The future of NASA's Free-Flying Space Robots

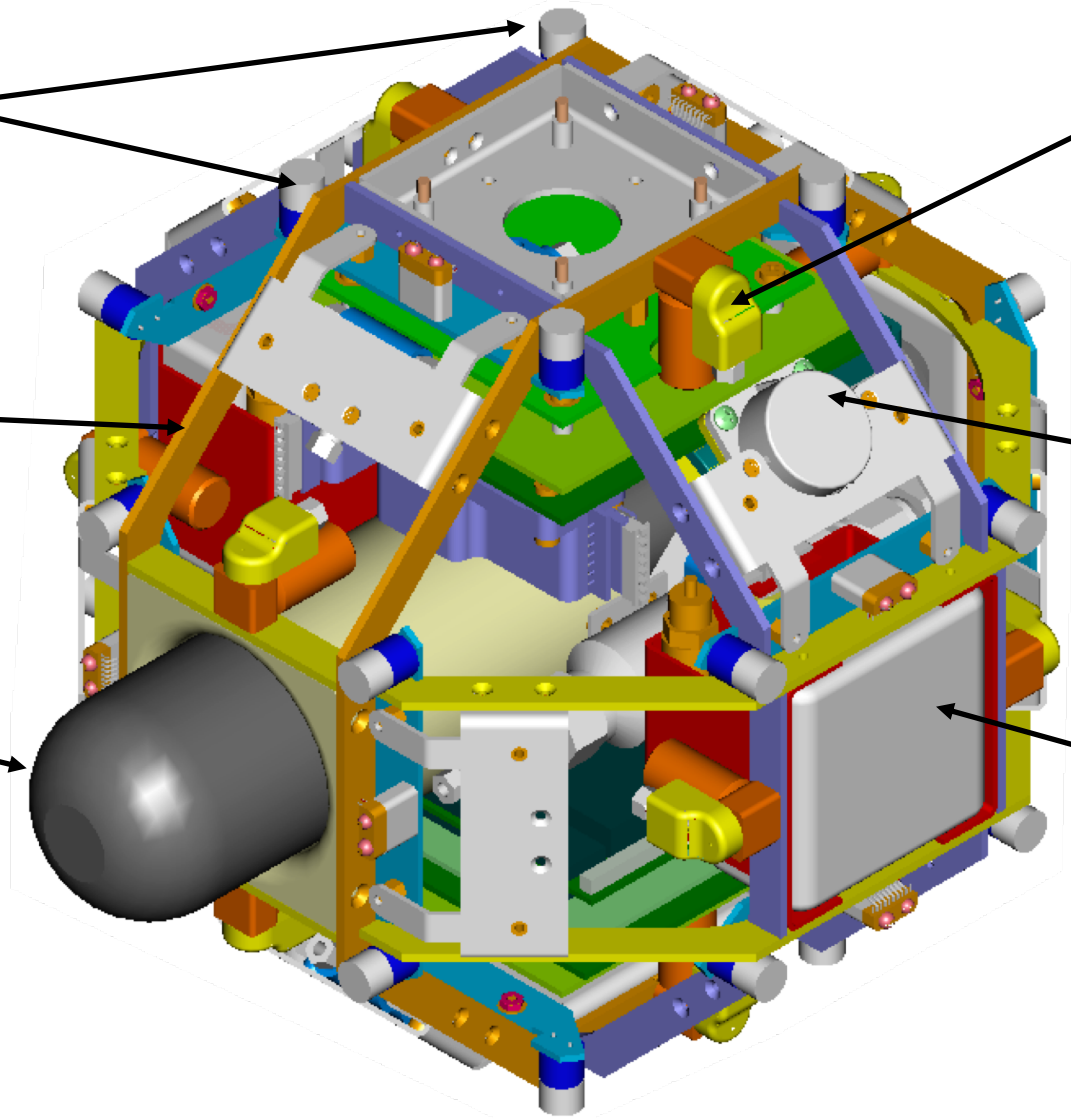
ISS National SPHERES/Astrobee Facility

NASA Ames Research Center

Synchronized Position Hold Engage Reorient Experimental Satellites - SPHERES

Scott Kelly working with SPHERES in the Kibo lab

SPHERES Satellite



Slide Courtesy MIT and the Space Systems Laboratory

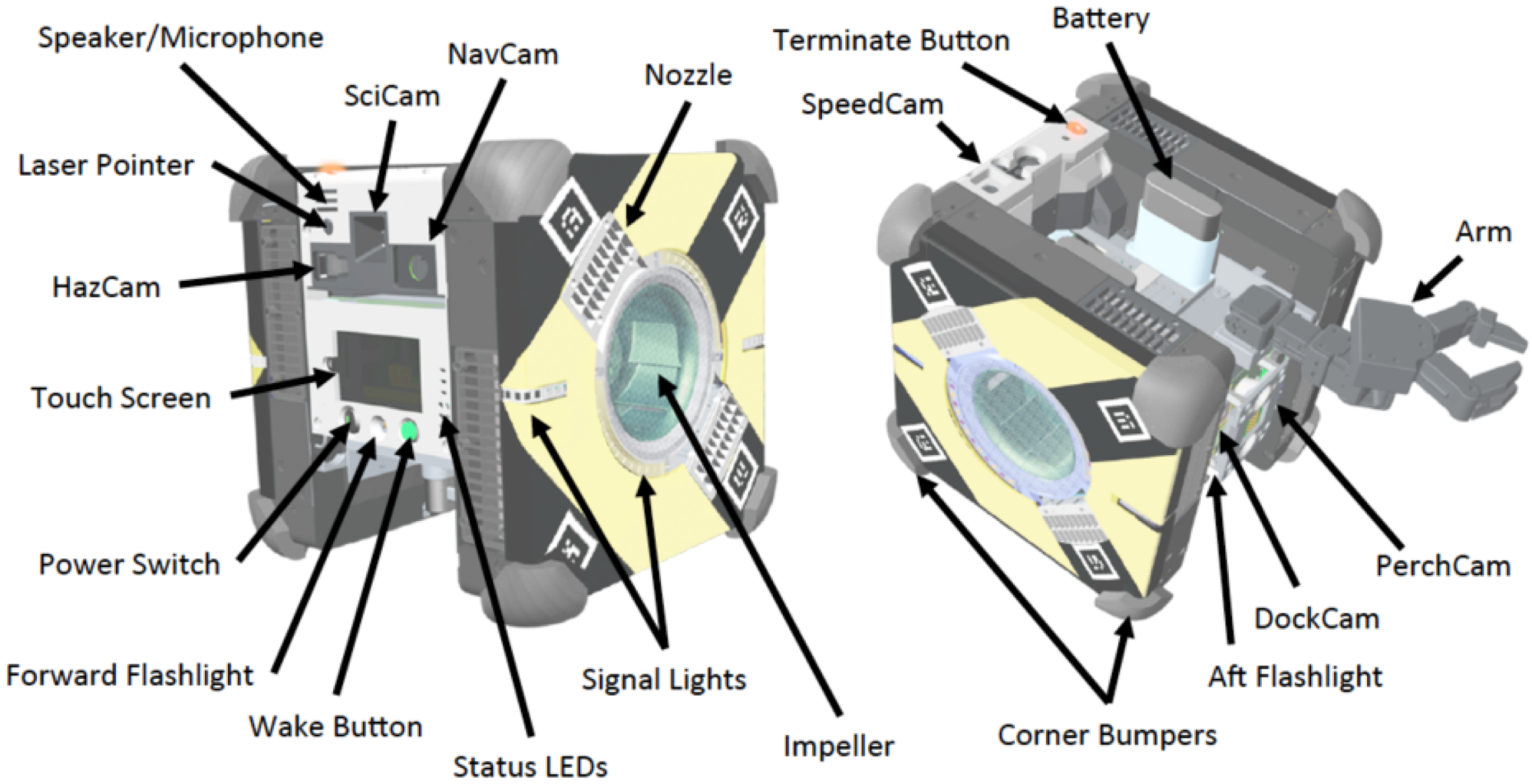
