NEWS RELEASE

October 14, 2026

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Astronomical Nano-Satellite VERTECS Completes Initial Operations and Begins Scientific Observations

First Images Captured from Space Released

A research team from the Kyushu Institute of Technology, Kwansei Gakuin University, Tokyo City University, Kanazawa University, the University of Tokyo, and other institutions has successfully completed the test operations conducted since the satellite was released into orbit. Having confirmed that the satellite meets its specified performance requirements, the team has begun routine operations for scientific astronomical observations.

The astronomical nano-satellite VERTECS was launched from the Tanegashima Space Center at 9:53:59 a.m. Japan Standard Time on June 12, 2026, aboard H3 Launch Vehicle No. 6 (H3-30 test vehicle). After insertion into its designated orbit, the satellite successfully communicated with its operational ground stations. The team then sequentially verified the satellite's power, communications, attitude control, data-processing, and observation-system functions.

During initial operations, the team pointed the satellite toward selected regions of the sky, imaged astronomical objects with its onboard visible-light instrument, and transmitted the acquired observation data to the ground. These operations confirmed that both the satellite system and the observation instrument achieve their specified on-orbit performance and can conduct routine astronomical observations.

During routine operations, VERTECS will begin its primary mission: observing visible extragalactic background radiation to reveal the history of star and galaxy formation in the universe. Members of the participating institutions are operating the satellite, and operations and observations are planned to continue for a year.

We extend our sincere gratitude to everyone who contributed to and supported the satellite's development, launch, and initial operations. Selected images acquired during initial operations are presented below.

