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ASTROBEE FREE-FLYERS: INTEGRATED AND TESTED. READY FOR LAUNCH!

Abstract

As of March 2019, four Astrobees free-flying robots have been integrated, tested and shipped to NASA's Johnson Space Center, Texas, ready to be launched to space. Two of these Astrobees units (Honey and Bumble) will be launched to the International Space Station (ISS) on April 17, 2019, on the Cygnus NG-11 (Northrop Grumman) cargo resupply spacecraft from the Mid-Atlantic Regional Spaceport (MARS) launch facility, at NASA's Wallops Flight Facility, in Virginia, while the third unit (Queen) will be launched in mid-July 2019, with the cargo resupply mission Space-X 18, from Cape Canaveral, at NASA's Kennedy Space Center. The primary purpose of the Astrobees system is to provide an autonomous and flexible platform for research on zero-g freeflying robotics, with the ability to accommodate guest researchers looking to utilize the unique capabilities of this platform in the microgravity of low earth orbit, and to advance the state of the art of guest science software and research payloads, which range from gecko-inspired adhesives for perching on smooth surfaces, to augmented reality interfaces to help astronauts and robots work together effectively, to RFID reader, performing inventory of RFID tagged items inside the ISS. Astrobees will also serve utility functions, such as free-flying cameras to record video and provide assistance during astronaut activities, and as mobile sensor platforms to conduct surveys of the ISS. In this paper we will give an overview of the status of the Astrobees system, which includes the docking station already launched and mounted in the JAXA JEM module of the ISS, the Astrobees robots, the Astrobees robotic arms, the ground data system (GDS) and the development of the several guest science payloads.