SPHERES/Astrobee ISS Free-Flyer Facility

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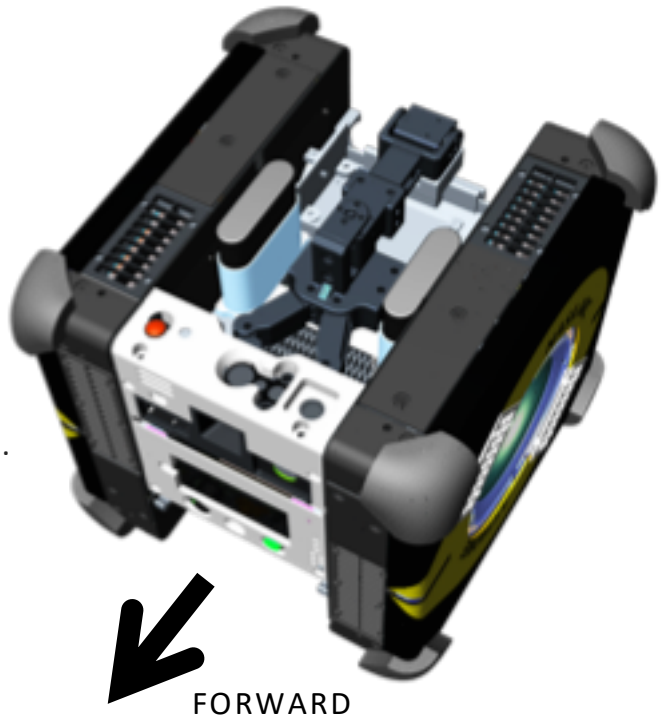
Astrobee Overview

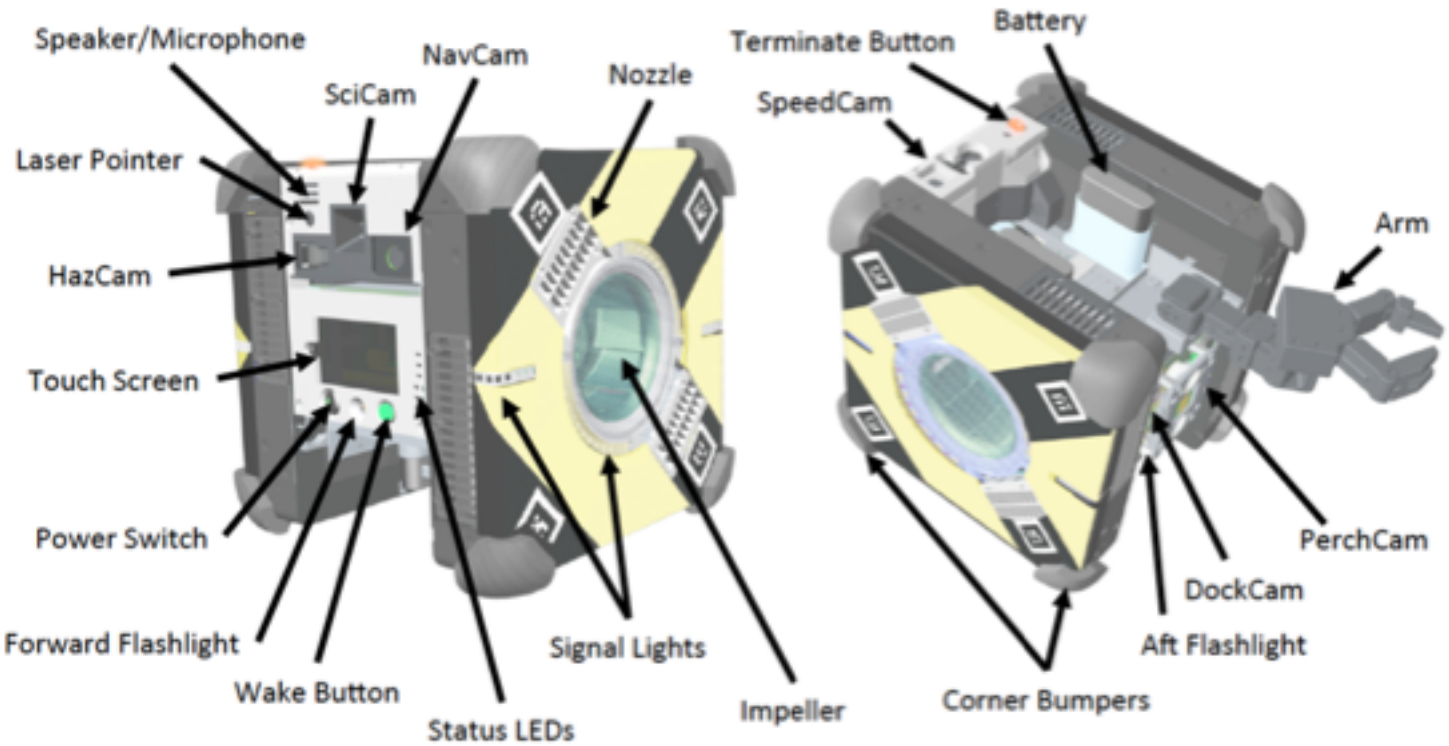
- Three free flyers on ISS starting 2019
- Docking station for recharge and wired communication
- Built in perching arm using payload interface
- 6 total cameras for various purposes, including one cellphone class HD camera.
- Main purposes:
  - *Host guest science payload (GSP payloads)*
  - *Serve as mobile camera for ISS situational awareness*
  - *Serve as mobile sensor platform*



