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### **NROL-39 Scheduled to Launch with GEMSat Auxiliary Payload**

On December 5, the National Reconnaissance Office (NRO) is scheduled to launch NROL-39 from Vandenberg Air Force Base Space Launch Complex-3E. The last of two NRO launches in 2013, NROL-39 will be the NRO's second rideshare mission, utilizing space aboard the launch vehicle to carry an auxiliary payload into orbit.

NROL-39 will carry the Government Experimental Multi-Satellite (GEMSat) payload into orbit in a specially designed Aft Bulkhead Carrier, part of the Atlas V Centaur upper stage. The GEMSat payload contains 12 CubeSats, or "nanosatellites."

GEMSat's CubeSats will perform a variety of unique scientific experiments and demonstrate high-technology operational concepts. Sponsored by the NRO's Mission Integration Directorate and the National Aeronautics and Space Administration's (NASA) Launch Support Program, these CubeSats were developed by a number of laboratories, universities, and government entities across the United States.

The NRO-sponsored CubeSats include:

- Two developed by Aerospace Corporation, called AeroCube-5 (AC-5), will demonstrate new technologies for pointing and tracking between two identical CubeSats. AC-5 will also record launch environment data such as pressure, temperature, and vibration; and will demonstrate a deorbit device.
- One developed by the Air Force Institute of Technology, ALICE, will test the performance of an advanced carbon nanotube array, which has great potential for smaller, lighter, and more energy-efficient satellite propulsion.
- Four developed by the United States Army — one called SNaP, two SMDC-One, and one TacSat-IV — will demonstrate nanosatellite communication capabilities.

The NASA-sponsored CubeSats, part of NASA's Educational Launch of Nanosatellites (ELaNa) mission, include:



- Two developed by Montana State University Space Science and Engineering Laboratory and funded by the National Science Foundation, called FIREBIRD, a space weather mission that will seek to resolve questions pertaining to microbursts in the Van Allen radiation belts.
- One developed by California Polytechnic State University, IPEX, will validate direct broadcast, autonomous science, and product delivery technologies supporting advancement of the Intelligent Payload Module for the proposed Hyperspectral Infrared Imager earth science decadal survey mission.
- One developed by University of Michigan, called MCubed-2, will demonstrate an advanced on-board data processing system.
- One developed by Medgar Evers College, City University of New York, CUNYSAT-1, will monitor satellite spin, battery, and solar panel efficiencies.

### **NRO CubeSat Rideshare: an Innovative Collaboration**

Prior to the first NRO rideshare mission, NROL-36 in August 2012, the United Launch Alliance (ULA) redesigned the Atlas V Centaur upper stage pressure system, providing additional payload volume on the aft-bulkhead of the upper stage. The NRO and ULA developed an Aft Bulkhead Carrier to host an auxiliary payload. The NROL-39's auxiliary payload — GEMSat — contains multiple CubeSats integrated into Poly-Picosatellite Deployers, or "P-PODs," built by the California Polytechnic State University in San Luis Obispo, California. The P-PODs, in turn, are integrated into the Naval Postgraduate School CubeSat Launcher (NPSCul), an adapter that can attach multiple P-PODs to a single structure.



Photographs of the GEMSat payload (left) and the NPSCul (right).



“The GEMSat Rideshare on NROL-39 represents a significant milestone in accomplishing consistent access to space for advancing novel capabilities in support of the NRO and the Intelligence and Department of Defense communities,” said Major David Illsley, Chief, Overhead Solutions Branch of the NRO CubeSat Program Office.

“Lack of dependable launch opportunities within the United States, have formerly imposed a bottleneck on the rate of advancement for small satellite technologies and associated capabilities,” said Illsley. “Some payloads on GEMSat will demonstrate second generation payload technologies. This high development and demonstration tempo allows for rapid transition from innovation to operations of novel overhead solutions.”



**NROL-39**

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The NRO is a joint Department of Defense-Intelligence Community organization responsible for developing, launching, and operating America’s intelligence satellites to meet the national security needs of our nation.