

**STATEWIDE AGENCIES RADIO SYSTEM (STARS)
PROGRAM**

**A Report to the Governor, House Appropriations Committee,
And Senate Finance Committee**



October 2014

**Colonel W. Steven Flaherty
Superintendent**



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October 1, 2014

TO: The Honorable Terence R. McAuliffe, Governor of Virginia

The Honorable Walter A. Stosch
Chairman of the Senate Finance Committee

The Honorable S. Chris Jones
Chairman of the House Appropriations Committee

Pursuant to Item 413 C.2 of the 2014 Special Session I, Virginia Acts of Assembly, I am respectfully submitting herewith a report on the *Statewide Agencies Radio System (STARS) Program*.

Respectfully,

A handwritten signature in black ink that reads "W. S. Flaherty".

Superintendent

Implementation Report

Statewide Agencies Radio System (STARS) Contract

Colonel W. Steven Flaherty, State Police Superintendent and Mr. Mark Moon, Vice President and General Manager of Motorola signed a \$329 million contract between Motorola and the Commonwealth of Virginia for the design, construction, and implementation of the Statewide Agencies Radio System (STARS) on July 13, 2004. A ceremonial contract signing was held on July 16, 2004, in conjunction with a press conference.

Effective July 1, 2011, the Virginia State Police Communications Division assumed responsibility for the engineering, installation, maintenance, and operations of the STARS Network. The STARS Network (including the backbone microwave network, the land mobile radio network, the five Tidewater tunnels and two western tunnels, and vehicles for all 21 state agencies) was operational.

STARS provides multi-channel, trunked, digital, voice and data wireless communications specifically designed to meet APCO Project 25 public safety requirements. The core network was built on the legacy Virginia State Police microwave radio network through upgrades to Synchronous Optical Network (SONET) ring-protected transmission paths. This network supports the 21 participating state agencies throughout the Commonwealth and facilitates interoperability with other state, local, and federal agencies.

The design of STARS was the culmination of a partnership with the Commonwealth, the project's engineering consultant, AECOM Design (formerly Hayes, Seay, Mattern & Mattern, Inc. (HSMM) / CTA Communications), and Motorola. The design considered: 1) meeting the needs of participants, 2) utilizing existing resources where possible, and 3) minimizing risk. STARS allows the Commonwealth to retain a high level of service and security and the flexibility to enhance capacity through additional radio frequencies. In all applicable design components, STARS has addressed safeguards to system security, including controlled system access, and Advanced Encryption Standard (AES) for law enforcement users. The system infrastructure will serve the Commonwealth for many years to come.

Total Cost of System Implementation

Special Funds

Pursuant to the Code of Virginia §2.2-2264, the General Assembly authorized the Virginia Public Building Authority to issue revenue bonds not to exceed \$159,300,000 for constructing, improving, furnishing, maintaining, acquiring and renovating buildings, facilities, improvements and land for the STARS project. Chapter 245 approved by the General Assembly session March 30, 2006, authorized additional funding via Bonds issued by the Virginia Public Building Authority in the amount not to exceed \$201,900,000 to complete STARS.

The revised Contract appropriation cost for STARS is	\$361,200,000
Less \$50,000 allocated to Department of Forestry	\$361,150,000
Phase 1 Cost	\$346,186,399
Bond Funds remaining at completion of Phase I	\$14,963,601
New site construction Phase 2	\$2,972,813
New site construction Phase 3	\$1,761,100
New site construction Phase 4	\$4,229,688
700 MHz Re-banding Phase 5	\$6,000,000
Projected Funding Balance at Project Completion	\$ - 0 -

STARS Management Structure

The STARS participants are composed of the following 21 state agencies. Representatives from each agency make up the User Agencies Requirements Committee (UARC):

Chesapeake Bay Bridge and Tunnel Police
Department of Agriculture and Consumer Services
Department of Alcoholic Beverage Control
Division of Capitol Police
Department of Conservation and Recreation
Department of Corrections
Department of Emergency Management
Department of Environmental Quality
Department of Fire Programs
Department of Forestry
Department of Game and Inland Fisheries
Department of Health
Department of Juvenile Justice

Department Military Affairs
Department of Mines, Minerals, and Energy
Department of Motor Vehicles
Department of State Police
Department of Transportation
Virginia Information Technologies Agency
Virginia Marine Resources Commission
Virginia Port Authority

The STARS Management Group is a Board established by Executive Order 28 (2002) and composed of the Secretaries of Agriculture and Forestry, Commerce and Trade, Finance, Health and Human Resources, Natural Resources, Public Safety and Homeland Security, Technology, and Transportation. The Secretary of Public Safety and Homeland Security serves as the Chairman. The STARS Management Group provides direction and overall governance for the development, implementation, and ongoing operation of STARS. In addition, the group reviews all procurements and contracts, coordinates radio frequency licenses granted by the federal government to agencies of the Commonwealth, and promotes interagency cooperation and coordination in the use of communications resources.

