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DISTRICT DEPARTMENT OF TRANSPORTATION

DDOT ITS Program --- Overview

Yanlin Li
ITS Systems
Transportation Operations Administration (TOA)
District Department of Transportation

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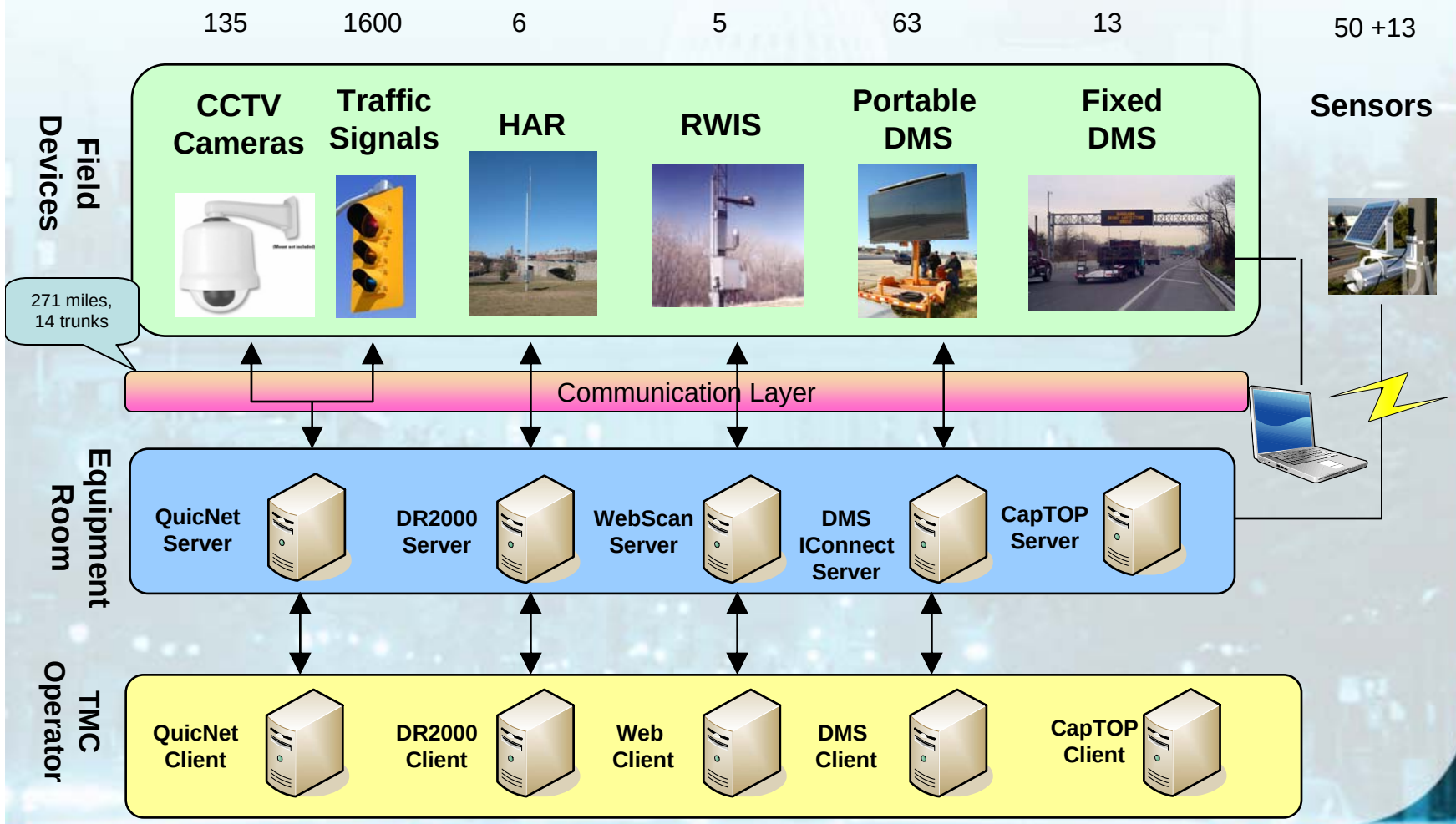
Introduction

