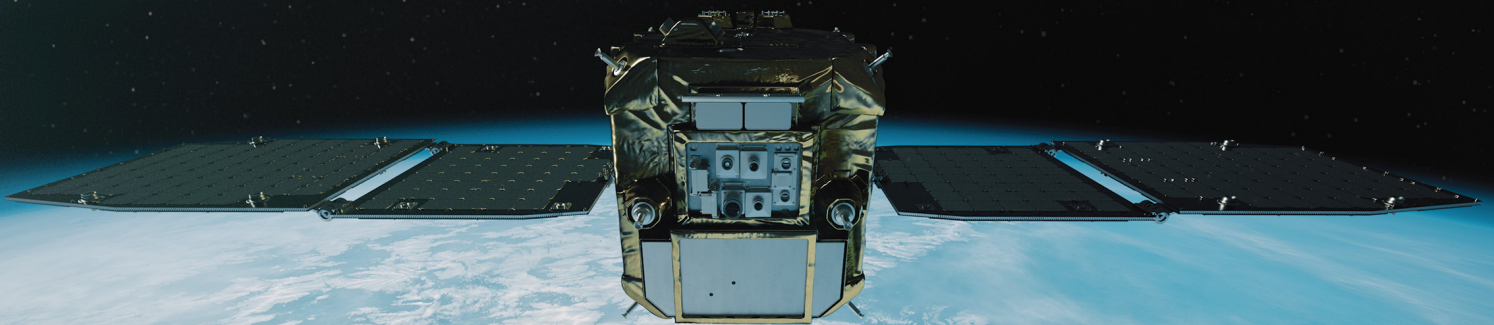




ADRAS - J

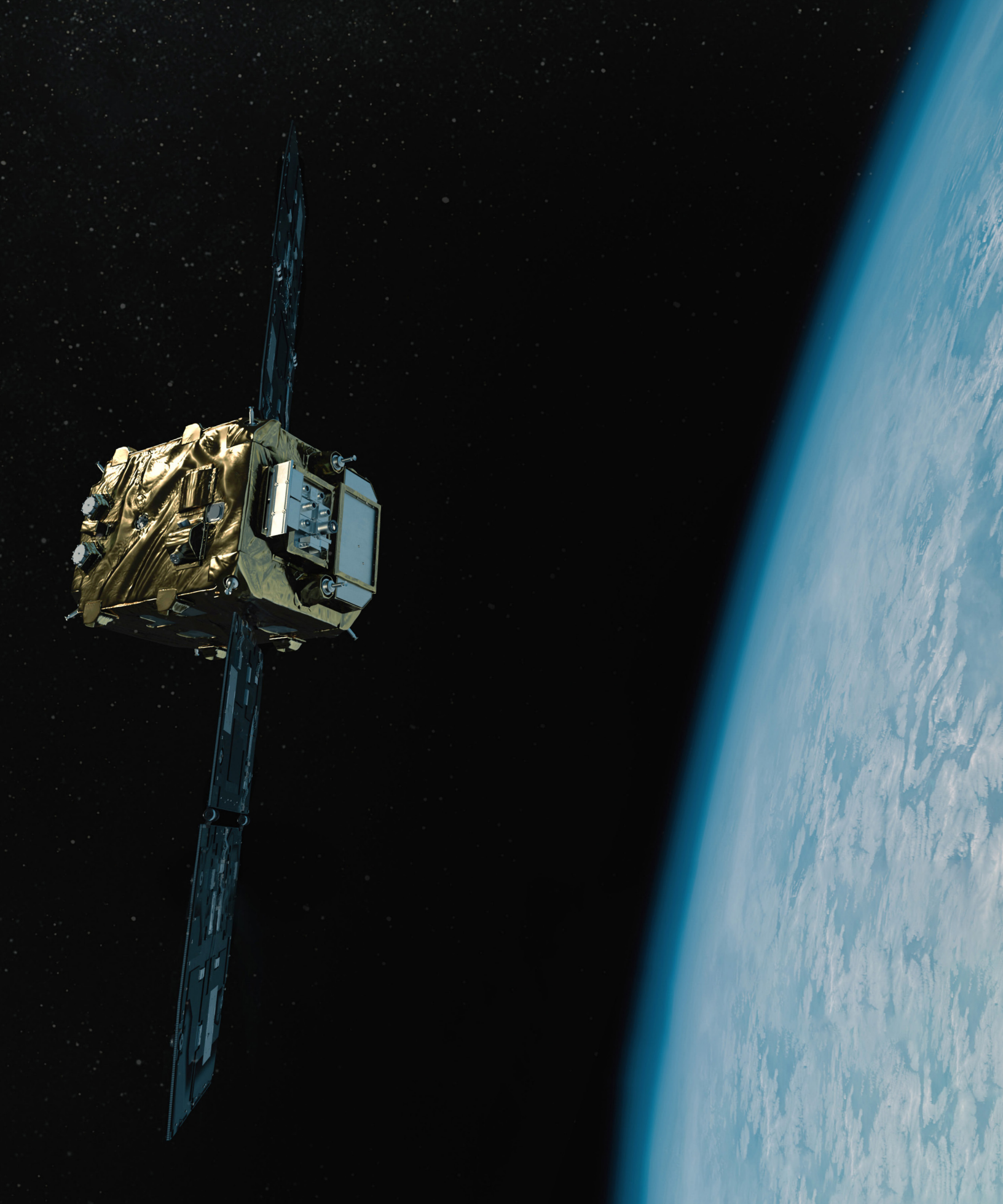
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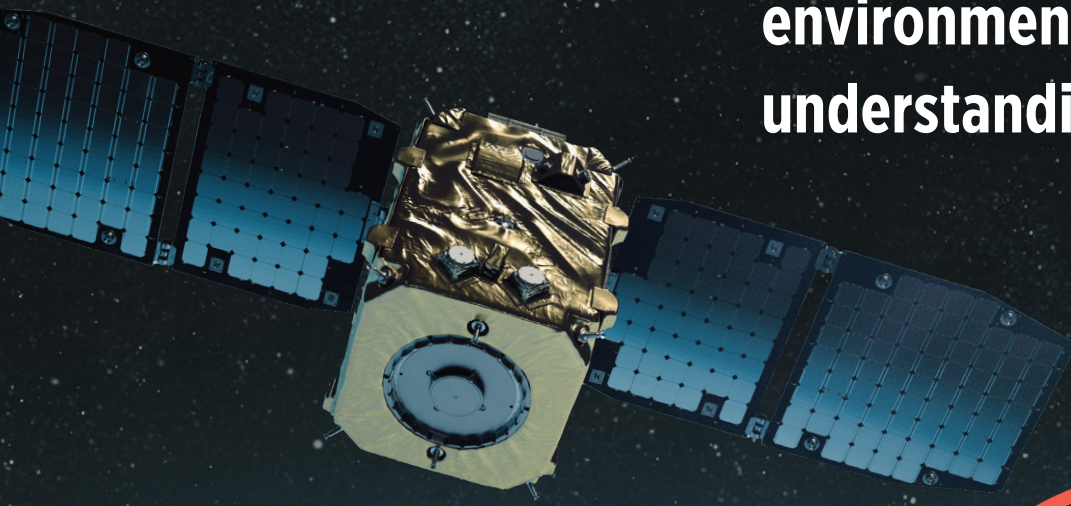


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Creating a sustainable space environment by better understanding debris risks



Introducing **ADRAS-J**

Since the launch of the first satellite in 1957, the creation of debris in Earth's orbits has been steadily increasing. This growth of debris is a threat to current and future space programs and has been the motivation for the development of various mitigation measures by the international space community. However, more recent analyses have shown that the commonly adopted mitigation measures will not be sufficient to stabilize the orbital environment and that active debris removal (ADR) must also be employed to secure a sustainable future in space.

