



Communications Planning for an ITS Statewide Network

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Communications Program

Central Office established a Communications Program that has been responsible for the following activities:

- **Communications Master Plan (CMP)**
 - Development and Implementation
- **Technical Communications Support**
 - Statewide initiatives
 - Support to the regions
 - Implementation of CMP
- **Fiber Optic Resource Sharing**
 - Negotiating and managing MOU
 - Incorporating use of the fiber optics into the CMP
- **Inventory**
 - ITS devices and communications equipment in field and at TOCs
 - Operations Programs (SSP, Emergency Response, Radio systems)
 - Collecting data sources for analysis (e.g., Wireless data)

Communications Master Plan

The ITS Communications Master Plan (CMP) serves as a guide to help effectively document, plan and design a communications program and system capable of meeting current and future needs of VDOT's ITS and Operations Program. The purpose of the plan is to:

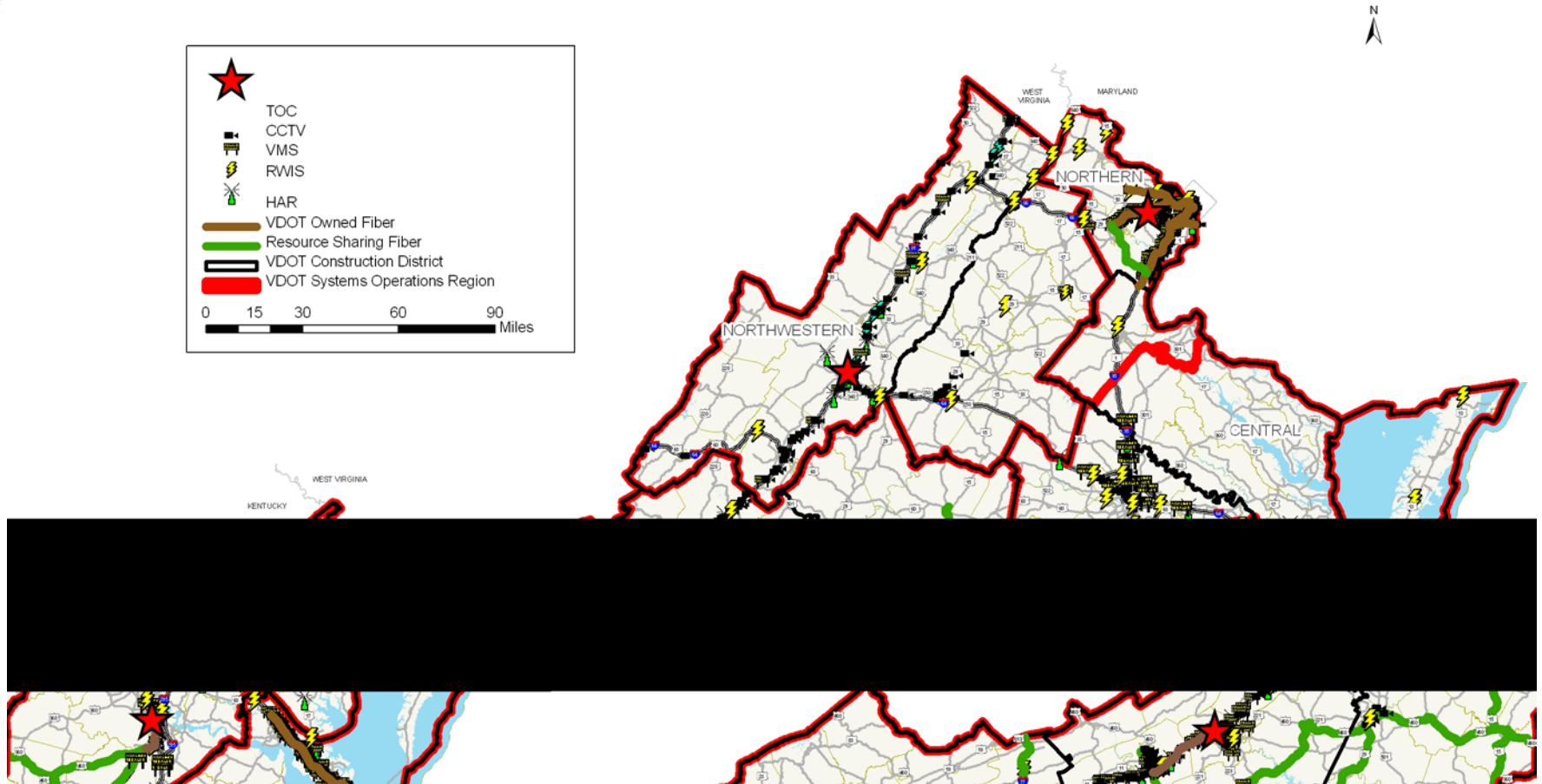
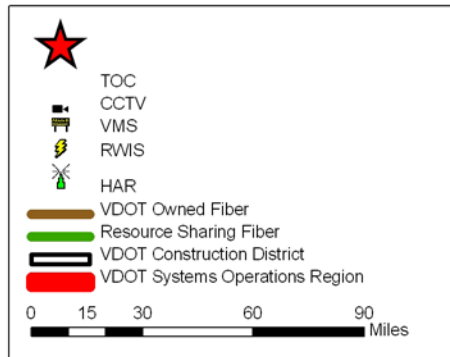
- Identify high-level statewide guidance, policies, and requirements for communications deployment
- Identify medium and long-term communications needs
- Develop recommendations for a statewide backbone network
- Provide guidelines and standards for implementing communications solutions