■ Initial Observation Images Acquired by VERTECS

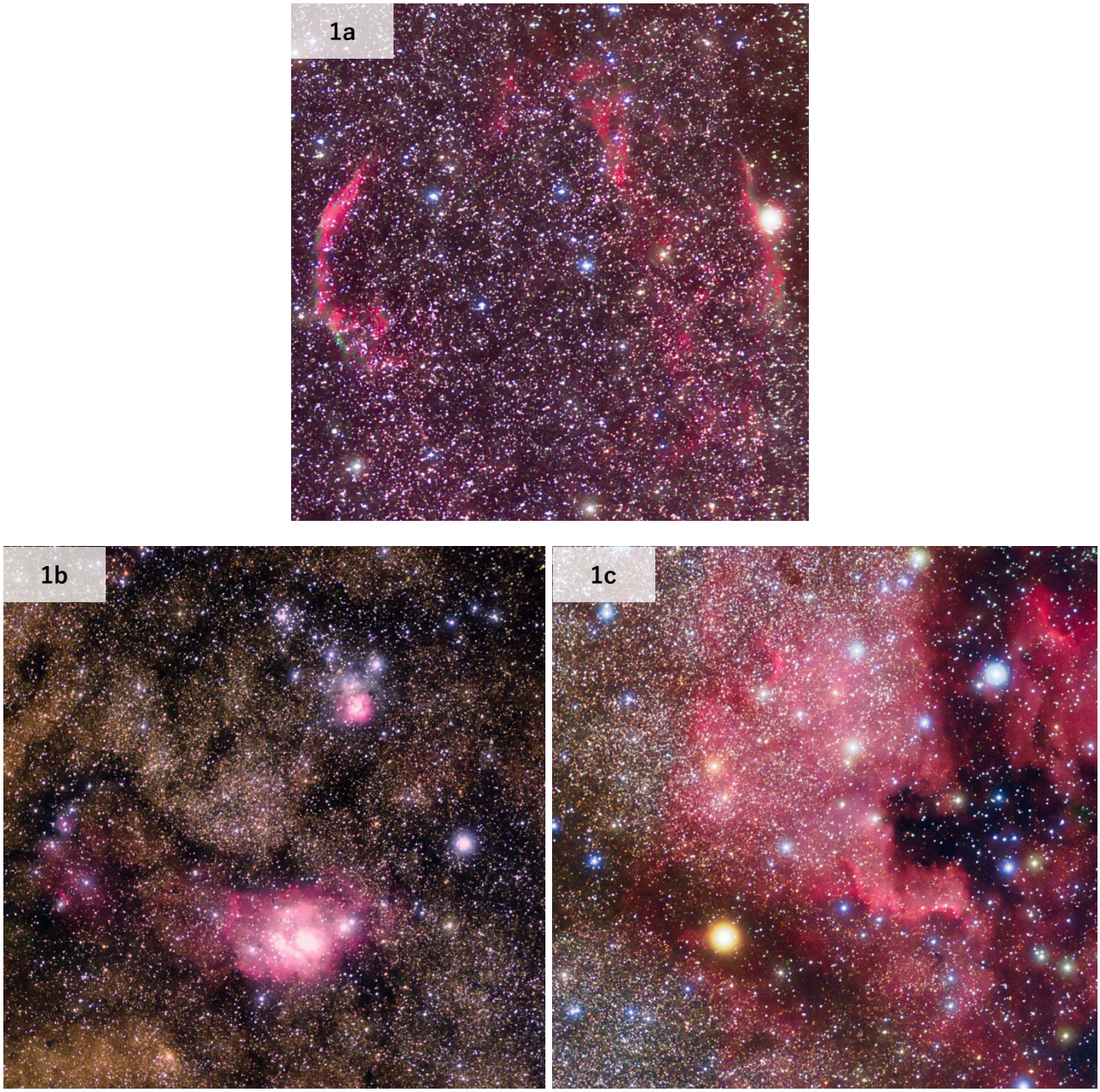

Figure 1. Multicolor composite images of the Cygnus Loop (a), Lagoon Nebula (b), and North America Nebula (c), acquired with the visible-light observation instrument aboard VERTECS. Brightness and contrast have been adjusted to make the astronomical objects easier to see. (Credit: VERTECS Project)

Figure 1 shows images acquired as VERTECS observed each target region of the sky. The images primarily capture stars and nebulae. By pointing at the intended regions and conducting observations, VERTECS demonstrated its high-precision attitude-control capability. The satellite obtained sharp images with one-minute exposures that would require several hours of exposure using ground-based telescopes.