Synchronized Position Hold Engage Reorient Experimental Satellites - SPHERES

Anne McClainworking with SPHERES Zero Robotics

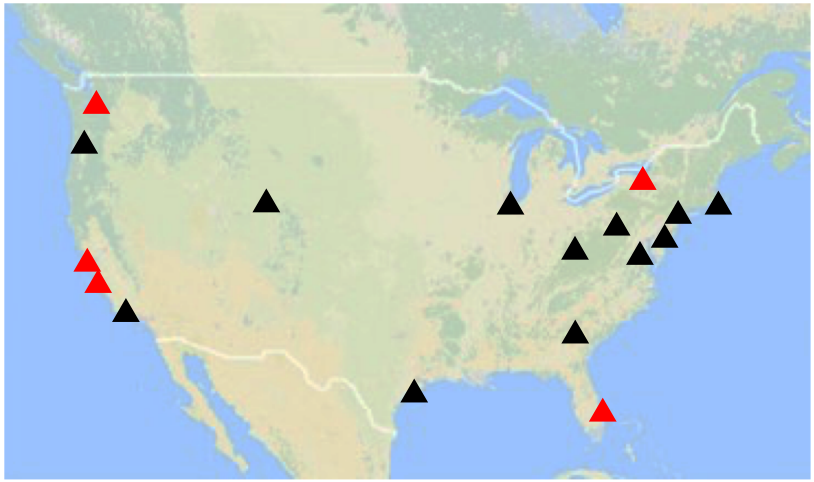
Astrobee Overview

- Three free flyers on ISS
- 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
- First GSP Payloads
  - REALM RFID reader
  - Zero Robotics High School and Middle School competitions
- **Guest Scientist opportunities**

