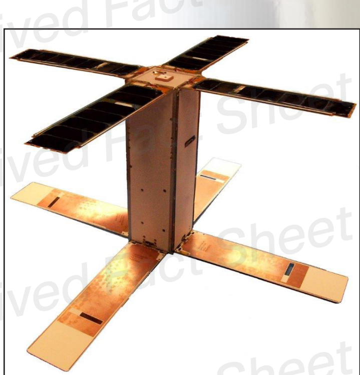
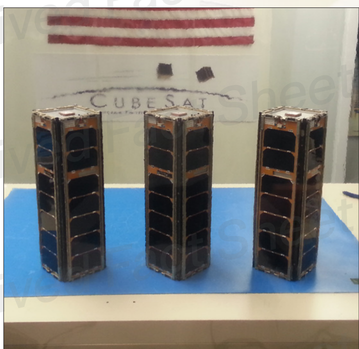
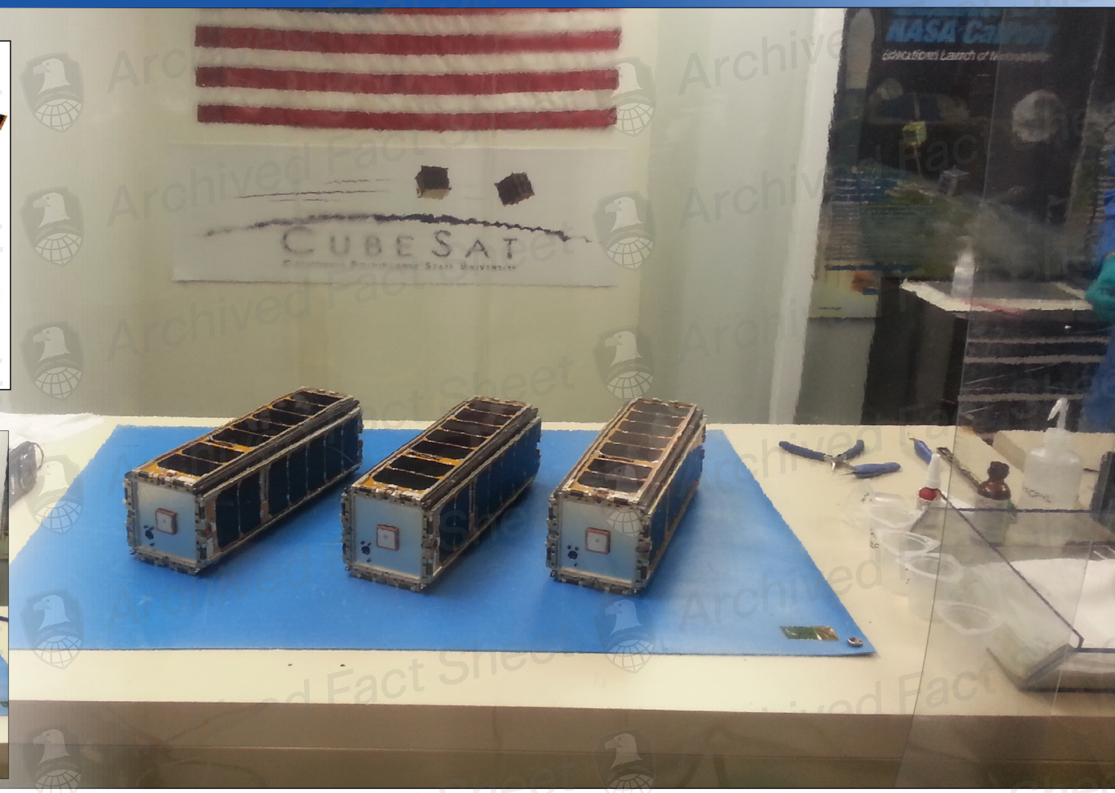
SNaP

Space and Missile Defense Command Nanosatellite Program







> SNaP is a small satellite constellation that allows beyond-line-of-site communication using existing UHF tactical radios

The Space and Missile Defense Command Nanosatellite Program (SNaP) is being developed to be a cost-effective and responsive satellite technology to mitigate the impact from loss or disruption of national space capabilities. SNaP is designed to deliver a more resilient space capability, to explore technologies deployed on nanosatellites in low earth orbit with the goal to ensure Warfighters have freedom to communicate, freedom to maneuver, and immediate access to actionable situational awareness. The technology trends in the electronics and computer industry of the last 20 years has enabled the development of satellites that are small and low cost, yet have significant military utility.

