



# Fact Sheet

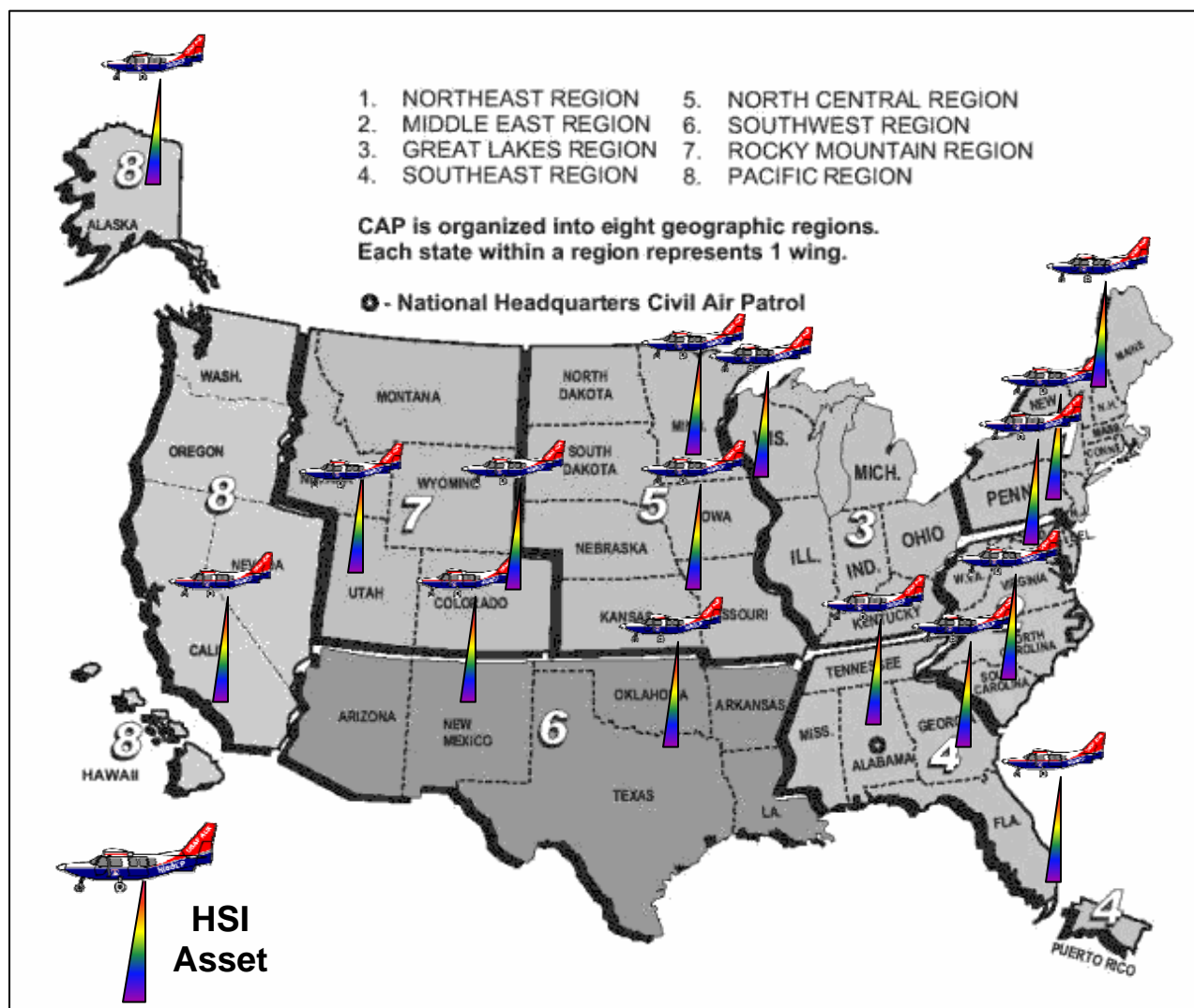
## Civil Air Patrol ARCHER System



### **ARCHER: Airborne Real-time Cueing Hyperspectral Enhanced Reconnaisance**

- ARCHER is a custom-designed system of hyperspectral imaging hardware and software.
- Hyperspectral imaging (HSI), in an aerial application, allows an operator to program into an onboard computer the “spectral signature” of an object. A sensitive HSI camera onboard can then detect and pinpoint any object(s) on the ground that match the signature. The HSI sensor is also capable of detecting anomalies, objects significantly different from the background in which they are located, as well as change detection, detecting changes over time through a pixel-by-pixel comparison. Data on possible “hits” that match the spectral signature, anomalies, or changes can be processed in real-time, stored and analyzed, and transmitted to ground teams.
- Each ARCHER system includes a ground station that allows crews to be flying sorties while other data already recorded is reviewed by analysts on the ground. Stored data can also be used to “re-fly” a mission to search for different spectral signatures, anomalies, or changes without having to launch an aircraft. Operators can also provide high resolution images of locations captured in flight using the “chip-on-demand” feature if one was not created in flight, and even tile these chips together in a mosaic format to piece together imagery for large areas if necessary.
- HSI has real-world applications for search and rescue, disaster impact assessment and relief, and homeland security.
- Civil Air Patrol’s ARCHER system is the nation’s first fully operational, large-scale hyperspectral imaging system.
- HSI is a daytime non-invasive technology, which works by analyzing an object’s reflected light. It cannot detect objects at night, underwater, under dense cover, underground, under snow or inside buildings.
- HSI can be used in conjunction with CAP’s existing satellite-transmitted digital imaging system (SDIS) to send images from the aircraft to the ground via e-mail and a satellite phone in two minutes or less.
- Since 2003, CAP invested almost \$5 million in the ARCHER system, along with additional funds to purchase Gippsland GA-8 Airvans to serve as the system platform.
- Space Computer Corporation of Los Angeles, CA has provided the software and NovaSol Corp. of Honolulu, Hawaii has provided the hardware for the ARCHER system.
- ARCHER was researched and developed under the direction of CAP’s all-volunteer Advanced Technologies Group, headed up by Col. Drew Alexa, CAP, of Colorado Springs, Co and Lt. Col. (Dr.) John Kershenstein, CAP, of Fairfax Station, Va.
- CAP developed ARCHER in cooperation with the Naval Research Laboratory, the Air Force Research Laboratory and the U.S. Coast Guard Research & Development Center. ARCHER is the largest interagency project CAP has ever undertaken in its 65-year history.

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The above map shows where current CAP ARCHER resources have been based.

- CAP has strategically placed 16 operational ARCHER systems in key locations all around the country, and has a spare system stored at the CAP National Technology Center in Richmond, Virginia when a system needs to be brought in for maintenance.
- Funding for ARCHER was provided to CAP by Congress under the 2002 Defense Appropriations Act.

**For more information on the Civil Air Patrol ARCHER System:**

Contact the CAP National Operations Center at 888-211-1812, ext.300 in an emergency, or email [opscenter@capnhq.gov](mailto:opscenter@capnhq.gov) for routine requests for support or information.

**For more information about Civil Air Patrol:**

Visit [www.cap.gov](http://www.cap.gov) or contact Mr. Steve Cox, Public Affairs Coordinator, at 877-227-9142 ext. 251 or [scox@capnhq.gov](mailto:scox@capnhq.gov).