National Aeronautics and Space Administration

R5 Spacecraft Series

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Mission Overview



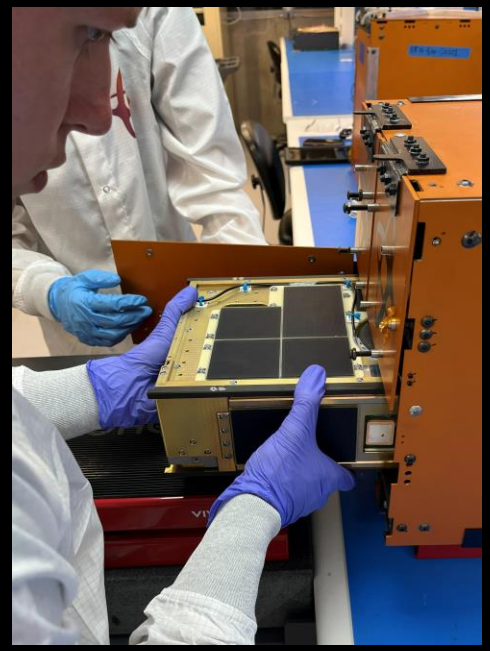


Image Credit: NASA (left), SEOPS (right)

Mission Status:

Various completed, in orbit, and in development

Shortfalls Addressed:

SF14.1, SF28.2, SF31.4, SF32.4

Objectives and Significance

R5 is pioneering new processes to enable capable, unique spacecraft to be delivered faster and cheaper than ever before. This has directly enabled more payloads to be demonstrated in addition to complex ConOps like proximity operations.

- 7 spacecraft completed since 2024, with 3 completed in the last 12 months
- Each spacecraft < $60k parts cost
- 10 payloads flown

Funding Pathway

- RTMD/SSDS Program
- JSC Engineering Directorate
- Orion Program

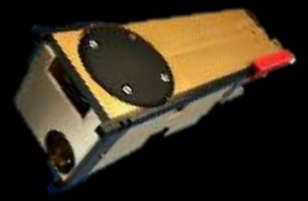
Launch Information (as appropriate)

- 02-2022 / 07-2024 / 11-2025 / 03-2026 / 07-2026
- Vandenberg / Cape Canaveral
- Astra Rocket 3 / Firefly Alpha / SpaceX Falcon 9

R5 Spacecraft Series

Mission Operations	Each R5 mission vehicle and ConOps is developed around the payload but generally looks like: 1. Deployment into target orbit 2. Automatic startup and commissioning 3. Automated primary mission ops and commanded ops with the bus power cycling and recovering 4. Automated passivation at end of mission
Accomplishments to Date	8 spacecraft completed >> 6 spacecraft launched >> 3 missions completed *5 spacecraft currently in development*
Partners & Contributions	Momentus: Proximity Operations Partner/Client/Launch Solstar Space: Crosslink Sandia National Laboratories: AIT support

Initial Spacecraft Demo



Bus and Payload Demo

4-month Development, $15k parts

Launched 2022

Lost after LV Failure



Los Alamos National Labs ELROI

Propulsion Demonstration

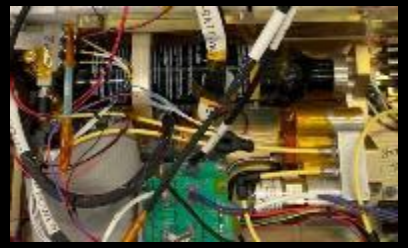


Bus and Payload Demo

6-month Development, <$60k parts

Launched 2024

Full 300-day Mission Complete



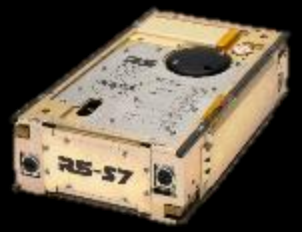
In-house cold-gas prop system



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…and more!

Prox Ops Demonstrator 1

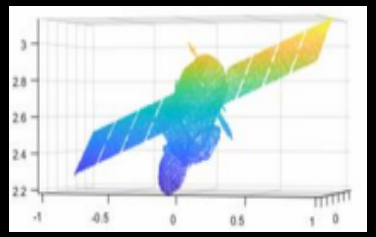


Proximity Operations Demo

5-month Development, $60k parts

Launched 2025

Completed Suborbital Prox Ops

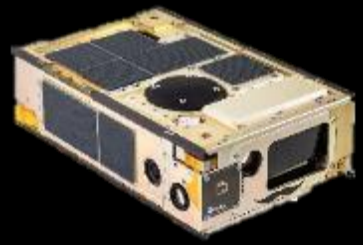


Martian Sky 3D Reconstruction



MOVIA Automotive LiDAR

Prox Ops Demonstrator 2



Proximity Operations and Payload Demo

5-month Development, $60k parts

Launched 2026

Awaiting Deployment



Event Camera Star Tracking

Solstar Space Co.

Solstar WiFi Crosslink

AI and ISAM Demo



Payload Demo

Awaiting Manifest



Astroscale Docking Plate



UC Davis Prototype RCW and Deployable Image Processing

…and more!

Optical Comm and SDA



Payload Demo

6-month Development, <$60k parts

Launched 2026

In Operations

Sandia National Laboratories

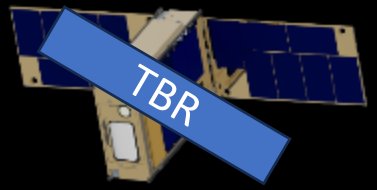
SNL Payloads



Optical Comm Payload

…and more!

Deep Space Nav and MPG



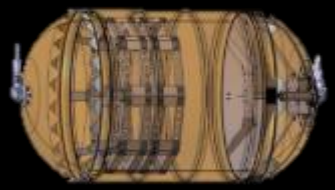
Payload Demo

Manifested ISS/SpX

In Formulation

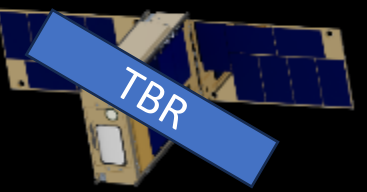


Autonomous cislunar OpNav



Modal Propellant Gauging Payload

Optical Comm and More



Payload Demo

Manifested STP-S29B

In Formulation



Optical Comm Payload

…and more TBD!

More in the works!



Exploring the secrets
of the universe for
the benefit of all.

nasa.gov