12.5 x 12.5 x 12.5 inches

10 kg mass target

Current Robot Design



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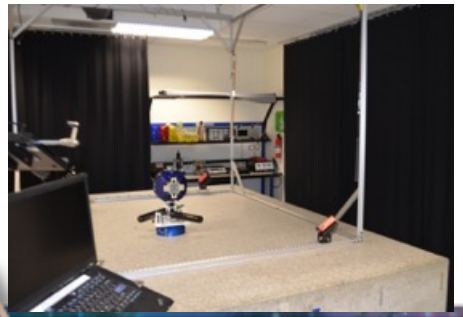
Astrobee Facility Labs

Flight Lab

International Space Station

Engineering Evaluation Lab (EEL)



Granite Lab

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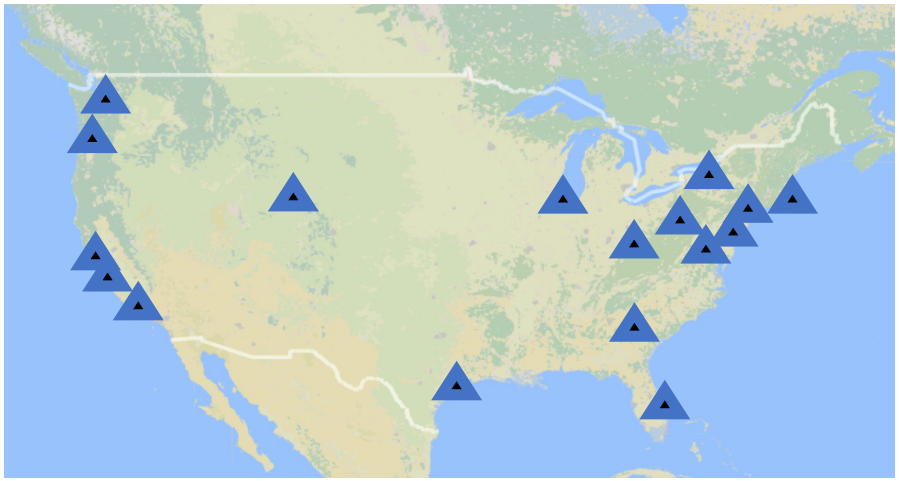
Guest Science Program (GSP)

- ***What's available from the Astrobee Facility?***
  - Astrobee Robotics Software Simulation
  - Ground Hardware: Qty 3 & ”Flat-Sats”
  - Labs: Granite & MGTF
  - Documentation and Training
  - Proposal Support
  - ISS Payload Partner
- ***How can I use Astrobee and what does it take?***
  - Guest Scientist Guide & Mechanical Payload ICD
  - New Hardware or “just” Software?
  - Ground Demonstration or ISS Operation?
- ***We want to hear from you!***
  - Approximate Scheduling
- ***Information found on website https://www.nasa.gov/astrobee***

