

Free-Flying Unmanned Robotic Spacecraft for Asteroid Resource Prospecting and Characterization, Phase II Project

SBIR/STTR Programs | Space Technology Mission Directorate (STMD)



ABSTRACT

In Phase 2 we will develop a fully integrated, autonomous free-flying robotic system based on a commercial SkyJib quadcopter, and demonstrate flying straight and level to a target location, acquisition of rock and regolith samples, and return to the point of origin. The work plan for Phase 2 is as follows: 1. Completion of the Guidance, Navigation, Control, Vision, and Sample Acquisition subsystems. 2. Integration of all the payload elements at ERAU and system level check out 3. Demonstration of the entire system at NASA KSC 4. Field deployment at analog location



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ANTICIPATED BENEFITS

To NASA funded missions:

Potential NASA Commercial Applications: In 2010, President Obama called for a new approach to space exploration, which would include human and robotic exploration of asteroids. The first step in this program would be Asteroid Retrieval Mission (ARM) currently under study at NASA. Characterization of these objects would require novel approaches akin to what is here proposed. In the latest Decadal Survey, the committee recommended selecting a Comet Surface Sample Return mission as one of the NF4 missions.

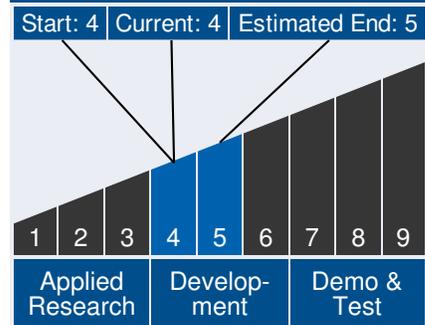
To the commercial space industry:

Potential Non-NASA Commercial Applications: Sampling of contaminated soils and liquid from hazardous environments (nuclear reactors, chemical spills etc.). Geologists could use it to capture samples from hard to reach areas, such as for example lava-tubes in Hawaii. Cameras and sensors could map the area and give the geological context. Commercial companies such as Planetary Resources and Deep Space Industries, who are interested in asteroid mining for economic gains, could also use this technology.

Table of Contents

| | |
|--|---|
| Abstract | 1 |
| Anticipated Benefits | 1 |
| Technology Maturity | 1 |
| U.S. Work Locations and Key Partners | 2 |
| Management Team | 2 |
| Technology Areas | 2 |
| Details for Technology 1 | 3 |

Technology Maturity

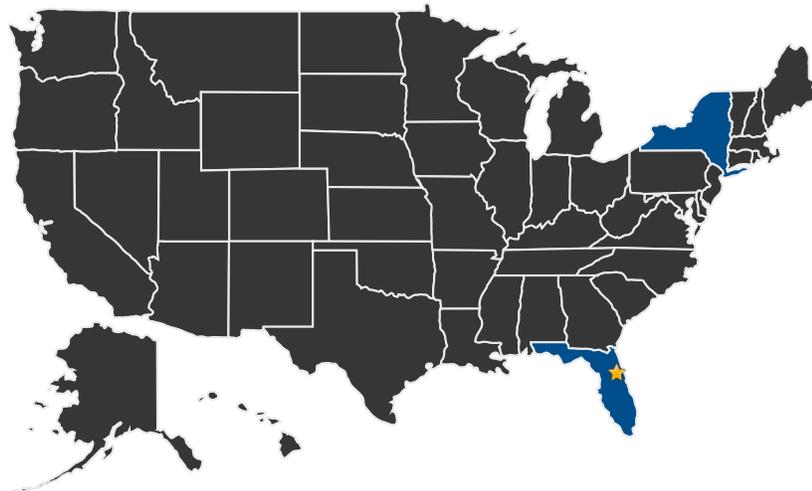


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U.S. WORK LOCATIONS AND KEY PARTNERS



■ U.S. States
With Work

★ **Lead Center:**
Kennedy Space Center

Other Organizations Performing Work:

- Embry-Riddle Aeronautical University (Prescot, AZ)
- Honeybee Robotics, Ltd. (New York, NY)

PROJECT LIBRARY

Presentations

- Briefing Chart
 - (<http://techport.nasa.gov:80/file/18145>)

Management Team

Program Executives:

- Joseph Grant
- Laguduva Kubendran

Program Manager:

- Carlos Torrez

Principal Investigator:

- Hever Moncayo

Technology Areas

Primary Technology Area:

- Robotics and Autonomous Systems (TA 4)
 - └─ Mobility (TA 4.2)
 - └─ Small-Body and Microgravity Mobility (TA 4.2.4)
 - └─ Free-Floating Robots (TA 4.2.4.1)

Secondary Technology Area:

- Human Exploration Destination Systems (TA 7)
 - └─ In-Situ Resource Utilization (TA 7.1)
 - └─ Destination Reconnaissance, Prospecting, and Mapping (TA 7.1.1)

Active Project (2015 - 2017)

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DETAILS FOR TECHNOLOGY 1

Technology Title

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