PRESS RELEASE

SAT ZENRIN NIPPON KOEI

October 15, 2020 SKY Perfect JSAT Corporation Zenrin Co., Ltd Nippon Koei Co., Ltd

JSAT - ZENRIN - NIPPON KOEI

A new business partnership to provide "Satellite Anti-Disaster Information Service"

SKY Perfect JSAT Corporation (Head Office: Minato-ku, Tokyo, Representative Director, President & CEO: Eiichi Yonekura, "JSAT"), Zenrin Co., Ltd. (Head Office: Kitakyushu-shi, Fukuoka Prefecture, President & CEO: Zenshi Takayama, "Zenrin") and Nippon Koei Co., Ltd. (Head Office: Chiyoda-ku, Tokyo, Representative Director and President: Ryuichi Arimoto, "Nippon Koei") announced their entry into a business partnership to develop and provide Satellite Anti-Disaster Management Service, the first ever service of its kind in Japan.^{*1} This service uses and combines expertise from the three companies, JSAT's satellite data, Zenrin's map data and Nippon Koei's disaster prevention technology. Expected to be available in 2021, the service will assess risk, mitigate damage and facilitate rapid recovery from natural disasters such as floods, landslides, earthquakes, volcanic eruptions and other emergencies.



Satellite Anti-Disaster Information Service.

JSAT and Nippon Koei entered into a business agreement in November 2019^{*2,} to develop disaster management solutions using satellite data to promote disaster preparedness and mitigation projects by monitoring infrastructure in normal times. Now that Zenrin has joined the partnership, its expertise in detailed and precise mapping data will combine with the existing disaster management solutions. By analyzing the incorporated data, this new solution will make it possible to produce a more highly accurate risk assessment and better focus post-disaster analysis for areas and facilities managed by the public and private sector throughout Japan. This is the first service in Japan that reaches down to the individual building level.

In normal times, the Satellite Anti-Disaster Information Service will use satellite data to visualize disaster risks which will help in disaster preparedness by continuously monitoring a wide area that includes infrastructure such as that on hillsides, river embankment structures and roadways. In the event of a disaster, satellite data will be used to quickly assess damage over a broad area to support rescue and recovery

activities and prevent secondary disasters.

For addressing the problem of flooding, in addition to satellite data for flood detection technology, the service now will have flood prediction technology that uses meteorological/topographical data and SNS-based flooded area mapping technology. This will help to speed up alert issuance and greatly benefit evacuation efforts.

This service will also be introduced to Asia and other overseas locations. We believe our experience in Japan has made us well positioned to lead in the development of the disaster management field. For this reason, we commit to doing our part to achieve several goals set by the United Nations as Sustainable Development Goals (SDGs) which apply to our industry, Goal 9, "Industry innovation and infrastructure", Goal 11, "Sustainable cities and communities", and Goal 17, "Partnerships for the goals"

To respond to the increasing risk of disaster in recent years, the

Example of display using Satellite





Satellite Anti-Disaster Information Service will be useful for business continuity planning (BCP) for both the private and public sectors, allowing precise management of risk during normal times and accurate evaluation of the damage situation when disasters occur. The three companies, leaders in Japan in their business fields of satellites, mapping information, and engineering consulting are teaming up to build and provide this service to aid disaster management so that the world will be safer and more secure.

Introduction movie: https://youtu.be/8Is0Yu8TH-o

■How the system works SKY Perfect JSAT ENRIN Corporation Developing data analysis technology that Providing necessary data for estimation of uses satellite imagery from optical EO expected damage, including residential map satellites and SAR satellites. data, building polygon and statistical map data. NIPPON KOEl Developing risk evaluation technology (alert function), prediction technology and display contents. Public sector Private sector Companies including railroads, airports, National and local governments, media, electric power, gas, municipal offices telecommunications carriers and insurance.

Overseas

Foreign governments and private sector

■Features of Satellite Anti-Disaster Information Service

When disaster occurs, this service uses more than 170 small optical Earth Observation (EO) satellites^{*3} and multiple Synthetic Aperture Radar (SAR) satellites.^{*4} Small optical EO satellites are capable of timely monitoring of a vast area where multiple damage occurs simultaneously in various locations. SAR satellites, unlike planes or helicopters, can capture images when the weather is bad or during the hours of darkness. By combining two types of satellite, the service facilitates more rapid assessment of damage than had been previously possible and makes it easier to calculate further risk including extent of flooding and potential landslide damage.

