space related products including reaction wheels for small satellites and resolvers used in Mars rovers. Among these, the high-output, high-density motor attracted significant attention, as it is being developed for eVTOL propulsion, which is a key focus in the aviation industry. We received many technical inquiries and questions about the development status. Additionally, many of our longtime customers visited the booth, allowing us to showcase new products and engage in meaningful business discussions.



▲ Exhibited within the booth of the Nagano Prefecture Industrial Promotion Organization.



▲ High-output, high-density motors for eVTOL propulsion.



▲ A range of space related products.

The 68th Space Science and Technology Joint Lecture Conference

The 68th Space Science and Technology Joint Lecture Conference, where domestic space related agencies, companies, and universities gather, was held from November 5 to 8. With approximately 2,050 participants and 90 exhibiting companies, it was the largest event in its history, and our company also participated.

We showcased new products, including reaction wheels (angular momentum: 1.0 Nm), i-FOG, 3-axis FOG units/IRU, space grade step motors, resolvers, and more. Over 300 visitors came to our booth, and active presentations and meetings took place on-site. Many project engineers from JAXA and various companies participated, as well as representatives from

overseas companies, highlighting the high level of interest in the conference. It was a valuable opportunity, and we were once again reminded of its significance.

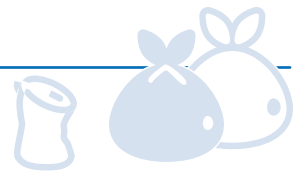


▲ Presentation at the business session



▲ Overview of our booth





01

We conducted an environmental volunteer activity in the Hachinohe area.

On October 26, an environmental volunteer activity was carried out at three locations in the Hachinohe area (Hachinohe, Fukuchi, and Misawa) across a total of five factories. This marked the 13th time the event was held.

Under the clear autumn sky, 106 participants, including employees and their families from our company, group companies, and our partner company, Minami Co., Ltd., took part in the event. With a friendly and cheerful atmosphere, the group cleaned up litter along the roads surrounding the factories, collecting many empty cans and plastic items.

By beautifying the roads and pedestrian paths we use for commuting and work, we aim to contribute to creating a clean and livable community, and we will continue our environmental activities moving forward.



▲Hachinohe area



▲Fukuchi area



▲Misawa area

02

Initiatives for environmental beautification



Tenryu River Environmental Picnic

A total of 436 people, including employees and their families from our company and group companies, participated in activities such as picking up trash along the Tenryu River tributary and beautifying the area around the business premises



▲Tenryu River Environmental Picnic

Mabechi River Clean-Up Operation

33 people from our company and group companies participated. Under clear skies, we spent about an hour walking along the Mabechi River, picking up trash.



▲Mabechi River Clean-Up Operation

Hachinohe Hightech Park Clean-Up Operation

Approximately 50 employees from our company and group companies participated. Along with picking up trash, we also worked on maintaining the safety of the park's walking paths by tidying the sidewalks and trimming tree branches.



▲Hachinohe Hightech Park Clean-Up Operation

03

We have launched a web page summarizing our environmental activities.



The newly launched web page summarizing our environmental activities introduces our environmental policy, efforts related to ISO14001, as well as external environmental and community activities. We have included photographs for each section, ensuring that visitors can easily understand the nature of our activities at a glance.

This web page also publishes numerical data on the CO₂ emissions from our business operations. Our company generates a significant amount of CO₂ during the manufacturing process, and achieving carbon neutrality has become an important challenge. Going forward, we will use the website to introduce our efforts toward achieving carbon neutrality.