1. ITS Systems General Assessment
2. ITS Systems Elements Overview
3. Program Goals and Outlook

Existing ITS Program



ITS And Operations - General Assessment

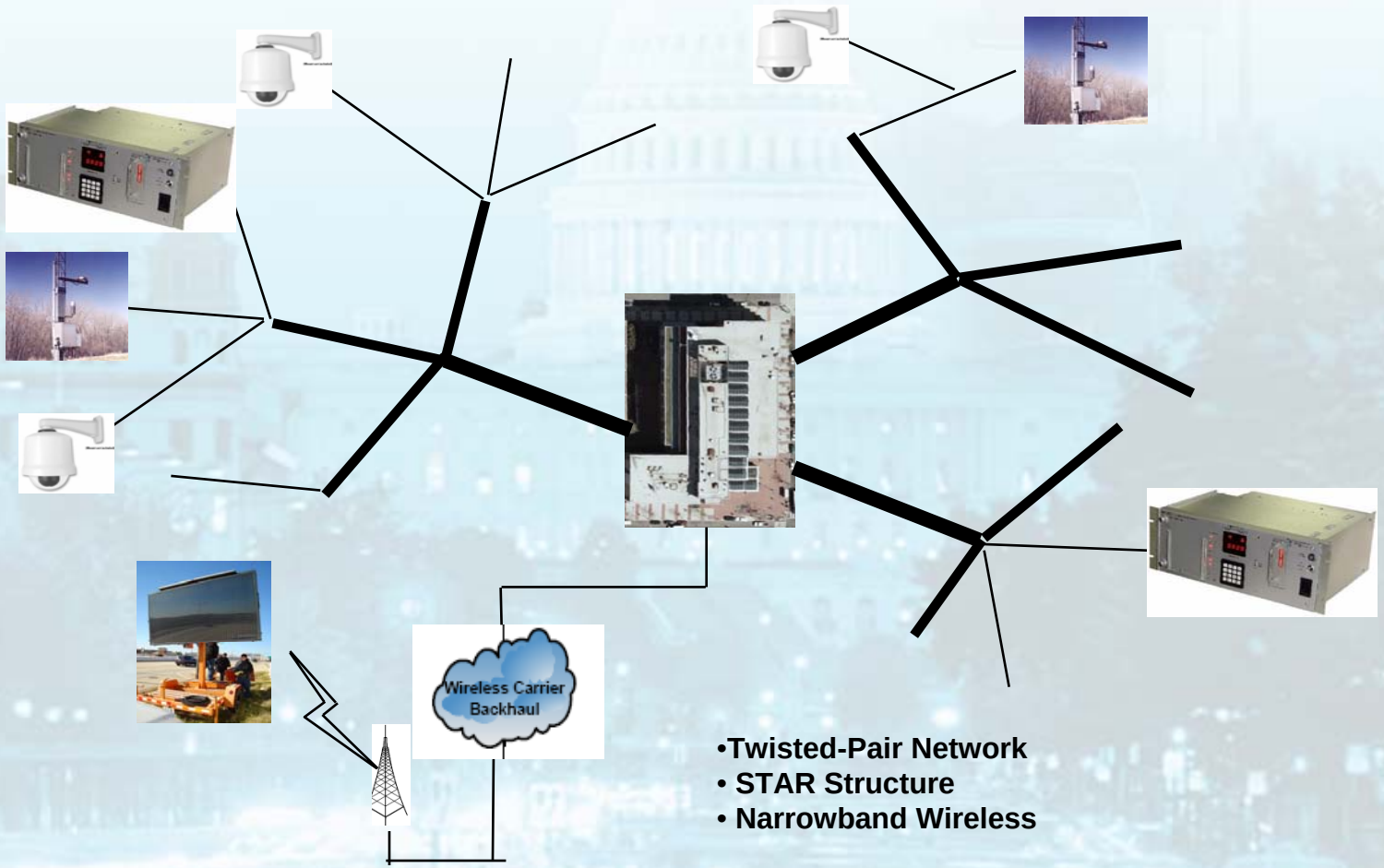
- Deficiencies in ITS Infrastructure
  - Old copper-based communication system
  - No traffic detector systems for data collection and incident detection
  - No Centralized CMS
  - Old Traffic Signaling System
  - Insufficient Cameras
  - Limited TMC central software functions
  - Lack of transit and genuine traveler's information system
  - Insufficient coverage of RWIS and Data Acquisition
  - Interferences in HAR
  - Limited ITS/CVO/CVISN
  - Tunnels and Bridge protections -- OH vehicles, Drainage, CO,

