

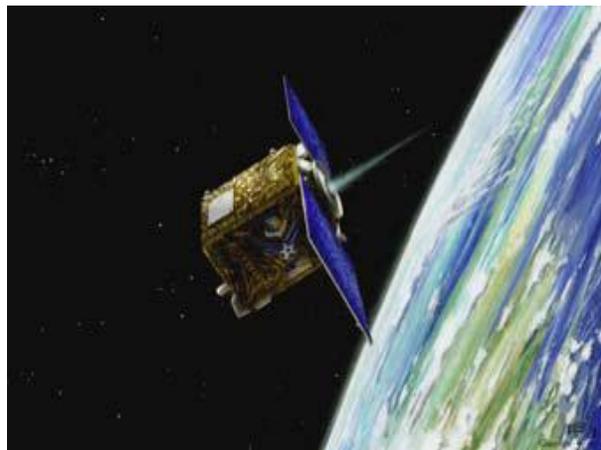
XSS-11 Micro Satellite

The Experimental Satellite System-11 (XSS-11) micro satellite demonstrated a new class of low-cost spacecraft with the goal to explore a variety of future military applications such as space servicing, diagnostics, maintenance, space support and efficient space operations. Micro satellites, such as the XSS-11, offer affordable platforms to demonstrate key capabilities including rendezvous and proximity operations, autonomous mission planning, as well as other enabling space technologies. The XSS-11 operated under the Air Force's Experimental Satellite System's Micro Satellite Flight Demonstration Program within the Air Force Research Laboratory.

Features: The XSS-11 micro satellite weighs approximately 100 kilograms and was successfully launched aboard a Minotaur I rocket on April 11, 2005. AFRL's Space Vehicles Directorate employed XSS-11 to demonstrate synergistic technologies and operations necessary to enable the development of space systems needed to meet Air Force Space Command's future capabilities. These technologies and operational concepts, as well as the lessons learned were documented and transferred to the operational community to facilitate development of future operational concepts and systems.

After completing systems checkout of the Minotaur I upper stage, the micro satellite successfully demonstrated rendezvous and proximity operations with the expended rocket body. During its projected 12- to 18-month flight, the spacecraft will conduct and proximity maneuvers with several U.S.-owned, dead or inactive resident space objects near its orbit.

During its historic, groundbreaking mission, the XSS-11 program developed and demonstrated capabilities and technologies necessary to efficiently plan, evaluate, and safely oversee a variety of autonomously conducted rendezvous and proximity operations. The performed advancements have enhanced the Air Force Space Command's subsequent missions. It also helped to reduce the size and complexity of future space ground stations.



Background: The XSS-11's mission focused on increasing the level of autonomy, maneuverability, and complexity of mission operations that could be planned and safely executed.

The successful flight of the XSS-11 spacecraft continues the evolution of a technology that promises to reduce satellite size, which in turn will decrease launch costs and extend the capabilities of future space missions.

Lockheed-Martin Astronautics, Waterton, Colo., serves as AFRL's structure, propulsion, and systems support contractor for XSS-11. The team also includes Broad Reach Engineering, Tempe, Ariz.; Octant Technologies, San Jose, Calif.; Draper Laboratory, Cambridge, Mass. and SAIC, San Diego, Calif.

Another significant XSS-11 player was the Air Force's Space Test Program, administered by the Space and Missile Systems Center's Detachment 12, that provided launch, and on-orbit command and control oversight.

The spacecraft is no longer operational.

In November 2005, the XSS-11 project was selected for *Popular Science's* 2005 Best of What's New Award in the Aviation and Space category.

Additionally, during the American Institute of Aeronautics and Astronautics 2007 annual conference, the XSS-11 team received the AIAA Space Systems Award for accomplishing one of the most impressive space missions in the history of Air Force Research Lab. The award was presented to Harold Baker, the XSS-11 program manager.



Photograph of the upper stage of the Minotaur I launch vehicle taken from the XSS-111 spacecraft at a distance of 0.5 kilometers. (Air Force Photo)