However, before space debris can be removed, it must first be safely approached and characterized. What condition is it in? Is it tumbling, and if so, how quickly?

ADRAS-J, or Active Debris Removal by Astroscale-Japan, will answer these questions and offer unprecedented insight on the behavior of debris objects in space.



ADRAS-J Mission Patch

ADRAS-J will be the world's first attempt to safely approach and characterize an existing piece of large debris through Rendezvous and Proximity Operations (RPO), opening up a range of on-orbit servicing possibilities, including active debris removal. With ADRAS-J, Astroscale is partnering with the Japan Aerospace Exploration Agency (JAXA) on its Commercial Removal of Debris Demonstration (CRD2) program. As one of the world's first demonstrations of removing large-scale debris from orbit, CRD2 will pave the way in developing the technology and policies that will drive the sustainable space market.

ADRAS-J MISSION OVERVIEW

The ADRAS-J spacecraft was selected by JAXA for Phase I of its CRD2 program. Astroscale is responsible for the design, manufacture, test, launch, and operations of ADRAS-J.

The client is an unprepared object that does not provide any GPS data on its own, meaning the precise location and orbital position needed for an RPO mission is not available. Once deployed to a precise orbit, ADRAS-J will use ground based observation data of the client's approximate orbital position to initially approach the client from a safe distance based on this limited information.

Once the spacecraft is within a certain distance from the client, ADRAS-J will use its own on-board rendezvous payload sensors to conduct a safe approach with the client. These sensors will capture various types of relative navigation information about the client, such as distance and attitude, needed to demonstrate RPO technologies to safely approach an unprepared client. Seamless switching and coordination between these sensors is crucial to the success of the mission. Switching between the sensors can be likened to transitioning between a telescope, binoculars, and a magnifying glass while in a fast-moving vehicle on Earth which illustrates the difficult challenges that need to be overcome for this type of mission.

For this mission, ADRAS-J will conduct a close approach and orbit around the client to gather data and images to assess the client's condition such as: spin rate, spin axis, and condition of the structure. The mission will demonstrate the most challenging RPO technologies necessary for on-orbit services, however ADRAS-J will not dock with the client.

Client

Client	H-IIA
Country of Origin	Japan
Launched	2009
Payload	Greenhouse gases Observing SATellite (GOSAT)
Dimensions	11m x 4m / 3 tons
Altitude	Approx. 600km



*(Above) *SSC: 33500 H2A R/B (Image acquired from GOSAT satellite during separation in 2009)
Credit: JAXA*