<https://www.tamagawa-seiki.com/company/environment.html>



▲Web page featuring our efforts toward the environment



▲Environmental Management



▲Changes in CO₂ Emissions



▲Emergency Response Training



The Former Ogasawara Family Shoin is located in Izuki, Iida City. It was established around 1624 by Ogasawara Naganao, and is designated as an important cultural property of Japan, along with its entrance, in March 1952 due to its significance as a valuable structure representing the residence of the early modern period. The year 2024 marks the 400th anniversary of the Shoin's construction, and the "Former Ogasawara Family Shoin 400th Anniversary Celebration" was held until December 27. Two special exhibitions were also held concurrently, "Shinano-shu - Izuki Ogasawara Family, Zakoji Family, and Chiku Family" and "Kazuyo Sejima + Ryue Nishizawa/SANAA 25th Anniversary Special Exhibition of the Ogasawara Memorial Museum." Our company sponsored the 400th Anniversary Celebration of the Former Ogasawara Family Shoin.



▲Former Ogasawara Family Shoin



▲Ogasawara Memorial Museum designed by SANAA

Yasuoka Village
泰阜村
 Tour Minami Shinshu
 vol. 7

Introducing the food and culture of local areas around TAMAGAWA SEIKI

Yasuoka Village is a small village located in the southern part of Nagano Prefecture, with a population of 1,500. It is also the birthplace of Hiroichi Hagimoto, the founder of TAMAGAWA SEIKI, and from the village, one can overlook the city of Iida and the headquarters of the company.



01. Ai Park Yasuoka



This is a comprehensive leisure area where families can enjoy outdoor sports such as summer bobsleigh, miniature golf, and mallet golf. The view from Kanada Park on the premises is magnificent, offering panoramic views of Mt. Ena as well as the Central and Southern Alps, along with the cityscape of Iida.

02. Mango Valley



The Mango River flows through dense trees, with numerous small and large waterfalls along its course. You can enjoy a 7-kilometer trek through the valley. Why not recharge your energy with a forest bath?



Greenwood Nature Experience Education Center

They plan and operate various "nature experiences" such as the popular mountain bandit camp, as well as learning programs that foster mutual recognition of differences through "life experiences" with peers. By using forests and rivers as our fields, we support the development of "emotional richness" and "life skills."



TAMAGAWA SEIKI ELECTRONICS CO., LTD.



Founded in 2001 as a group company of TAMAGAWA SEIKI CO., LTD. in Yasuoka Village. With the founder's vision of "aiming to be a company that nurtures people and technology in this area and contributes to society," we strive daily to improve.

The main products we manufacture are drivers for production equipment and drivers/sensors for railway related applications.



My recommendation Osaka Office/Yoshiaki Hagimoto

Yasuoka Village is a small village with a population of around 1,500 people. There are no convenience stores or traffic lights, but it does have a hidden gem station. A recommended spot is the leisure area "Ai Park Yasuoka", where you can enjoy activities such as summer bobsledding, putter golf, and mallet golf with your family. Additionally, it has been selected as one of the "Top 100 Sunset Spots in Shinshu," so be sure to visit it at least once.



**Cover
of this
issue**

Autumn leaves around Karakasa Station on the Iida Line

In this edition of "Southern Nagano, Town and Village Tour," we are introducing Yasuoka Village, which has four stations on the JR Iida Line. The photo above is of the area around Karakasa Station, one of these stations. This location is adjacent to Karakasa Port, the terminal of the Tenryu River Downstream Boat Ride, and in mid-November, you can enjoy the beautiful scenery of autumn leaves.



TAMAGAWA SEIKI CO., LTD.

Headquarters & First Plant:

1879 Oyasumi, Iida-shi, Nagano, 395-8515, Japan
PHONE +81-265-21-1800
FAX +81-265-21-1861

Tokyo Office:

3-19-9 Shinkamata, Ohta-ku, Tokyo 144-0054, Japan
PHONE +81-3-3738-2131
FAX +81-3-3738-3134

TAMAGAWA TRADING CO., LTD.

International Marketing Sales Department:

1-3-1 Habacho, Iida-shi, Nagano, 395-0063, Japan
PHONE +81-265-56-5423
FAX +81-265-56-5427

Web siteURL <https://www.tamagawa-seiki.com>