

PROJECTS



Hodoyoshi-1

Extended operation in orbit

Hodoyoshi-1 is a 60 Kg, cubic microsatellite 60 cm on each side with aimed at Earth observation. It is equipped with a reaction wheel, a star sensor, a MEMS-based gyroscope, a GPS receiver, and is capable of accurate three-axis attitude control. Additionally, it will demonstrate orbit control capabilities with a novel propulsion system based on hydrogen peroxide. From a 500 Km sun-synchronous orbit, the satellite will obtain images with a ground resolution of 6.7 m in multiple spectral bands with a swath width of 28 Km. The mission specifications of Hodoyoshi-1 are equivalent to those of a traditional larger satellite heavier than 150 Kg.

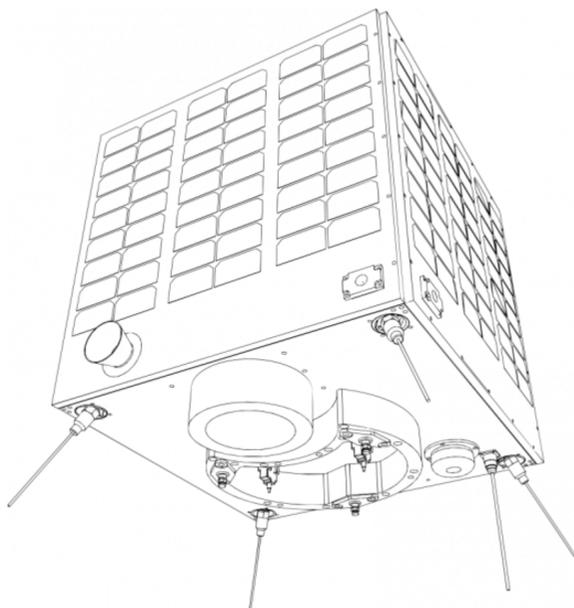
Since 2010, the University of Tokyo has been developing a world-leading R&D project whose title is loosely translated as "Establishment of a New Paradigm of Space Development and Utilization with Microsatellites through the Original Japanese Concept of *Reasonably Reliable* (Hodoyoshi) Systems Engineering." The project's aim is to further higher Japan's technological competence in microsatellites and consolidate the leading position of Japan in this field through the collaboration between industry and academia.

Axelspace developed Hodoyoshi-1 in cooperation with the Next-generation Space Systems Technology Research Association (NESTRA), as the first microsatellite in the project. The mission accomplishments of this satellite will signify an important step towards the realization of AxelGlobe, our future real-time Earth observation platform consisting of a number of low-cost microsatellites similar to Hodoyoshi-1.

OBJECTIVES

Images with a ground resolution of 6.7 m obtained from Hodoyoshi-1 can be used in a wide range of applications including agriculture, forestry, fishery, map-making, GIS (geographic information system) and disaster monitoring.

We conducted a business demonstration experiment of using microsatellite images with two companies (Asia Air Survey Co., Ltd. and Kokusai Kogyo Co., Ltd.) and one institution (Remote Sensing Technology Center of Japan). Through this experiment, we have demonstrated the serviceability of remote-sensing images by microsatellites, making it the first step in deploying businesses in the future.





Hodoyoshi-1 carries an optical system capable of obtaining images with the ground resolution of 6.7 m. It uses CCD sensors in the blue, green, red and near-infrared spectral bands respectively. Near-infrared data will enable us to study the growth and health state of plants, which is undetectable with the visible bands alone.

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| Image Acquisition Mode | Push-broom |
| Ground Resolution | 6.7m |
| Spectral bands | Blue (450-520nm) |
| | Green (520-600nm) |
| | Red (630-690nm) |
| | Near Infrared (780-890nm) |
| Signal / Noise Ratio | Blue (153) |
| | Green (178) |
| | Red (235) |
| | Near Infrared (167) |
| Swath Width | 27.8km |
| Maximum Continuous Image Length | 179km |
| Bit Depth | 12bit |

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| Dimensions | 503 × 524 × 524mm (excluding protrusions) |
| Mass | 60kg |
| Downlink Rate | 10-20Mbps |
| Generated Power | 50W |
| Attitude Control | Three-axis control (nadir pointing) |

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| Launch Date and Time | November 6, 2014 4:35:48 PM (Japan Standard Time) |
| Launch Vehicle | Dnepr Rocket |
| Launch Site | Yasny Launch Base, Russia |
| Orbit | Sun-synchronous, 500 km altitude |