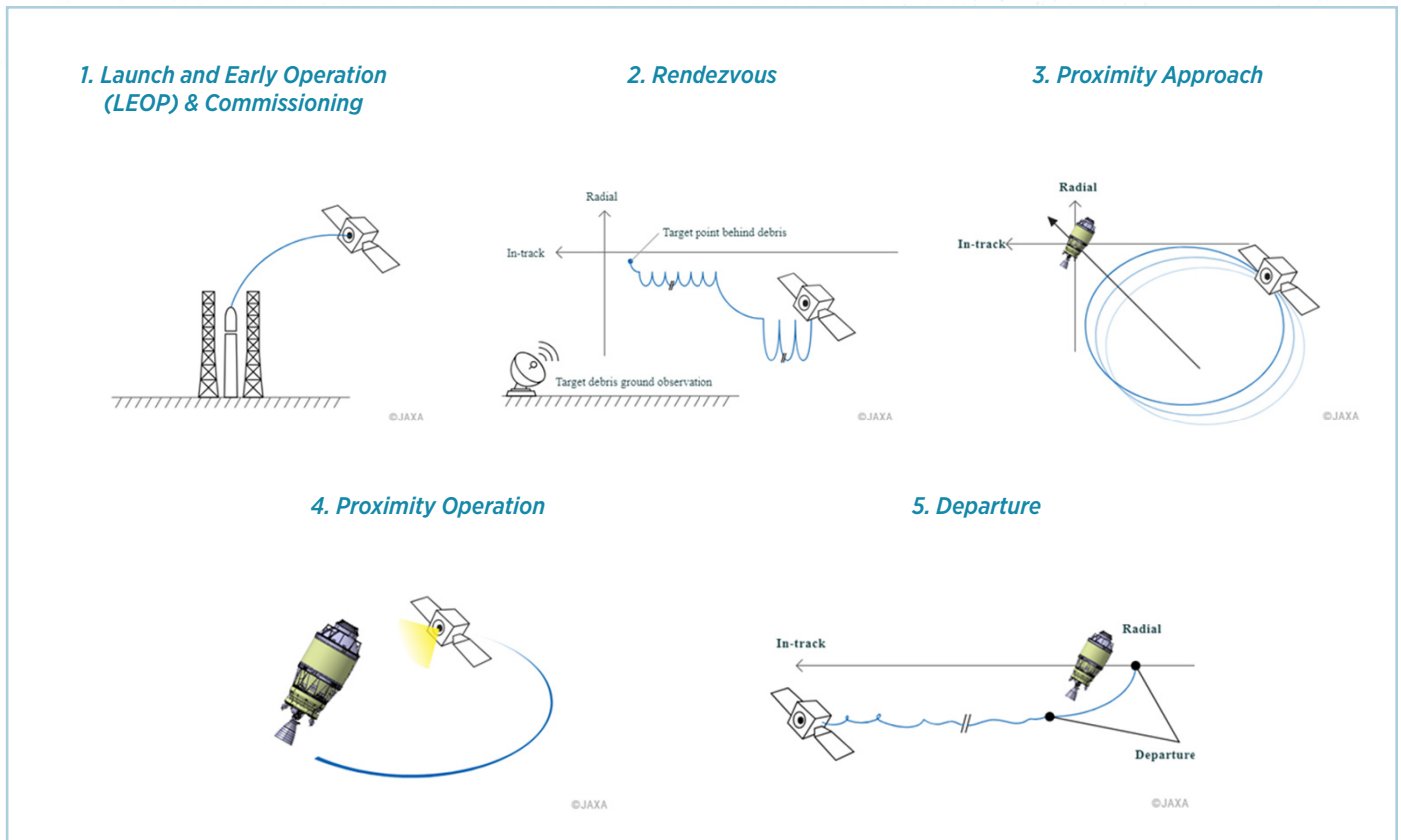
*(Above) *SSC: 33500 H2A R/B imagination
Credit: JAXA*

**Space Surveillance Center US military debris catalog ID number*

ADRAS-J MISSION HIGHLIGHTS

Outline of the Commercial Debris Removal Demonstration Phase I

provided by JAXA



ADRAS-J will be **the world's first attempt to safely approach and characterize** an existing piece of large debris **through RPO**.

The mission will **lay the groundwork for one of the world's first ADR missions** and for **in-space inspection and situational awareness capabilities**.

ADRAS-J will **demonstrate the essential RPO capabilities** for delivering future safe and secure on-orbit services.

ADRAS-J will **serve as a catalyst for making ADR and other on-orbit services a feasible reality** for governments and commercial businesses around the world by addressing the technological, economic, and policy challenges.



