Welcome to the Community of Practice Webinar Series!

*First, a bit of housekeeping…*

- Please mute your microphone and turn off your camera
- Today’s session will be recorded
- Recordings for this and all future session will be posted on the Flight Opportunities website
- Please engage!
  - Use the chat throughout the session to ask questions
Flight Opportunities Mission

The Flight Opportunities program facilitates rapid demonstration of promising technologies for space exploration, discovery, and the expansion of space commerce through suborbital testing with industry flight providers.

Join us for future Community of Practice webinars!

Watch our website and newsletter for next month’s topic

nasa.gov/directorates/spacetechnologyflightopportunities/newsletter

Future webinars
- Webinars are held 1st Wednesday of each month at 10 a.m. PT
- Topics will be announced in the Flight Opportunities newsletter and website
- Session recordings will be posted on the Flight Opportunities website
- Let us know session topics you would like to see covered
Leveraging SBIR Awards for Suborbital Flight Tests
Stephen Caskey, Michael Ewert, Alexander Van Dijk
January 5, 2022
https://www.nasa.gov/directorates/spacetech/flightopportunities/community-of-practice

Today’s Speakers

Stephen Caskey, Ph.D.
Thermal Systems Engineer
Air Squared

Michael Ewert
Engineer | Deputy Project Manager
NASA’s Johnson Space Center

Alexander van Dijk
Technologist
Flight Opportunities

SBIR Overview - What exactly do I get?

Up to $1.15 million for Phase I and II and nearly $3 million or more for Post Phase II opportunities!

Note: The 2022 Phase II funding amount is planned to increase to $1 million from $750,000. This is dependent on the final budget appropriated by Congress.
Leveraging SBIR Awards for Suborbital Flight Tests

Stephen Caskey, Michael Ewert, Alexander Van Dijk

January 5, 2022

How does it work?

Solicitation Release
January 2022

Proposal Submissions
January 2022 – March 2022

Proposal Reviews and Selection
February 2022 – May 2022

Phase I Selection Announcement
May 2022

Note: Dates are subject to change. For the latest dates, please visit our website’s “Schedule & Awards” page.

NASA SBIR/STTR Program | sbir.nasa.gov

2022 NASA SBIR/STTR Solicitations

January 6 – March 9, 2022

Changes from previous years:

- Phase I funding will increase from $125,000 to $150,000
- SBIR and STTR will be split into separate solicitations
- Phase II requirements will no longer be part of the Phase I solicitations
  - Phase II submissions details will be available to Phase I awardees toward the end of their period of performance

NASA SBIR/STTR Program | sbir.nasa.gov
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NASA SBIR PHASE II-E

Vapor Compression Refrigeration System for Food Storage on Spacecrafts

NASA Flight Opportunities - SBIR/STTR Community of Practice
01/05/2022

Air Squared Inc | Purdue University | Whirlpool Corporation

Data rights shall be in accordance with CFR 52.227-20 Rights in Data
Overview of Parabolic Flight Tests

- Project Members
  - Air Squared – SBIR Prime
  - Oil-free scroll hardware
  - Prior NASA Projects
    - Phase I – 7 completed
    - Phase II – 4 completed
    - Phase II-E – 1 completed
  - ISS Demonstration Refrigerator
  - Purdue University – SBIR subcontractor
    - Liquid flooded evaporator investigation
    - Highly instrumented benchtop system
  - Whirlpool Corporation – Phase II-E investor
    - Supported ISS Demo design and any issues encountered during flights
  - Johnson Space Center – Phase II-E investor
  - Armstrong Flight Opportunities – Phase II-E Investor

Mars 2020 Moxie

Overview of Parabolic Flight Tests

- Flew three separate experiments with three investments to create Phase II-E
  1. Complete VCC
  2. Transparent Evaporator
  3. ISS Refrigerator
Vapor Compression Cycle Technology After Parabolic Flights

- Numerous (at least 4) journal publications generated sharing flight results
- Two-phase flow in evaporator transition into flow regime during microgravity and aids compressor ingesting only vapor
- Created VCC scaling approach to communicate requirements on larger storage volumes
- Seeking NASA contractor to support design iteration to fly small ISS refrigerator on station for continuous microgravity operation

Key Lessons Learned

- Completed assembly with 80-20 flight structure
- Installing onto Zero-G Plane
- Completed installation with Purdue test stands in background
Key Lessons Learned

- Started Phase II-E plans early Q6 during Phase II
- RPP required for Zero-G
  - Engaging early was extremely beneficial
  - First experiments flown with pressurized refrigerant
- Ground fault circuit breaker caused issues with custom built stands
  - Should be removed on future flights
  - Replicate Zero-G flight equipment as much as possible when conducting ground tests
Thank You!

Transition to Panel