The User Agencies Requirements Committee (UARC) consists of two representatives (primary and alternate) from each member agency and institution. The Chairman of the UARC is selected by the STARS Management Group. The current Chairman is Captain Joseph Pajic with the Virginia Department of Game and Inland Fisheries. The UARC meets as necessary, but at least quarterly. The specific duties of UARC are to advise on the needs of member agencies for the planning, design, establishment, and operation of STARS; to provide advice on proposals for other federal, state, or local agencies to join STARS and on any proposals for third party use of any STARS infrastructure or component; and to assist the STARS Management Team with the development of a comprehensive management plan and procedures for the operation of STARS.

Projected STARS Recurring Operating Costs

The STARS Network is a public safety grade wireless communications system that must be maintained in an operational status 24 hours per day, seven days per week. To accomplish this, a well-trained staff of engineers and technicians must be available and have access to parts, test equipment, and vehicles on a 24/7 basis. Based on a study by the STARS Management Group, commercial services were cost prohibitive, would not maintain the required level of knowledge of the network, and were not available on a 24/7 basis. The Department of State Police has historically been a self-maintained communications network provider with Department employed engineers and technicians. There is no other practical or cost-effective way to maintain the STARS network infrastructure and the subscriber vehicles within the network.

The implementation of STARS replaced the legacy Virginia State Police radio system. Effective July 1, 2011, the Virginia State Police Communications Division assumed responsibility for the engineering, installation, maintenance, and operations of the STARS Network. The Department assumed responsibility for equipping new vehicles, aircraft, and boats that belong to the 21 STARS agencies, removing equipment from decommissioned or crashed vehicles, and refurbishing and re-installing the reconditioned hardware into other vehicles. Communications Division funding plus additional funding for the maintenance of STARS provides for total funding of \$26,177,087 each year.

Maintaining technology today is a labor-intensive and costly proposition. Hardware and software are typically obsolete by the time they are purchased and installed and STARS is no exception. The FY 2015 lifecycle cost to keep the core network current is \$2,130,442. This does not include the hardware upgrades that provide land mobile radio services that become obsolete after Software Release 7.17, which is scheduled for implementation in 2019. The projected cost to replace this hardware averages \$141,000 per site or \$8.5 million to replace the original sites. All new sites under construction have been equipped with the new hardware.

The dispatch centers in the original network consisted of 40 analog Gold Elite consoles and 38 MCC7500 digital consoles. The analog consoles are not supported after Release 7.16, which is scheduled for implementation in July 2017. The digital consoles will be upgraded as part of the Release 7.11 to 7.14 upgrade scheduled for July 2015. Of the original 40 consoles, 21 have been upgraded, with 18 remaining to be replaced. One of the original consoles is no longer in service. The cost to replace the remaining 18 analog consoles is approximately \$810,844.

There are a number of other major subsystems that require replacement in the near future. These include:

<u>Subsystem</u>	<u>Projected Cost</u>
LMR Repeater	\$8,100,000
Fault Monitoring System	\$740,975
Logging Recorders	\$374,350
Mobile and Portable Radios	Over \$50 Million

The costs above do not consider manpower, installation supplies, per diem and other travel costs. It is a representative, but not all-inclusive listing, of major network changes that continue to evolve.

COMLINC

Local, state, and federal radio systems operate in a number of specific frequency bands (VHF low-band, VHF high-band, UHF, 700 MHz, and 800 MHz). Radios operating in different frequency bands cannot communicate. The Commonwealth Link to Interoperable Communications (COMLINC) allows dispatchers at the state, federal, county, and city communications centers to

establish communications patches between themselves and another agency regardless of frequency band. For example, a sheriff's department can patch to the fire department regardless of the frequencies used by each agency. Patches can also be made to phone networks and used to establish dispatcher conferences. Using COMLINC, dispatchers initiate the patch themselves at their console in coordination with the participating agency. COMLINC also provides instant recall of recorded audio.

COMLINC was initially implemented in 16 localities in central Virginia, and at State Police Divisions 1 and 5, along with the STARS Network Operations Center (NOC). As of this report, there are 172 agencies/jurisdictions on the COMLINC network, including all State Police divisions, most localities, colleges and universities, and state and federal agencies.

The COMLINC Project implemented by the Cities of Lynchburg and Roanoke provide interoperability for 34 localities in State Police Divisions 3 and 6. The Commonwealth participated in this procurement and standardized on the Sytech RIOS system for statewide use.

