

Civil Air Patrol processor adapted for Tactical Satellite-3

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4/22/2009 - **KIRTLAND AIR FORCE BASE, N.M.** -- What do Civil Air Patrol planes have in common with Tactical Satellite-3?

Both utilize the same onboard processing.

Adapted for functionality in the cosmos for the upcoming TacSat-3 mission by Space Computer Corp., Los Angeles, Calif., and the Air Force Research Laboratory's Space Vehicles Directorate here and Sensors Directorate, Wright-Patterson AFB, Ohio, the Airborne Real-time Cueing Hyperspectral Enhanced Reconnaissance system has been employed by the Civil Air Patrol for search and rescue, homeland security and disaster impact appraisal and aid operations.

On the satellite, the ARCHER processing will serve as the "brains" behind the main payload, the Advanced Responsive Tactically-Effective Military Imaging Spectrometer, which will demonstrate data transmission to the warfighter on the ground within 10 minutes, following a single-pass collection opportunity on the target of interest.

"The TacSat-3 program was interested in using the Civil Air Patrol's ARCHER capability, but we had to transform the airborne system into one that could function in the difficult space environment. With support from both the AFRL's Sensors Directorate and the Space Computer Corporation, the impossible became possible," said Dr. Peter Armstrong, systems engineer, ARTEMIS sensor processor, TacSat-3 program.

"An airborne system can collect data over a long period of time, but in space, due to orbital mechanics, a single collect is generally less than one minute. Our goal for TacSat-3 is to obtain one collect per orbit."

For the ARTEMIS onboard processor, built by SEAKR Engineering, Centennial, Colo., the ARCHER system uses two problem-solving computational programs or algorithms simultaneously to decode the collected data and disseminate the resulting imaging product to the requester. First, the anomaly detection algorithms interpret the information by searching for pixels that appear different than the background. Second, the matched filter algorithms seek to correspond the measured spectra and compare them to the color signatures of specified targets. This dual-algorithm modality enhances TacSat-3's capability to instantaneously change an area to be imaged, as tasked by the warfighter in the field.

TacSat-3, managed by the AFRL's Space Vehicles Directorate, is scheduled to launch on May 5 from the Mid-Atlantic Regional Spaceport located at NASA Wallops Flight Facility, Wallops Island, Va. The satellite will also demonstrate space plug-and-play avionics technology and the rapid transmission of information obtained from sea based buoys to a ground station during its 12-month flight.

"Certainly, we are very excited about demonstrating hyperspectral technology from space. The ability to provide the warfighter with near real-time data will enhance our combat operations and the ARCHER system's role in that process is critical," said Dr. Armstrong. "The system has performed well during testing on the ground and we expect it to do the same in space."