In normal times, SAR satellites can be used to detect minute deformations as they constantly track infrastructure status and natural physical conditions. This service can improve the customer's disaster preparedness by providing information that estimates risk and issues alerts.

*1 Confirmed by the three companies

*2 Nippon Koei and JSAT entered into a business partnership using satellite data to determine the risk of accidents due to aging infrastructure. - Service for making disaster prevention and reduction work more efficiently started in 2020. https://www.skyperfectjsat.space/en/news/detail/nippon koei and sky perfect jsat enter business partnershipusing satellite data to determine the ris.html

*3 A satellite that relies on light from the Sun to capture images as with ordinary photographs. The SAR satellite imagery can be obtained in full color and is easy to understand visually.

*4 One of the Earth Observation technologies used by satellites, known as a synthetic aperture radar satellite. By emitting radio waves from SAR satellites and analyzing the reflected pulse from an object on Earth's surface, it is possible to make observations even in cloudy weather and at night. By repeating the transmission and reception of radar waves while the satellite is moving and then synthesizing them, the large synthetic antenna aperture (the antenna diameter) is created. This technology can capture higher-resolution images and cover an area with greater accuracy.

Nippon Koei	 Assessing risk and issuing alerts based on multiple data, including satellite data. Developing a system including display contents that fits individual needs. Developing disaster prediction technology. Promoting services to the public and the private sectors.
JSAT	 Capturing and analyzing satellite data over disaster impacted areas by using optical EO and SAR satellites. Promoting services to targeted private sector entities.
Zenrin Co. Ltd.	 Providing content to include residential map data^{*5} or point data^{*6} on individual buildings useful for disaster preparedness or when disaster does occur to calculate the extent of the damage.
	• Developing and promoting services to the public and the private sectors. *5 data covering details such as building names, resident names, addresses, and street intersection names. *6 data for the approximately 38 million buildings nationwide, along with detailed information such as number of floors or area dimensions of each type of building including such as residences, public facilities and medical facilities, etc.

Roles of the three companies

Company profiles

SKY Perfect JSAT Corporation		
Head office	: 1-8-1 Akasaka, Minato-ku, Tokyo, Japan	
Representative	: Eiichi Yonekura, Representative Director, President & CEC	
Established	: November 10, 1994	
Business description :		

SKY Perfect JSAT Corporation is the only operating company in Japan that provides both broadcasting and satellite communications. Our satellite communication service covers Asia, Oceania, Russia, the Middle East, Hawaii, and North America to support the "safety, security and convenience of society". Our pay TV broadcast services deliver a wide variety of entertainment through Japan's largest satellite multichannel platform "SKY PerfecTV!", which boasts about 3 million domestic subscribers. We also are developing business solutions that utilize the world's most advanced technology using satellite data. And we are confident that with our customers we can build a better future by further digital transformation.

website:

https://www.skyperfectjsat.space/en/ https://www.jsat.net/en/index.html

Zenrin Co, Ltd.

Head office	: 3-1 Tobata-ku, Kitakyushu-shi, Fukuoka, Japan
Representative	: Zenshi Takayama, President & CEO
Established	: April, 1961
Business description	:

Zenrin is working to solve social issues and support business by providing various content including residential maps and mapping databases through collecting and managing different types of information which form the basis of our Intelligence and Geospatial Information. We are also building a database that supports technologies that make people's lives richer and more rewarding. website: <u>https://www.zenrin.co.jp/english/index.html</u>

Nippon Koei Co., Ltd.

Head office	: 5-4 Kojimachi, Chiyoda-ku, Tokyo 102-8539, Japan
Representative	: Ryuichi Arimoto, Representative Director and President
Established	: June 7, 1946
Business description	•

Business description :

The Nippon Koei Group is the number one civil engineering consultant in Japan, which supports the safety and security of people all over the world. Since being established in 1946, Nippon Koei has been involved in solving social issues via business in the field of social infrastructure maintenance as the leading company of civil engineering consultants in Japan. The company now provides sustainable business related to the basis of building nations and human resources in over 160 countries and regions around the world. The Nippon Koei Group implements reforms according to the changing needs of the times, while achieving improved profitability and sustained business expansion.

website: https://www.n-koei.co.jp/english/