



## Northrop Grumman's Delivery of Modular Space Vehicle Means Faster, Flexible, Small Satellite Launch Capabilities

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REDONDO BEACH, Calif., Feb. 26, 2014 /PRNewswire/ -- Battlefield commanders have long wanted satellites that can be assembled quickly and launched rapidly to meet immediate needs. Now they have that capability with the plug-and-play Modular Space Vehicle (MSV) delivered Feb. 25 by Northrop Grumman Corporation (NYSE: NOC).

The logo for Northrop Grumman, featuring the company name in a bold, blue, sans-serif font. Below the text is a blue swoosh underline that starts under "NORTHROP" and curves under "GRUMMAN".

A photo accompanying this release is available at: <http://media.globenewswire.com/noc/mediagallery.html?pkgid=23831>

The MSV is the first open systems spacecraft bus that supports a top priority of launching smaller, less expensive satellites in a matter of weeks for short-term missions – a capability commonly referred to as "responsive space."

A Northrop Grumman-led team designed and built MSV in 30 months under a task order valued at approximately \$50 million. The company delivered the MSV to the Operationally Responsive Space Office at Kirtland Air Force Base, N.M., which leads U.S. military efforts to shorten satellite development time.

"Because MSV is the first to implement space plug-and-play standards with simplified, standard hardware and software interfaces, the bus is loaded with flexibility," said Doug Young, vice president, Missile Defense and Advanced Missions, Northrop Grumman Aerospace Systems. The MSV bus has the flexibility to:

- Operate in several orbits (Low Earth, Medium Earth and Geosynchronous);
- Be launched from a variety of launch vehicles – the Minotaur I and IV, Evolved Expendable Launch Vehicles (EELV) and the Falcon 9. MSV also is compatible with the EELV Secondary Payload Adapter-Grande.
- Accommodate payloads for a vast range of missions (radar imaging, missile warning, military communications and weather); and
- Perform on orbit anywhere from one to seven years or more.

"MSV provides ways for future development of rapid response space capabilities that will be timely, cost-efficient and flexible," Young said. "A satellite bus contains the support structure and control subsystems that allow the payload to perform its mission."

The open systems design approach has numerous other advantages, such as:

- Standard plug-and-play interfaces that allow payloads to be fully checked out prior to integration with the spacecraft using common test equipment for all missions. The same interfaces mean common test equipment can be used across all missions.
- A flexible power subsystem that can be tailored for multiple missions by adding or subtracting batteries and solar arrays, compared with traditional manufacturing methods requiring changes to baseline hardware designs.
- The ability to accommodate last-minute payload and bus component changes with minimal impact to cost and schedule.

Rapid development capabilities and expertise developed under MSV have been incorporated into the company's Eagle line of spacecraft bus products as MSV/Eagle-1M™. They were demonstrated previously in the same approach the company took for building and launching NASA's successful Lunar CRater Observation and Sensing Satellite for the agency's Ames Research Center, Moffett Field, Calif., in just 27 months.

The MSV bus was integrated and tested at Applied Technology Associates, Albuquerque, N.M., one of five core subcontractors on the company's team. Team members also include Design Net Engineering, Golden, Colo.; Microcosm Inc., Hawthorne, Calif.; Advanced Defense Systems, Columbia, Md.; and Space Dynamics Laboratory, Utah State University, Logan, Utah.

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