As the network grew from these 34 communities to the current 172 participants, the Virginia State Police Communications Division accepted responsibility for engineering, installation, maintenance, and technical support for the entire statewide COMLINC Network. As with the STARS Network, COMLINC is becoming dated since the servers and workstations were based on the Microsoft Windows XP operating system. The cost of upgrading all existing COMLINC sites to the latest release of software (Version 3.38) with the Windows 7 computer operating system is estimated at over \$2 million.

SIRS

In 1977, the Statewide Interdepartmental Radio System (SIRS) Advisory Board was created to improve coordination between state and local law enforcement agencies. At that time, no direct radio link existed between these agencies. The Advisory Board accepts applications for the use of the selected low-band VHF radio frequency of 39.54 MHz for statewide access for SIRS participating agencies. The FCC had set aside a Very High Frequency (VHF) of 155.475 MHz (wideband) and 155.4825 MHz (narrowband) as VHF interoperability channels to be used by law enforcement statewide. The SIRS advisory board manages the low band and VHF interoperability frequencies.

Currently all STARS law enforcement vehicles are equipped with an independent low band (39.54 MHz) SIRS radio. This radio, being independent of the STARS radio, is always available to send and receive radio transmissions. STARS mobile radios are programmed to transmit and receive on VHF high-band frequencies. SIRS radios have been installed in 18 STARS sites throughout the Commonwealth and will appear on all VSP dispatch consoles to improve interoperability with localities and the Department.

Mobile Data Enhancement

The original STARS contract provided mobile data terminals (MDTs) for all law enforcement via laptops installed in the vehicles and the Integrated Voice and Data (IV&D) feature in the network. This capability provided for Virginia Criminal Information Network (VCIN) checks and Department of Motor Vehicle (DMV) license checks through the radio network. The variety and complexity of information technology changes daily, as does the bandwidth requirements. The IV&D feature in the STARS network was designed to accommodate short message traffic and cannot accommodate enhancements such as DMV photographs. To accommodate these new bandwidth requirements, commercial wireless data cards were added to the laptops.

In addition to the increased bandwidth demands, the FBI and Department of Homeland Security have added new security standards that require 1) portable computer hard drives to be encrypted to protect sensitive data if stolen, 2) encryption for all transmitted data that traverse unsecured networks such as the Internet, and 3) multi-factor authentication to confirm the identity of the person logging into the network.

All of these requirements add a strain on an already tight budget. Hard drive encryption requires new software. The encryption of transmitted data requires virtual private network (VPN) hardware and software. Depending on the implemented solution for multi-factor authentication, hardware and/or software will be required. All of these capabilities require new administrative procedures.

The original STARS Motorola laptops are out of warranty and are being replaced with the latest Panasonic Tough Book laptops. Laptops for personnel assigned to State Police Divisions 1 and 2 and selected workgroups have been replaced. The projected cost to replace the Motorola laptops was at least \$16 million at a rate of \$3.2 million per year. Budget constraints have slowed the replacements at the same time that the failure rates and lack of spare parts for the Motorola laptops have increased.

New STARS Site Construction

After the STARS Network was turned over to the Communications Division, users in a number of areas within the Commonwealth began to report radio problems that were attributed to areas of very weak or poor coverage. Radio transmissions were garbled or robotic sounding or radios were not able to send and receive. STARS Network Operations Center personnel began to gather information that enabled the engineers to perform coverage testing to determine the best location for new sites.

The VSP Communications Division took over engineering and installation of several subsystems of the STARS Network, resulting in a cost savings to the Commonwealth. Subsequently, the Communications Division requested permission from the STARS Management Group to use these funds to install 16

additional land mobile radio sites to fill in coverage gaps in the original network. Two of these sites were funded through the General Fund.

The first site to be converted from microwave-only to LMR was in Waverly. This site operated so well that additional channels had to be added to handle the traffic. The additional new sites are in varying degrees of implementation:

- Waverly Complete
- Dumfries Scales Complete
- Rawley Springs Complete
- Potts Mountain Under construction
- Bath County Hydro Pending start of construction
- Elliott Knob Complete
- Massanutten Complete
- Westin Hotel In MOU negotiations with the Virginia Beach PD
- Gordonsville Frequency lockdown pending start of construction
- Big Walker Mountain Awaiting Federal Forestry approval to construct
- Lambsburg Under construction
- Indian Mountain Pending landowner permission to construct
- 1st Division Dispatch Complete
- VSP Driver Training Facility Complete
- Amelia VDOT Pending local approval to construct
- Purgatory Site has been identified, pending negotiations

The addition of these sites is scheduled for completion by June 2015.