Guest Scientists

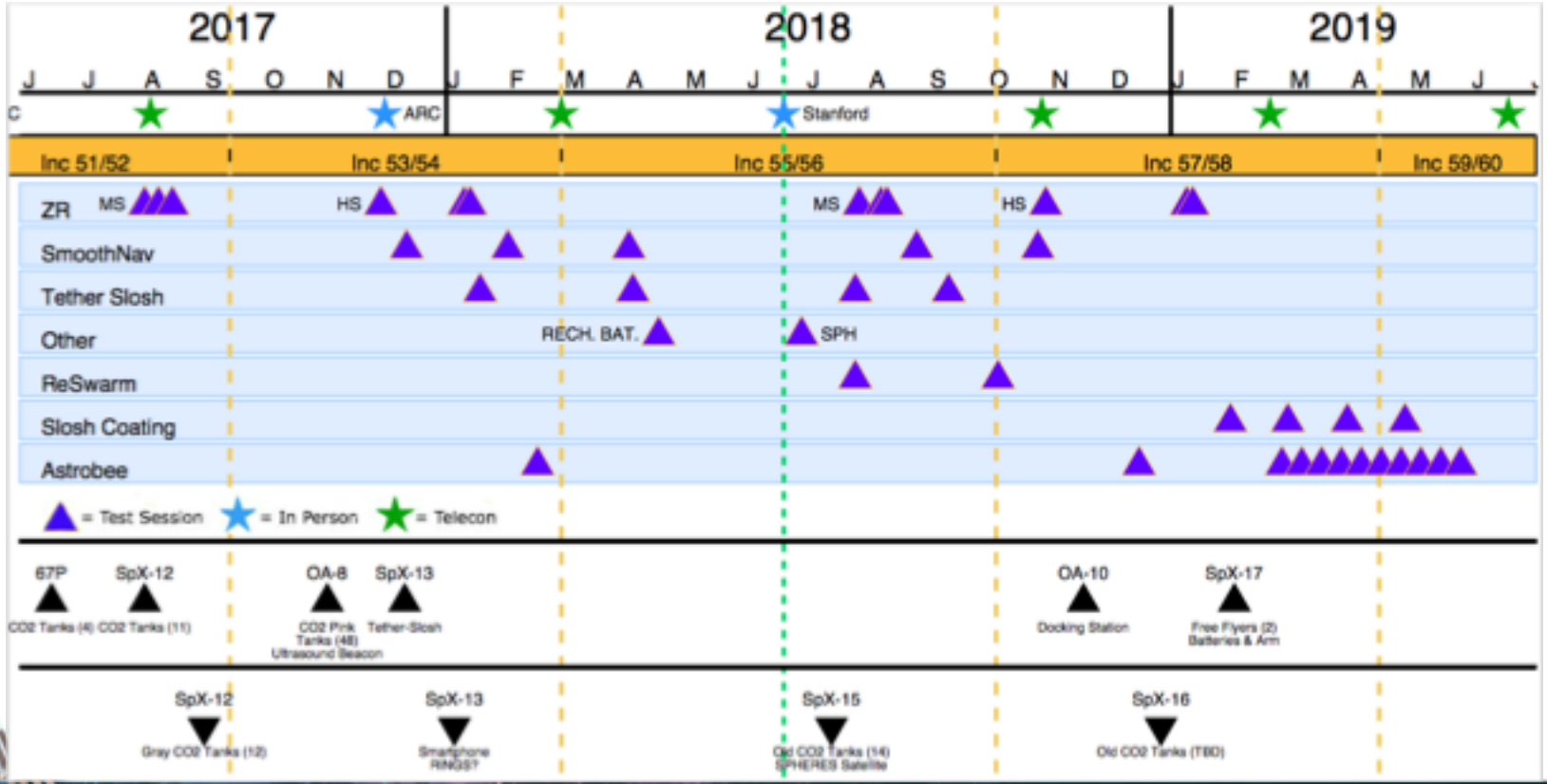
- Replacing SPHERES, it is anticipated that Astrobee will carry on as a **highly utilized payload** on the ISS
- 40+ projects have expressed interest in using Astrobee
  - *Topics range from 0g fuel tank slosh to propellantless flight via acrobatic arm motion*
- 7 Projects actively working towards ISS payloads
  - *MIT/Zero Robotics*
  - *Naval Postgraduate School*
  - *Astrobotic/Bosch*
  - *Stanford*
  - *REALM RFID reader*
  - *JAXA joint activity*