ITS And Operations - General Assessment

- Deficiencies in Systems Disciplines and Processes
  - ITS Architecture
  - Systems Engineering Management Plan
  - SOPs in O&M
  - LR ITS Plan
  - Little ITS contents in DDOT's Blue Book to Guide Future Construction Projects
- Deficiencies in Operations
  - No Analysis/Automated Reporting Tools
  - Limited Performance Measures
  - No Automated/Semi-Automated Response Plans
  - No Coordination with Transit Operations
  - Lack of ITS asset management tools and process

WHAT DO WE DO?

ITS Program – Communication



- **Twisted-Pair Network**
- **STAR Structure**
- **Narrowband Wireless**

Communication Systems

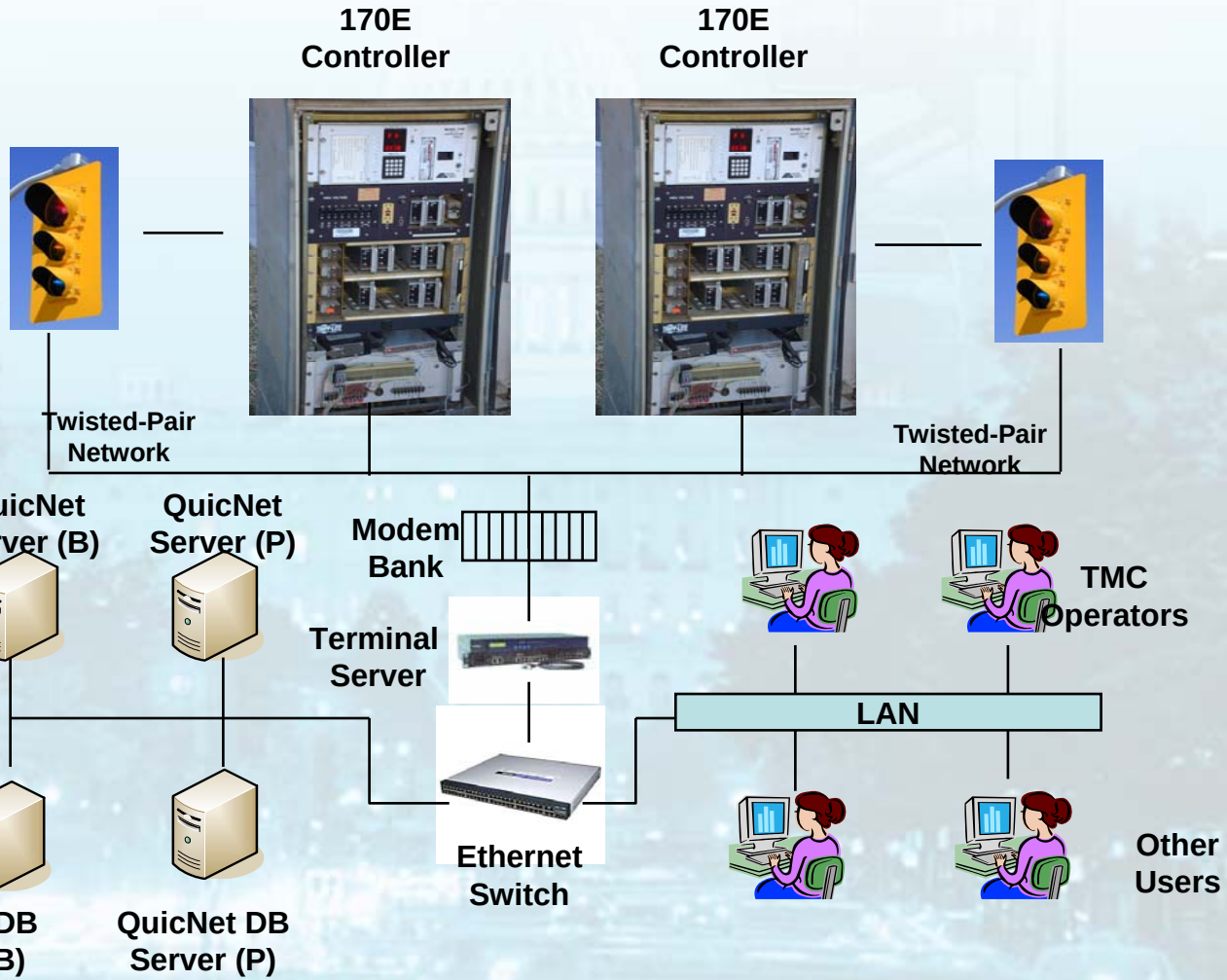
Deficiencies

- Out dated
- Bandwidth constraints
- Escalating maintenance cost
- Insufficient to support applications needs
- Inadequate coverage (e.g., no freeways)

Solution

- Long Term Strategy
  - Develop dedicated fiber network plus a redundant wireless network
- Short – Mid Term Strategy
  - Use DC-NET for new CCTVs
  - Incremental construction
  - Public and private partnership
  - Investigate wireless options