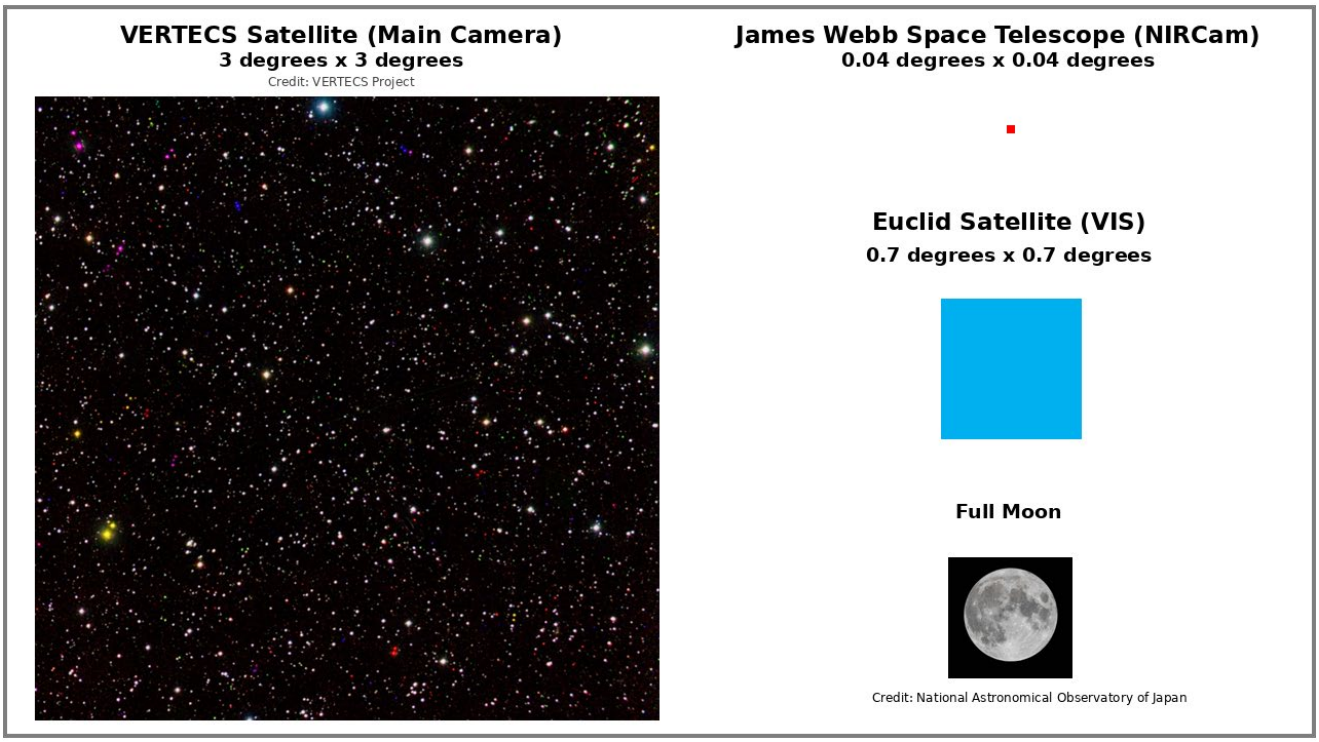

Figure 2. Multicolor composite image of the Boötes region acquired by VERTECS and a comparison of the fields of view of the James Webb Space Telescope and the Euclid satellite. (Credit: VERTECS Project)

Figure 2 shows the Boötes region, which was selected for observations of visible extragalactic background radiation because it contains no bright astronomical objects. The field of view of VERTECS's main camera is 3 degrees by 3 degrees in each wavelength band, allowing a single observation to cover an area about 40 times the apparent area of the full Moon. Existing space telescopes such as the James Webb Space Telescope and Euclid require many observations to image such a wide field. Analysis of this image confirmed that VERTECS achieves its specified resolution and sensitivity.

Figure 3. Image of Earth acquired by VERTECS. (Credit: VERTECS Project)

Figure 3 is an image of Earth captured by the secondary camera aboard VERTECS. When communicating with an operational ground station, VERTECS must maintain an attitude that points its antenna toward the station on Earth. The image confirms that the satellite maintained a stable attitude while communicating with the ground station. A video recorded during the Earth imaging sequence is available at https://www.kyutech.ac.jp/themes/vertecs/vertecs260904.mp4.

■ Comments from Representatives of Participating Institutions

1. Kyushu Institute of Technology (Lead Institution)

Kei Sano, Assistant Professor, Department of Space Systems Engineering, Faculty of Engineering

VERTECS has completed its initial operations and functional checks of each onboard system and has now begun routine observations. The initial images mark an important first step, demonstrating that the satellite can achieve its specified observational performance in space. I sincerely thank the partner institutions and all the students, researchers, and engineers who have supported the project and devoted themselves to its development and operation. We will now steadily accumulate and analyze observation data with the aim of producing new scientific results.

2. Kwansei Gakuin University

Shuji Matsuura, Professor, Department of Physics and Astronomy, School of Science

As the team primarily responsible for developing the observation instrument, we are relieved to have confirmed that its on-orbit operation and performance match our ground tests and simulations. We are also deeply impressed by the beauty of the astronomical images obtained with this small space telescope above Earth's atmosphere. Using the expansive map of the universe that will be built through long-term observations, our research team will take on the challenge of unraveling the mystery of the extragalactic background radiation.

3. Tokyo City University

Takao Nakagawa, Specially Appointed Professor, Advanced Research Laboratories

I am delighted that VERTECS is performing as expected, and I look forward to seeing the data from the full-scale observations ahead. The Tokyo City University team will continue contributing to the VERTECS Project in multiple areas, including satellite operations, data reception, and analysis.

4. Kanazawa University

Ichiro Jikuya, Associate Professor, Faculty of Frontier Engineering / Advanced Research Center for Space Science and Technology

I participated in the introduction of the attitude-control unit for the VERTECS Project. With the successful completion of initial operations and the establishment of high-precision attitude control that enables the telescope to realize its full performance, development of the satellite bus has reached a major milestone. I hope this solid foundation will now support the mission payload and

lead to outstanding scientific results, including a better understanding of extragalactic background radiation.