- Voice communication
- Data transfer including short message service texting
- Data exfiltration from unattended ground sensors
- Compatibility with PRC 117 and PRC 152 radios
- Compatibility with partner nation radio (Harris 5800M)
- Propulsion system for station keeping
- Type 1 encryption

U.S. Army Space and Missile Defense Command/ Army Forces Strategic Command

SNaP

The Space and Missile Defense Command Nanosatellite Program (SNaP) is a Department of Defense Joint Capability Technology Demonstration to develop and demonstrate low-cost space support capabilities through the evolution of advanced nanosatellite technologies and concepts. This is a Joint Capabilities Technology Demonstration (JCTD) that focuses on beyond-line-of-sight voice and data communications and improved access to high value information.

The JCTD program is managed by the office of the Under Secretary of Defense (Acquisition, Technology and Logistics). The SNaP program is managed and executed by the U.S. Army Space and Missile Defense Command/Army Forces Strategic Command's Technical Center's Space and Strategic Systems Directorate at Redstone Arsenal, Alabama.

The overall demonstration objectives are to successfully demonstrate beyond-line-of-sight voice and data relay, and data exfiltration of unattended ground sensors. Other supporting technologies such as encryption and propulsion will also be demonstrated.

SMDC/ARSTRAT is developing cost-effective and responsive satellite technologies to mitigate the impact from loss or disruption of space capabilities. These are not to replace national systems but rather to add resiliency.

To deliver a more resilient space capability, the Army is exploring technologies deployed on nanosatellites in low earth orbit to deliver needed capabilities to the tactical Warfighter. The goal is to ensure Warfighters have freedom to communicate, freedom to maneuver, and immediate access to actionable situational awareness.

Nanosatellites in low earth orbit could be a proliferated constellation that slowly degrades with individual satellites that are difficult for an adversary to detect and track. These nanosatellites would be designed for short life, allowing much more frequent design and technology refresh and tailored to specific missions or areas of operation surge requirements. This constellation of small satellites could be more responsive to a larger number of end users due to higher persistence and tasking priority at lower levels of command.

One advantage low earth orbit provides is the satellites are so much closer to the earth, which allows much lower signal levels to be received and processed.

In October 2015, three SNaP nanosatellites were launched from Vandenberg Air Force Base, California. After launch and being released from the main rocket body, the three SNaP satellites were diagnosed for status and functionality, and were tracked by SMDC/ARSTRAT ground stations.

Each SNaP nanosatellite consists of three approximately 10 centimeter cubes stacked for a length a little more than 30 centimeters, weighing nearly 5.5 kilograms. Each has four deployable solar panels and four deployable RF antennas.

SNaP uses deployable solar arrays instead of the fixed arrays used on SMDC-ONE, to increase power generation. A new on-board propulsion capability for station keeping and to maintain constellation spacing will prove SMDC can accomplish the technological challenge of having propulsion capability in a small package. The propulsion capability will allow the command to maintain proper satellite spacing within a satellite constellation and maximize contact availability.

SNaP incorporates many lessons learned and technology improvements from SMDC-ONE, including improved electrical power system design and the flight computer. The SNaP preflight test rigor has been improved to allow a more thorough system checkout prior to satellite delivery to the launch site.

The SNaP program is part of a continuing evolution of Army nanosatellite capabilities that started with the first SMDC-ONE nanosatellite launch in December 2010, followed by the launch of additional SMDC-ONE nanosatellites in September 2012 and December 2013.

For more information, please contact:
USASMDC/ARSTRAT Public Affairs Office
P.O. Box 1500
Huntsville, AL 35807
Phone: 256-955-3887
Fax: 256-955-1214
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