ITS Program - Traffic Signal System



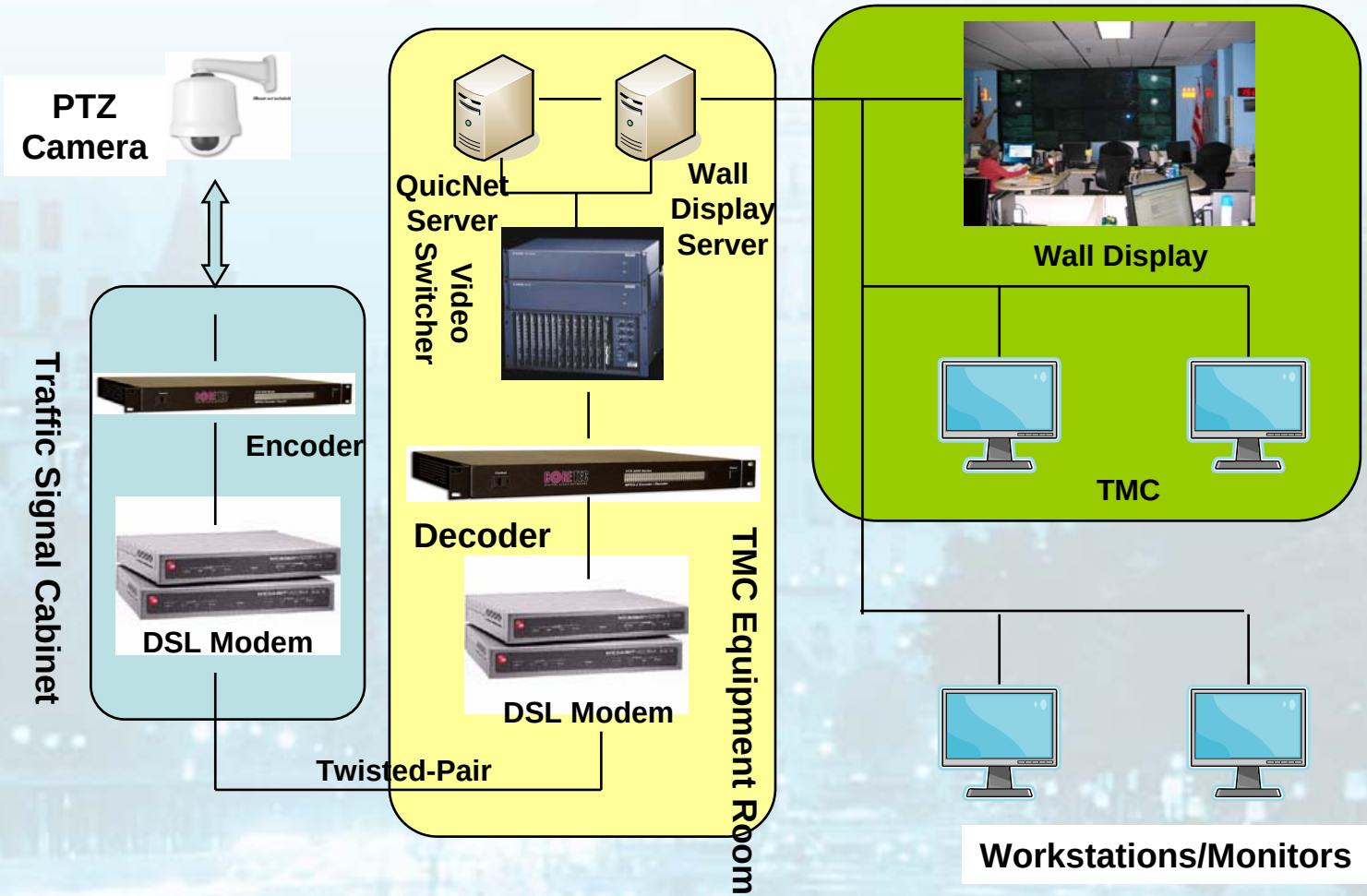
Signal System General Assessment

- Well maintained pre-time signals (Grade B vs. national average D)
- Reasonably tuned to meet general requirements
- Supporting limited transit signal priority/emergency operations

- Deficiencies
  - Old 170E controllers with few vendor supports
  - Old central software and firmware
  - Escalating cost
  - Limited functions
  - Old cabinets
  - Venerable for power outages

- Solutions
  - Pursue 2070 controller pilot projects
  - Researches of name brand new central software
  - 1200 old cabinets need to be replaced
  - UPS
  - Generators