Astrobee Design

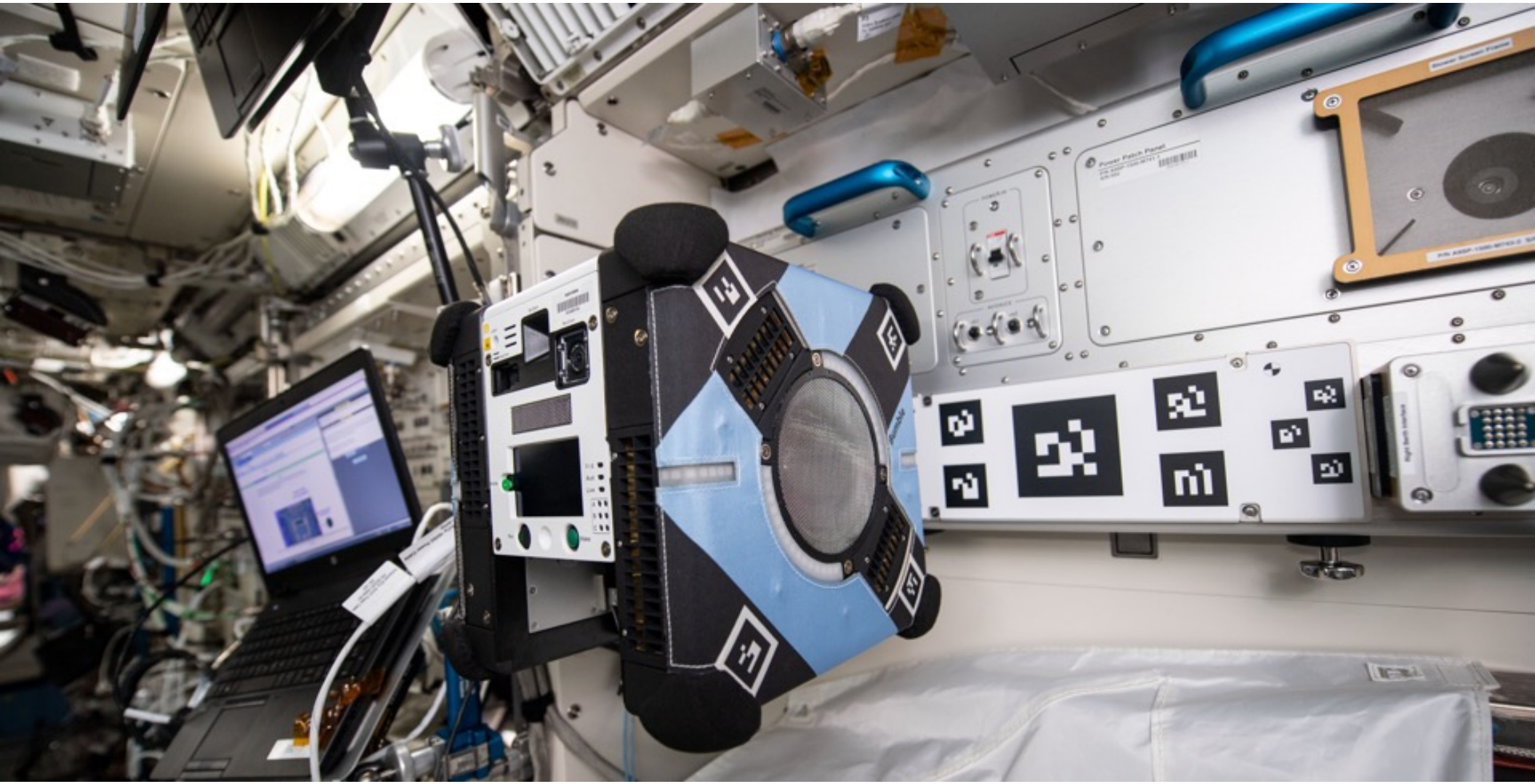


Astrobee Research Community



- CASIS
  - MIT (Zero Robotics), Astrobotics-Bosch
- ECF
  - Georgia Tech, CU Boulder, Brown
- ESI
  - IIT, **Columbia**, **Stanford**, UMD
- NSTRF
  - Stanford, U-Penn, USC, MIT (2), UCSD, Tufts , Oregon St., Cornell
- SBIR/STTR
  - **FIT**, Honeybee, **Tethers Unlimited**, Altius, Energid
- Other
  - REALM-2 (AES), MIST (NASA CIF), **NPS** (Navy), MIT/JPL (SSTP)

Bumble



A view of the free-flying Astrobee robot named Bumble and the docking station onboard the International Space Station (ISS).

Website

www.nasa.gov/astrobee