Communications Master Plan

Nine components comprise the Communications Master Plan, with the CMP Summary summarizing all the key elements and decisions for a statewide backbone network

Component	Description
Inventory of Existing Conditions	Report and GIS compiling the results of data gathering and staff interviews to collect current ITS communications devices, communications, and equipment.
Existing Network Assessment Report	Documents current network architecture, connectivity, network devices, and supported bandwidth. Provides an assessment of bandwidth, security, redundancy, and reliability.
Network Requirements Analysis	Analyzes and documents functional requirements of proposed fiber for the statewide backbone.
Redundancy Options and Recommendations	Presents and analyzes the tradeoffs between redundancy options and recommends specific architectures for physical and operational redundancy
Assessment of Current and Emerging Broadband Wireless Technologies	Study performed by VTTI, incorporating research from CIT on capabilities of wireless broadband technologies available for use by DOTs, presents what other DOTs are doing in the wireless realm, and makes recommendations on wireless technology applications and deployments
Network Design and Architecture	Network design and architecture plan for interconnection TOCs, TEOC, and field devices. It defines network requirements that need to be met, hub locations, fiber routes, equipment, and other specifications.
Deployment and Migration	Presents deployment and migration considerations and priorities/phasing for implementation of the Network Design and Architecture Plan.
Cost Estimate	Identifies relevant costs for implementing specific phases of the backbone network and provides a worksheet for high level estimating of project costs.
CMP Summary	A summary of all the components listed above. This document draws out the key elements and decisions for the inventory, requirements, design, deployment and cost for a statewide backbone network to support ITS and Operations Programs.

Current ITS Inventory



Fiber Optic Resource Sharing

- Identify, negotiate, and track all fiber optic resource sharing terms and agreements
- A fiber optic resource sharing agreement allows for an exception to the utility accommodation policy
- Worked with Maintenance Division to develop and refine a process for the entire resource sharing progression starting from the request at the residencies to implementation of the fiber optic network
- Provides process, guidelines and templates for agreements
- Laid out a plan to utilize over 800 miles of resource sharing in the CMP

Service Provider	Region	Status			Additional Documentation	Basic Terms
		In Use	Planning/ Designing to be Used	Not Currently Used		
Mid-Atlantic Broadband Corp.	SWRO		✓		Amendment 1 Amendment 2	2 fibers throughout their network of 700 miles, with the exception of 12 fibers along Route 1
Bristol Virginia Utility	SWRO	✓			Addendum 1	2 fibers throughout their 125 mile network, except along I-77 from mile marker 40 to 66 where VDOT has purchased 12 fibers
Citizens Coop.	SWRO		✓		Attachment A	2 fibers throughout their 125 mile network
U.S. Government	NRO	✓			Contract Mod #1 Contract Mod #2 Contract Mod #3 (in process)	24-count fiber and conduit to VDOT along portions of I-66, Route 267, Route 619, Route 28, and Route 234
WMATA	NRO	✓			Attachment A Licenses Agmt Amendment #1	Conduit space along WMATA's rail system along I-66 from I-495 to the Pentagon Metro ; 48-count fiber along the Fairfax County Parkway and West Ox Road beginning at VDOT cabinets on I-66 and terminating at the PSTOC
Qwest	ERO			✓		9.75 miles of 96-count single mode fiber installed in an existing VDOT conduit along I-664
Level 3	ERO		✓		Contract Mod #1	2 inch conduit along the Monitor Merrimac Bridge Tunnel, a 1 ¼ conduit and 24-count fiber along the Midtown Tunnel, and 48-count fiber along portions of Route 164