ITS Program - CCTV And Wall Display System

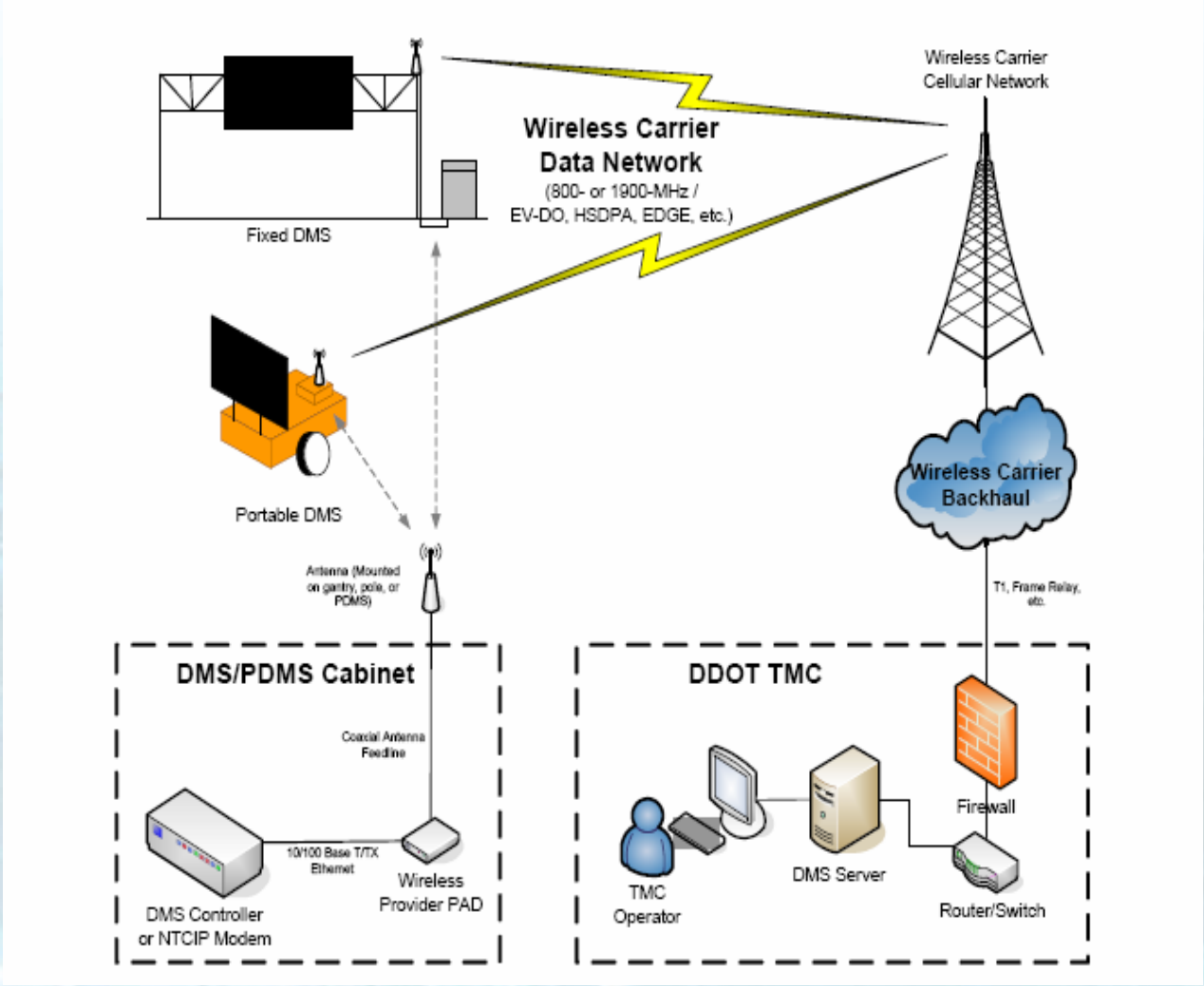


CCTV General Assessment

• 134 CCTV work well – served as our eyes and ears on the streets

- Deficiencies
  - 10% of CCTV constantly suffer from problems due to communication issues
  - Not sufficient coverage – no freeways, e-route focus
  - Bandwidth hungry - limited by communication network
- Solutions
  - Plan to add 60 CCTV in next four years
  - Plan to add critical infrastructure protection ability
  - Plan to add freeway cameras
  - Enhance incident detection capability in freeways - incidents/ stopped vehicles/debris
  - DC-Net for communication support

ITS Program - Dynamic Message Sign (DMS)



DMS System General Assessment

- Significant usages and demands
- Communicates valuable information to traveling public

- Deficiencies
  - 63 portable signs are old & insufficient
  - 2/13 freeway/fixed signs are working
  - Lack of central control and integration
- Solutions
  - Long term citywide DMS project Preliminary Engineering/PS&E (08)
  - Procure 47 PDMS (08)

ITS Program - Road Weather Information System (RWIS)

