

STARS Technology Brief

The STARS concept was originally conceived in the mid nineteen-nineties to be an upgrade to the antiquated Virginia State Police land mobile radio network, which was implemented in 1977. As planning progressed, both technology advances and direction from state government led to the present concept of a shared system composed of the twenty state agencies that use two-way radio communication as a regular part of their operations.

To support the large increase of user agencies and radios, the microwave network for the system is undergoing a complete renovation. The 87 existing tower sites will increase to 94 sites, and the network design now includes alternate paths, or rings, to provide continuous high reliability in the event of a path outage.

Forty-five of the microwave radio transmitter sites will also be used for two-way communications with user radios. These sites will provide the Commonwealth with quality, geographically statewide, mobile radio coverage utilizing Project 25 digital trunked technology in the VHF High Band.

STARS will employ an integrated voice and at (IV&D) land mobile radio architecture that follows Project 25, which uses the same mobile radio for both voice and mobile computer communications. This feature will provide statewide mobile data coverage for law enforcement while saving the Commonwealth the additional expense of a separate data infrastructure and an additional radio/modem in each vehicle.

The IV&D infrastructure implements the Advanced Encryption Standard (AES), which provides the capability for encrypting voice and data traffic. Over-the-Air Re-Keying (OTAR) is included as a feature to permit centralized management of encryption keys in remote radio equipment.

The digital trunking technology allows diverse functional groups of people to communicate privately within their own organizational elements as “talk-groups”, even while other groups are communicating among themselves. Members of a talk-group can be located anywhere in the state and included in a call by the system's control computer. As the members of a talk group move throughout Virginia, the system will automatically track them so they will not be out of communications with other members of their group. Whenever an activity or emergency requires interoperability, talk-groups from different organizations can be combined to provide joint communications.

The digital trunking technology of the infrastructure will also be carried a step further for the agencies that require a portable radio while away from their vehicles. STARS will include a Digital Vehicular Repeater System (DVRS), which will cross-band the VHF signal used between the tower and vehicle to an 700 MHz signal for vehicle-to-portable radio communications. The DVRS will also support encryption thus ensuring secure end-to-end communications.

Build-out of the initial STARS project is anticipated to occur over a six-year period. Operational status of STARS is first scheduled for December 2005, and will occur in the twenty-one counties and four cities comprising the Richmond or VSP Division 1 area. Some of the participating agencies that have operations within the implementation areas defined below, will have STARS equipment installed during the respective stage of the build-out. Others will wait until their entire service areas are implemented, which may include more than one VSP divisional area. For agencies with legacy VHF radio systems, current operating frequencies may be programmed into the STARS subscriber equipment to provide continuity in areas of the state that have yet to be implemented.

Scheduled dates for operational status of the implementation areas are as follows:

- Richmond (Division One) December 2005
- Tidewater (Division Five) May 2008
- Culpeper (Division Two) July 2008
- Northern Virginia (Division Seven) October 2008
- Salem (Division Six) April 2009
- Appomattox (Division Three) May 2009
- Wytheville (Division Four) September 2009

Adjustments to this schedule may be necessary to accommodate the anticipated relocation of the Division 7 headquarters facility in Northern Virginia.