ADRAS-J is leading the world's first attempt to survey debris through RPO



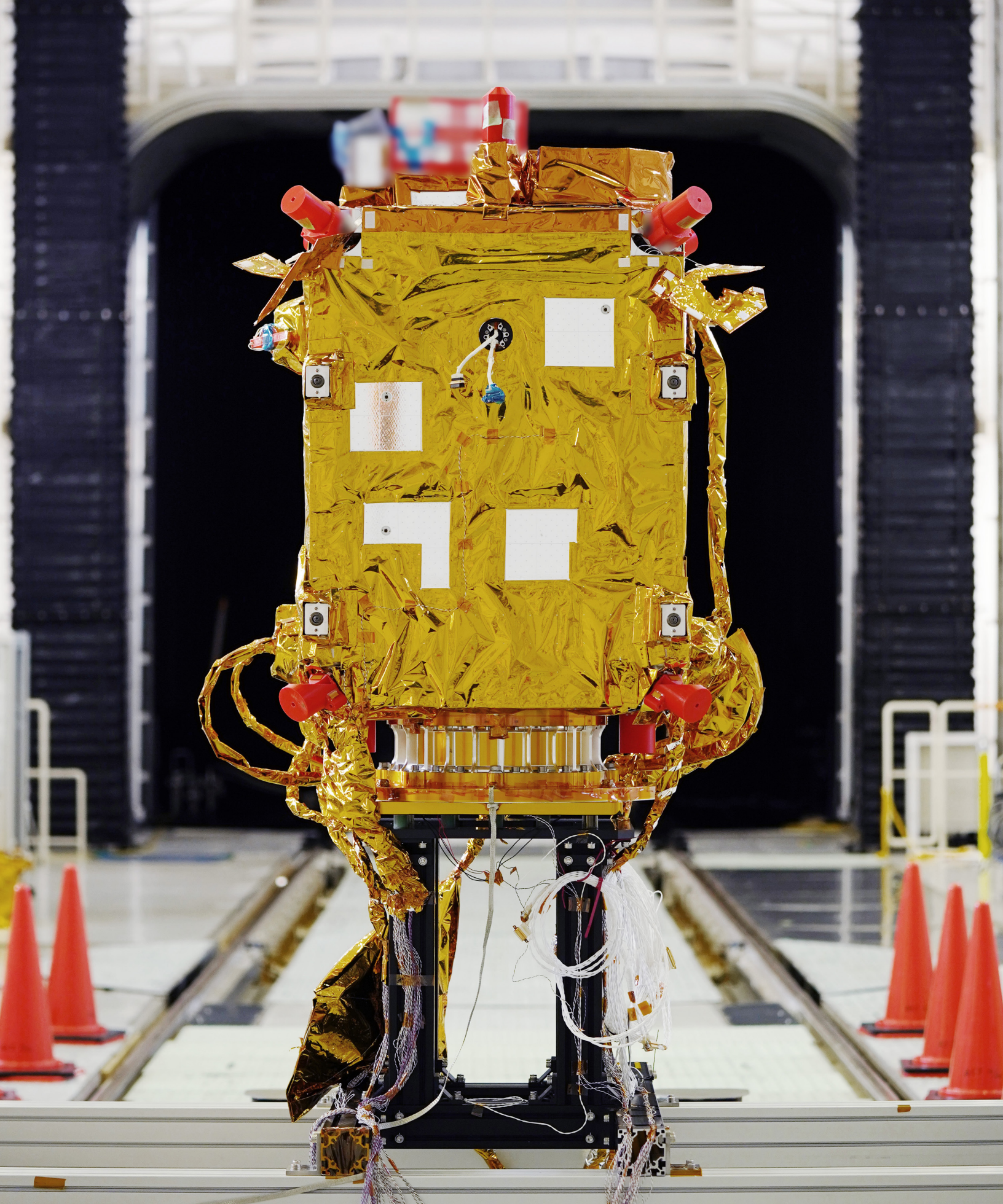
"Guidelines on a License to Operate a Spacecraft Performing On-Orbit Servicing"

Mission Policy

ADRAS-J will be a pioneering mission for not only demonstrating technology, but also the regulations and operational practices necessary for future on-orbit services. Safely approaching an unprepared object in space is an essential part of on-orbit servicing and during the mission, Astroscale will take measures based on the ["Guidelines on a License to Operate a Spacecraft](#)

[Performing On-Orbit Servicing](#)," issued by the Japanese government in November 2021.

The guidelines are the world's first to explicitly stipulate measures to ensure safety and transparency in on-orbit services. JAXA, space experts, relevant ministries and agencies, and private companies, including Astroscale, participated in discussions on and contributed to the creation of the guidelines.