5. The University of Tokyo

Koji Takimoto, Project Researcher, Department of Aeronautics and Astronautics, Graduate School of Engineering

For VERTECS, I coordinated the onboard observation instrument and developed the telescope. Even as each satellite function was verified after launch, we remained anxious about whether the telescope would perform as expected in space until we saw the first image. That made the arrival of the sharp images especially rewarding. We will continue satellite operations and observations and work to turn them into new scientific results.

■ References

・About VERTECS
https://vertecs-project.com/(VERTECS website)

・Nano-Satellite VERTECS Successfully Inserted into Orbit and Establishes Communication with Operational Ground Stations
https://www.kyutech.ac.jp/whats-new/press/entry-12173.html (Kyushu Institute of Technology website)
https://www.kwansei.ac.jp/news/06416.html (Kwansei Gakuin University website)
https://www.tcu.ac.jp/news/all/20260617-72038/ (Tokyo City University website)

・Kyushu Institute of Technology Unveils Ultra-Small Satellite VERTECS
https://www.kyutech.ac.jp/whats-new/press/entry-12116.html (Kyushu Institute of Technology website)

・Kyushu Institute of Technology and JAXA Launch Nano-Satellite Development to Study the History of Astronomical Object Formation through Visible Extragalactic Background Radiation Observations
https://www.kyutech.ac.jp/whats-new/press/entry-9530.html (Kyushu Institute of Technology website)

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Attachment 1

■Overview of VERTECS, a Satellite Project to Observe Visible Extragalactic Background Radiation

VERTECS Logo

Named from Visible Extragalactic Background RadiaTion Exploration by CubeSat, VERTECS is an astronomical satellite project designed to observe visible extragalactic background radiation. It was selected as the first project under JAXA-SMASH, the Program to Expand Launch Opportunities and Nano-Satellite Missions through Industry-Academia-Government Collaboration operated by JAXA's New Business Promotion Department, and development began in fiscal year 2022. VERTECS carries a visible-light telescope aboard a 6U nano-satellite measuring 100 mm x 226 mm x 340 mm. By observing the extragalactic background radiation, the cumulative light emitted from the early universe to the present, the project aims to reveal the history of astronomical object formation.

More than 80 researchers and students developed the satellite in collaboration with private companies. Under JAXA-SMASH, the participating organizations are the Kyushu Institute of Technology as the lead institution; JAXA's Institute of Space and Astronautical Science (ISAS); Kwansei Gakuin University; Tokyo City University; Kanazawa University; the University of Tokyo; Tohoku University; Institute of Science Tokyo; the University of Fukui; Cosina Co., Ltd.; Seiren Co., Ltd.; and Image Tech Inc. In international collaborative research, the Kyushu Institute of Technology works with National Tsing Hua University and National Chung Hsing University in Taiwan on the research and development of ground software and related systems. The telescope instrument consists of wide-field optics optimized for visible extragalactic background radiation observations and a low-dark-current detector. The bus includes an onboard computer based on the nano-Satellite bus developed by the Kyushu Institute of Technology, a power system with deployable solar-array paddles, an integrated attitude-control unit, and a high-speed communications unit. Together, these systems provide the precise attitude control required for astronomical observations and downlink the large volume of image data to the ground. The completed satellite was launched aboard H3 Launch Vehicle No. 6 (H3-30 test vehicle) through the H3 rideshare launch service procured by JAXA from Space BD Inc. and was inserted into Earth orbit.

Satellite operations are conducted in the S-band (approximately 3 GHz), with the ISAS Sagamihara Campus serving as the primary station and the Kyushu Institute of Technology as the secondary station. Observation image data are received in the X-band (approximately 8 GHz) at the Tokyo City University Setagaya Station and the University of Tokyo Kashiwa Station.