Goals of Statewide ITS Backbone

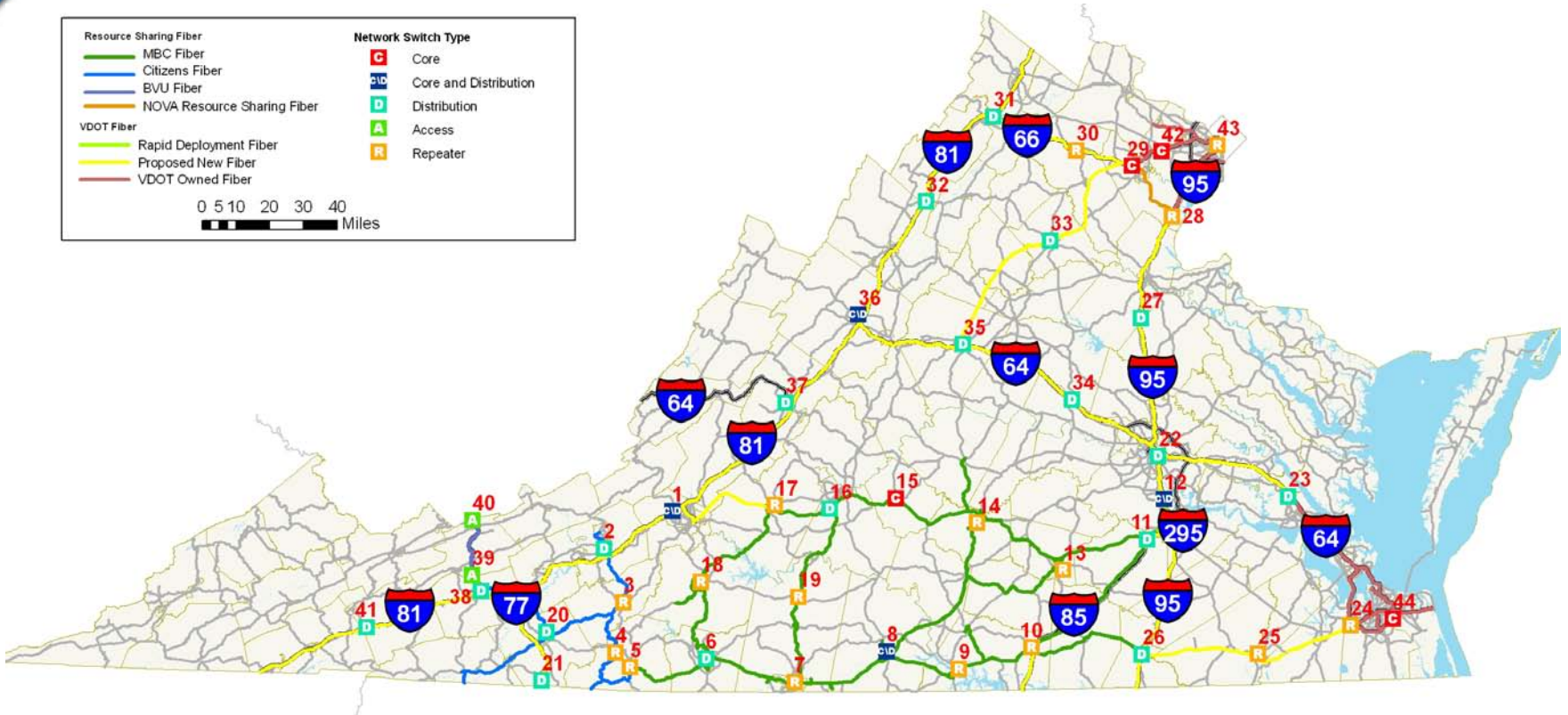
The statewide backbone was designed to meet the following long term goals/criteria:

- **Connect ITS field devices to a fiber optic backbone to eliminate high leased service costs where possible**
- **Provide a communications network for center-to-center communications**
- **Reduce costs for Internet connectivity at centers by providing redundant peering points via the statewide backbone**
- **Provide a reliable, redundant and high-speed network for operational needs**
- **Network will be for VDOT use only**
- **Utilize resource sharing where possible**

Proposed Statewide Network

Resource Sharing Fiber		Network Switch Type	
	MBC Fiber		Core
	Citizens Fiber		Core and Distribution
	BVU Fiber		Distribution
	NOVA Resource Sharing Fiber		Access
VDOT Fiber			Repeater
	Rapid Deployment Fiber		
	Proposed New Fiber		
	VDOT Owned Fiber		

0 5 10 20 30 40 Miles



11 Dinwiddie
12 Richmond
13 Blackstone
14 Farmville

21 VA Welcome Center
22 TEOC
23 I-64 @ SR 199
24 US 58 @ I-664

31 I-66 @ I-81
32 New Market
33 Culpeper
34 I-64 @ US 522

41 Chilhowie
42 PSTOC
43 NOVA TOC
44 Hampton Roads

1 Salem TOC
2 Christiansburg
3 Floyd
4 Vesta

Phase 1 - Rapid Deployment and Resource Sharing Fiber Lighting

VDOT recently invested in fiber along I-81 and I-95/I-85 to bridge the gap between the Salem and Richmond TOCs and the Resource Sharing fiber optic networks to take advantage of and activate fiber available along those networks

