Flight Opportunities

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Greetings from Flight Opportunities

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Enjoy!
The Flight Opportunities team

News

A Decade of Flight Opportunities

Since 2011, Flight Opportunities has been facilitating rapid demonstration of promising technologies for space exploration, discovery, and the expansion of space commerce through suborbital testing with industry flight providers. As we round out a full decade of this work, we want to take a moment to celebrate the significant impact that our program has made to date—as well as the many organizations and technologists behind the program's success. While it is not possible to capture all of the accomplishments of the program in numbers, we would like to share a few key metrics. In the last ten years Flight Opportunities has:

- **Supported 195 successful flights**
- **Enabled 676 tests of payloads**
- **Selected 259 proposals into the program's portfolio, more than 20% of which have transitioned to missions, programs, commercial partners, or further testing**
- **Worked with 13 active commercial flight providers**

We are proud of these achievements, and of the many organizations and technologists—both within NASA and beyond—who have done the work to make this impact possible. We look forward to many more years to come.

An Historic Achievement

Flight Opportunities would like to congratulate our colleagues in NASA's **Commercial Crew Program** and NASA partner SpaceX for successfully **launching NASA astronauts from American soil** in a commercially built and operated crewed spacecraft for the first time in history. This historic moment underscores the value of continued collaboration with the commercial space industry in helping NASA achieve its goals—a key tenet of Flight Opportunities since the founding of the program.

NASA astronauts Bob Behnken, left, and Doug Hurley, wearing SpaceX spacesuits, walk through the Crew Access Arm connecting the launch tower to the SpaceX Crew Dragon spacecraft during a dress rehearsal at NASA's Kennedy Space Center in Florida on Jan. 17, 2020. Credit: NASA

NASA Developing a Plan to Fly Personnel on Suborbital Spacecraft

For the first time in the agency's history, NASA has initiated a new effort to enable NASA personnel to fly on future commercial suborbital spaceflights. **NASA's Flight Opportunities program** has successfully worked with emerging commercial suborbital transportation systems to fly research payloads to space for short periods of microgravity time. In addition, the Flight Opportunities program recently released a call that allows those non-NASA researchers to propose accompanying their payloads in suborbital space.

Now the Suborbital Crew (SubC) office within NASA's Commercial Crew Program will lay the groundwork for flying NASA personnel on commercial suborbital space transportation systems. The goal of the SubC office is to perform a system qualification, or safety assessment, to enable NASA astronauts, principal investigators, and other NASA personnel to take advantage of these unique capabilities.

To learn more, **read the full NASA web feature**.

JPL's Terrain-Relative Navigation Technology Set to Launch on Mars 2020 Perseverance Rover

The Technology

Terrain-Relative Navigation (TRN) technology from NASA's Jet Propulsion Laboratory (JPL) enables pin-point landing and large hazard avoidance for crewed and robotic lander vehicles. A camera captures images during vehicle descent, which are subsequently matched to orbital maps stored onboard the lander. Matching images to multiple known terrain features enables automated determination of the lander's position relative to the terrain.

The Flight Testing

JPL's TRN technology was matured in part through Flight Opportunities-supported flight testing of the **Fuel Optimal and Accurate Landing System** on Masten's Xombie vehicle in 2014. The successful closed-loop flight tests increased the system's technology readiness level (TRL) by demonstrating its capability to autonomously change course on descent and adopt a newly calculated path to reach the target landing site.

The Transition

Infused into **Mars 2020**, JPL's technology will be aboard the Perseverance rover, scheduled to launch on the mission spacecraft in July 2020. Perseverance is scheduled to touch down in February 2021 in Jezero Crater—a 28-mile-wide expanse of steep cliffs and boulder fields. The rover will rely on JPL's technology to handle this challenging landing site.

"Our 2014 flights with Masten were the capstone of our technology development effort and put us solidly at TRL 6. Flight Opportunities facilitating that closed-loop demo in a relevant environment on a vertical takeoff vertical landing vehicle was unprecedented at the time. It was an instrumental step in the technology being accepted for Mars 2020." — Andrew Johnson, Principal Robotics Systems Engineer, NASA's Jet Propulsion Laboratory

Click the image above to watch a video featuring JPL's TRN technology on NASA's Tech Briefs TV. Credit: NASA

Events

Mark Your Calendars for Upcoming Virtual Events

- **Commercial and Government Responsive Access to Space Technology Exchange (CRASTE) 2020**: Flight Opportunities is among the organizations submitting presentations to this year's virtual content, which will be made available to registrants in the coming weeks.
- **Small Satellite Conference: August 1-6, 2020**
  Flight Opportunities representatives will be participating in several sessions at this year's virtual event, which includes free registration.

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Flight Opportunities is part of NASA's Space Technology Mission Directorate.