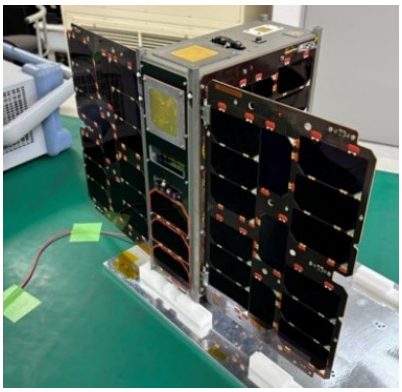
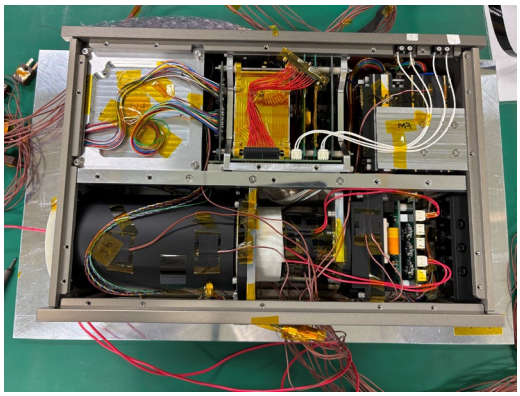
The project seeks not only to produce scientific results on visible extragalactic background radiation, but also to apply its knowledge and experience to future advanced nano-Satellite missions in astronomy and space science. Looking ahead to the practical application and commercialization of the project's

results, Kick Space Technologies Inc. was established as a startup originating from the Kyushu Institute of Technology. The company is expected to become a practical example of commercializing capabilities developed through ultra-small satellite development.

Objectives

- Reveal the history of astronomical object formation by observing visible extragalactic background radiation
- Train personnel with expertise in both science and engineering through a cutting-edge astronomical mission
- Commercialize a one-stop nano-Satellite service based on the VERTECS high-precision attitude-control bus (Kick Space Technologies Inc.)
- Commercialize an Earth-observation telescope for CubeSats based on the VERTECS visible-light telescope (Cosina Co., Ltd.)

Project Name		**Visible Extragalactic background RadiaTion Exploration by CubeSat (VERTECS)**
Partners	JAXA-SMASH Partners	1. Kyushu Institute of Technology 2. JAXA Institute of Space and Astronautical Science (ISAS) 3. Kwansei Gakuin University 4. Tokyo City University 5. Kanazawa University 6. The University of Tokyo 7. Tohoku University 8. Institute of Science Tokyo 9. University of Fukui 10. Cosina Co., Ltd. 11. Seiren Co., Ltd. 12. Image Tech Inc.
	International Partners	1. National Tsing Hua University (Taiwan) 2. National Chung Hsing University (Taiwan)
Launch	Date and Time	June 12, 2026, 09:53:59 (JST, 24-hour format)
	Launch Vehicle	H3 Launch Vehicle No. 6 (H3-30 test vehicle)
Satellite Specs	Mass [kg]	8.4
	Dimensions [mm]	100 x 226 x 340

<table>
<tr><td></td><td>Satellite</td><td colspan="2">   </td></tr>
<tr><td colspan="2">Orbit</td><td colspan="2">Sun-synchronous orbit</td></tr>
<tr><td colspan="2">Mission Overview</td><td colspan="2">VERTECS observes the extragalactic background radiation, the combined radiation emitted throughout cosmic history and an important probe of the formation of astronomical objects. Earlier observations found that the near-infrared extragalactic background radiation is several times brighter than the integrated light of known galaxies, suggesting an unknown population of objects. Proposed sources include early-universe objects such as primordial black holes and intra-halo light in nearby galaxy halos. Their emission spectra are expected to differ substantially at visible wavelengths. VERTECS therefore conducts multi-band visible-light observations to identify the origin of this excess background component.</td></tr>
<tr><td rowspan="2">System Overview</td><td>Mission Payload</td><td>• Telescope
- 70 mm focal length, F/2 lens optical system
- Four wavelength bands (450, 550, 650, and 750 nm)
- 3° x 3° field of view in each band
• Detector
- 9-megapixel CMOS sensor
- Image-processing FPGA and control CPU</td></tr>
<tr><td>Satellite Bus</td><td>• Onboard computer
• Power system
- Lithium-ion battery
- Deployable solar-array paddles
• Communications system
- S-band receiver
- S-band transmitter
- X-band transmitter
• Attitude-control system
- Integrated attitude-control unit</td></tr>
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