KEY FEATURES



ADRAS-J **employs full-range RPO technologies to approach an unprepared client**, including navigation sensors and rendezvous capabilities.

ADRAS-J features a robust combination of **satellite hardware and software architecture design** along with **RPO specific mission planning and operations approach** to ensure safe operations.

ADRAS-J utilizes **eight diagonal thrusters for precise relative position control** and **four straight thrusters for efficient high-thrust maneuvers**, enabling dynamic and delicate movements.

Dimensions

Stowed with no Solar Arrays Deployed	Approx. 83cm x 81cm x 1.20cm
Solar Arrays Deployed	Approx. 370cm x 81cm x 1.20cm
Mass	Approx. 150kg

Launch

Provider	Rocket Lab
Launch Vehicle	Electron
Launch Site	Launch Complex 1, Mahia, New Zealand
Date	Sunday, Feb. 18 UTC

About ASTROSCALE

Astroscale is the first private company with a vision to secure the safe and sustainable development of space for the benefit of future generations and is dedicated to on-orbit servicing across all orbits.

Founded in 2013, Astroscale is developing innovative and scalable solutions across the spectrum of on-orbit servicing, including life extension, in-space situational awareness, end-of-life, and active debris removal, to create sustainable space systems and mitigate the growing and hazardous buildup of debris in space. Astroscale is also defining the economics of on-orbit servicing and working with government and commercial stakeholders to develop norms, regulations, and incentives for the responsible use of space.

Headquartered in Japan, Astroscale has an international presence with subsidiaries in the United Kingdom, the United States, France, and Israel. Astroscale is a rapidly expanding venture company, working to advance safe and sustainable growth in space and solve a growing environmental concern.

Contact Us

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Find out more by visiting

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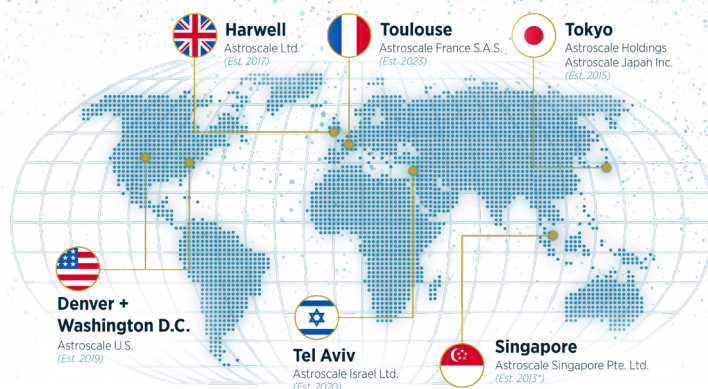


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Global Office Locations



**Astroscale Singapore was founded in 2018. In 2019, Astroscale Singapore merged with Astroscale PTE. LTD., which was formed in 2013. Accordingly, 2013 is shown as the formation date of Astroscale Singapore.*

Tokyo Headquarters



(Above) Astroscale Headquarters, Tokyo, Japan



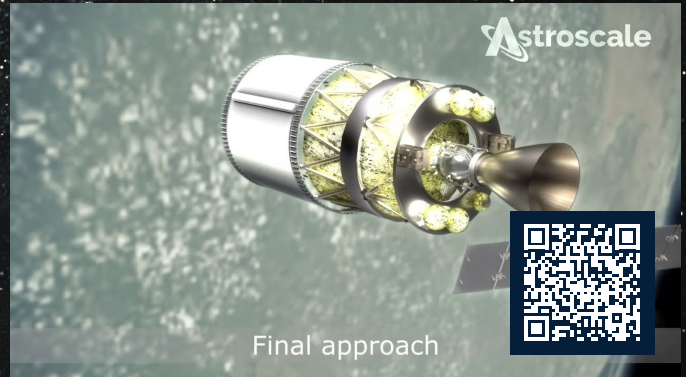
(Above) Astroscale team in Japan

MEDIA

Videos



[*ADRAS-J in Action*](#)



[*ADRAS-J Concept of Operations*](#)



