AFRL

EAGLE EXPERIMENT AIMS TO IMPROVE SPACE ACCESS

EAGLE Program Description

The Air Force Research Laboratory performs research and development vital to keeping the nation's technological edge in the space domain.

In support of that mission, AFRL scientists and engineers developed a space flight experiment called EAGLE. The EAGLE experiment's goals are to advance space access, improve spacecraft resiliency and increase space situational awareness (SSA).

EAGLE is a triple-nested acronym that when broken out is: Evolved Expendable Launch Vehicle (EELV) Secondary Payload Adapter (ESPA) Augmented Geosynchronous Laboratory Experiment. ESPA is an AFRL innovative technology that increases the number of satellites that can be put into space on a single launch. Much like a train can add extra cars to transport more cargo, one or more ESPA rings can be added under the primary payload to launch more satellites.

Benefits

EAGLE demonstrates a maneuverable ESPA-based space vehicle design, which allows six or more deployable or hosted spacecraft in geosynchronous orbit.

It also demonstrates the capability to provide low-cost access to geosynchronous orbit and geosynchronous transfer orbit for smaller class space vehicles by using excess weight and volume available on the EELV launch vehicle family.

A ULA Atlas V rocket launches AFSPC-11 in April 2018.

Photo Credit: Staff Sgt. Christopher Stoltz, 45th Space Wing Public Affairs

In addition, EAGLE will provide the opportunity to share the cost of launch as well as provide essential services on orbit such as power, communications, propulsion, pointing and navigation for payload experiments unable to afford the full cost of a host space vehicle.

(Continued on page 2)

(Continued from page 1)

EAGLE Experiments

One of the EAGLE payload experiments is another AFRL-developed spacecraft called Mycroft, which is a separable, fly-away satellite. The Mycroft vehicle launched with EAGLE will drift to approximately 35 km away and cautiously progress over several months to ranges approaching 1 km. As in previous Air Force Research Laboratory SSA experiments, rigorous research and development has been conducted to ensure that the satellite can perform safe automated spacecraft operations in near-geosynchronous earth orbit.

The Air Force Research Laboratory is using a layered strategy that combines system design, testing, mission design, procedures and flight operations controls to ensure safety. Before the start of experimental operations, AFRL calibrates the various spacecraft subsystems and verifies navigation capabilities.

Mycroft will evaluate the region around EAGLE using a visible imaging camera. Mycroft will also use its sensors and software to perform advanced guidance, navigation and control functions—key functions in all satellite operations.

While in orbit, the Mycroft spacecraft will support the Mycroft program's three experimental objectives to advance SSA technology in near geosynchronous orbit. It will explore ways to enhance space object characterization and navigation capabilities, it will investigate control mechanisms used for flight safety, and it will explore the designs and data processing methods for enhancing space situational awareness. Mycroft is expected to remain in orbit between 12 and 18 months.

ATA-Aerospace fueling crew in hazard suits preparing to fuel the EAGLE spacecraft (in background).

Photo Credit: AFRL Space Vehicles Directorate

Other experiments hosted on the EAGLE will detect, identify and analyze system threats such as man-made disturbances, space weather events or collisions with small meteorites. Together, EAGLE and Mycroft help train operators as well as ensure development of tactics, techniques and procedures during exercises or experiments to improve space maneuver operations.

EAGLE Launch

EAGLE was launched April 14, 2018, on Air Force Space Command-11 (AFSPC-11) from Cape Canaveral, Fla., and inserted into a near geosynchronous orbit.

The EAGLE and Mycroft spacecraft will be disposed of in a safe orbit at the end of the experiment period.