Astrobee guest scientist institutions in the US

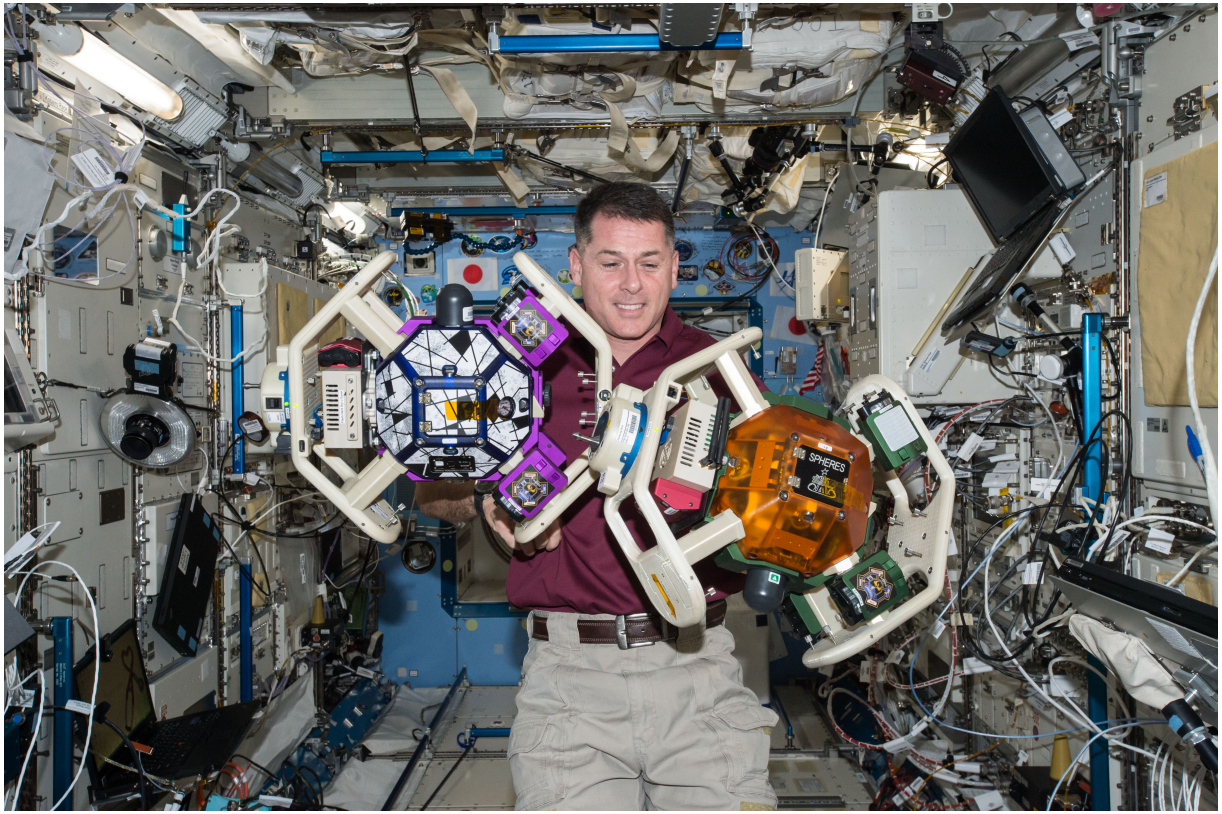
- Ground Studies
  - FIT/RINGS
  - Tethers Unlimited
  - NMSU

Calendar


2017
2018
2019
J J A S O N D J F M A M J J A S O N D J F M A M J
ARC
Stanford
Inc 51/52
Inc 53/54
Inc 55/56
Inc 57/58
Inc 59/60
ZR
MS
HS
MS
HS
SmoothNav
Tether Slosh
Other
RECH. BAT.
SPH
ReSwarm
Slosh Coating
Astrobee
= Test Session
= In Person
= Telecon
67P
SpX-12
OA-8
SpX-13
OA-10
SpX-17
CO2 Tanks (4) CO2 Tanks (11)
CO2 Pink Tanks (48) Ultrasound Beacon
Tether-Slosh
Docking Station
Free Flyers (2) Batteries & Arm
SpX-12
SpX-13
SpX-15
SpX-16
Gray CO2 Tanks (12)
Smartphone RINGS?
Old CO2 Tanks (14) SPHERES Satellite
Old CO2 Tanks (TBD)

SPHERES/Astrobee Social Media

- www.nasa.gov/spheres
- www.nasa.gov/astrobee
- twitter.com/NASA_SPHERES



Questions?

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