[*ADRAS-J Thermal Vacuum Chamber Testing*](#)



[*Road to 2030 / Astroscale*](#)

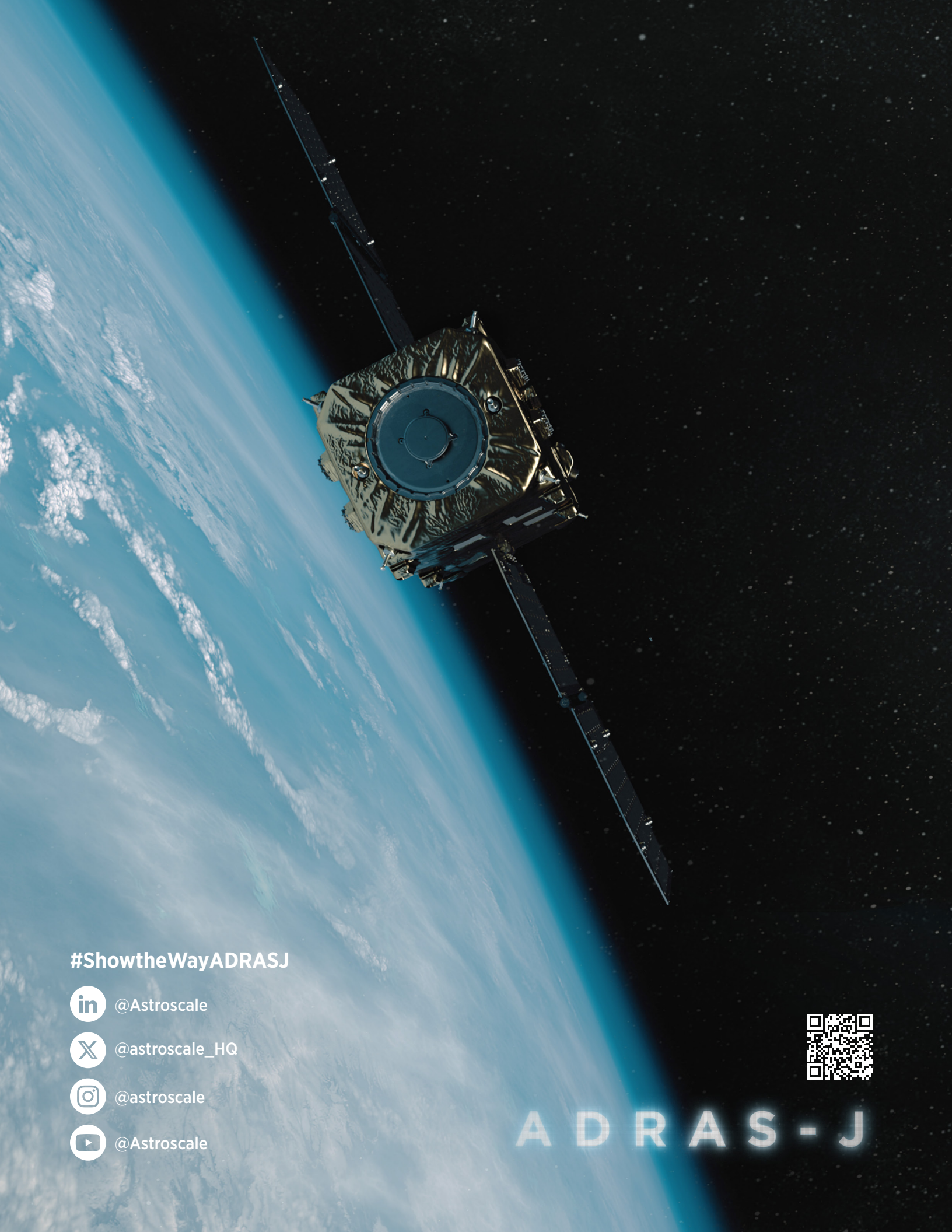
Resources

Image Library



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ADRAS-J