JAXA, SKY Perfect JSAT, and JR-West
Commence Collaboration to Apply AI-Based Railway Equipment Failure Prediction Technology in Spacecraft Maintenance
－ Addressing Maintenance Challenges from Earth to Space－

   The Japan Aerospace Exploration Agency (Head office: Chofu City, Tokyo, President: Hiroshi Yamakawa; "JAXA") and West Japan Railway Company (Head office: Osaka City, Osaka Prefecture, President: Kazuaki Hasegawa; "JR-West") have been advancing a joint co-creation activity[*1] since October 2022 to apply the machine failure prediction AI technology internally developed and used by JR-West to spacecrafts such as satellites. To expand this initiative, SKY Perfect JSAT Corporation (Head Office: Minato-ku, Tokyo; Representative Director, President and Chief Executive Officer: Eiichi Yonekura; "SKY Perfect JSAT"), Asia's largest satellite operator, has joined the collaboration. This partnership seeks to accelerate activities towards the application of this technology to actual operations.

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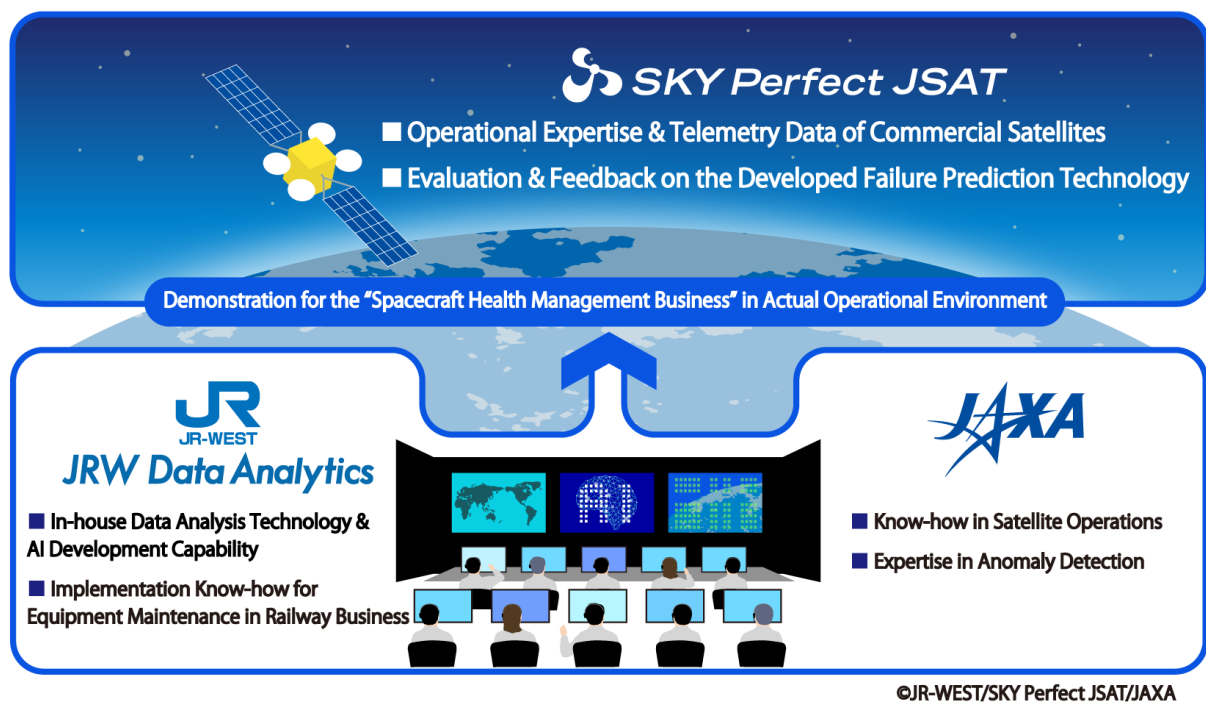
■ Details of the Co-Creation Activity
   Under the framework of "JAXA Space Innovation through Partnership and Co-creation (J-SPARC)[*2]," JAXA and JR-West have collaborated on developing AI to detect failures and abnormal signs in satellites. This collaboration combines JAXA's telemetry data[*3] assets and expertise in operating satellites with JR-West's data analysis and AI development technology, as well as its implementation know-how related to railway equipment maintenance. These efforts have enabled the visualization of the impact of external environments, which was challenging to confirm visually using conventional operational control methods. Additionally, the identification of the interrelationships among multiple telemetry data has led to the development of multiple AI models that improve the quality and efficiency of satellite operations.

   By joining this co-creation activity, SKY Perfect JSAT, with its experience and expertise in operating over 30 geostationary satellites developed by various manufacturers both

domestically and internationally, will contribute to addressing challenges in commercial satellite operations and improving the development of AI models for satellite telemetry analysis. Additionally, through demonstrations using actual satellites in operation, SKY Perfect JSAT aims to enhance the quality and efficiency of satellite operations by detecting abnormal signs with AI, thereby achieving further stable operations.

  Looking ahead, JAXA, SKY Perfect JSAT, and JR-West will explore effective utilization and risk hedging businesses for in-orbit satellites.

■ Roles

JAXA	Provides expertise in satellite operation and knowledge in anomaly detection, acquiring insights that contribute to improving the quality and efficiency of future satellite operations. These insights will be applied to satellite operations that require efficiency as the number of satellites, such as satellite constellations, increases.
SKY Perfect JSAT	Provides expertise and knowledge gained as satellite operator, along with its own satellite telemetry data. Offers evaluation and feedback on the developed failure prediction technology, with the aim of applying it to operational satellites. These efforts will enhance the quality and efficiency of satellite operations, and also promote further consideration of satellite health management business and horizontal expansion into other areas.
JR-West	Ultilizes a unique data analysis organization and internally developed AI in actual operations, including prediction of failures in automatic ticket gates. Designs and creates detection AI for spacecraft, based on its AI development technology and implementation know-how, incorporating the expertise of JAXA and SKY Perfect JSAT.

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[1] October 22, 2022, News Release: Commencement of Co-Creation Activity between JR-West and JAXA for Spacecraft Health Management using AI Technology for Failure Prediction (in Japanese)
https://www.jaxa.jp/press/2022/10/20221017-1_j.html

[2] JAXA Space Innovation Partnership (J-SPARC)
J-SPARC began with dialogues between JAXA and private enterprises seeking to launch space business. It is a co-creation research and development program with the objective of creating space-related businesses based on new ideas, with mutual commitment from both parties toward commercialization. The program involves joint consideration of business concepts and technical development and demonstration, aiming for clear end results. Since its implementation in May 2018, approximately 48+ projects and activities have progressed. https://aerospacebiz.jaxa.jp/solution/j-sparc/ (in Japanese)

[3] Refers to various sensor data and status information acquired on satellites. Specifically, it includes power, position, communication status, and equipment health status.