RWIS Station

Spread Spectrum Wireless Radio

Spread Spectrum Wireless Radio

170E Controller

DSL Modem

Twisted-Pair Network

DSL Modem

Ethernet Switch

LAN

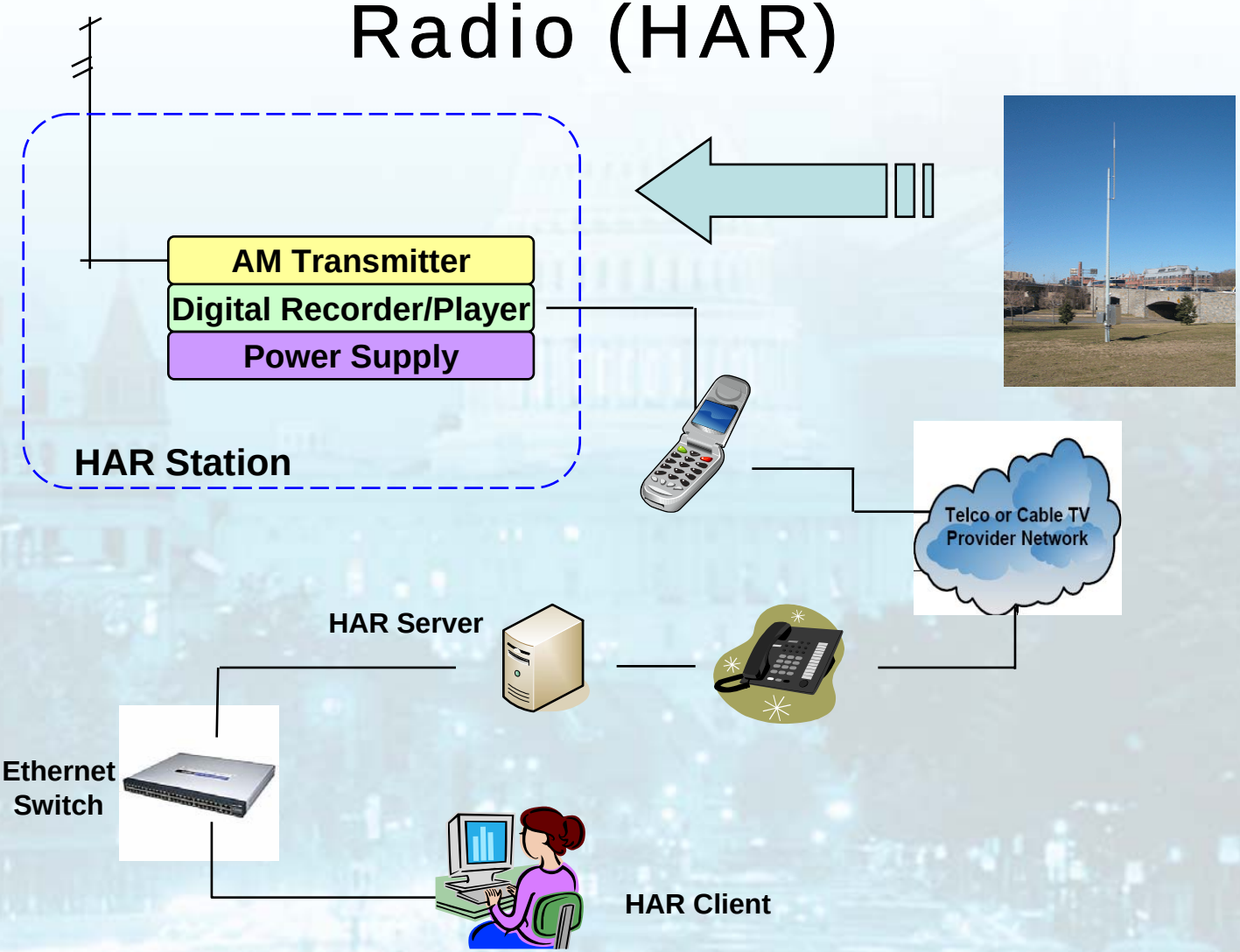
RWIS Server / Web Server

RWIS Users

RWIS System General Assessment

- Deficiencies
  - Communication issue
  - Insufficient coverage
  - Lack of data integration/access to COTS software
- Solutions
  - Updated hardware
  - Updated communication
  - Add five new locations (double)
  - Maintenance contract

ITS Program - Highway Advisory Radio (HAR)



HAR System General Assessment

• Limited usage due to current deficiencies

- Deficiencies
  - Wireless communication is not reliable and needs to be replaced
  - Interferences
- Solutions
  - Updated Software
  - Updated communication
  - Work with a maintenance contract
  - Need an FM channel instead of using AM channel

Traffic Detectors

- Deficiencies
  - No working count stations
- Solutions
  - Public/Private partnership (Speed Info, Traffic.com)
  - 32 Count stations (under construction)
  - 100 Count stations under design

Time span to solve this deficiency -5 year
Cost - $12 million

Transit and Traveler's Information System

- Deficiencies
  - Very little traveler's info
  - Lack of bus arrival information
  - Lack of incident information exchange between traffic and transit operations
  - Regional incident information sharing
- Solutions
  - New DDOT traveler's information website
  - 511
  - RITIS
  - Joint project with WMATA (bust arrival time information system)

ITS/CVO/CVISN

- Deficiencies
  - Deficient fixed scale locations
  - Insufficient weigh stations
  - Lack of personnel
  - Lack of CVISN components
    - Safety information exchange
    - Credentials administration
    - E-screening
- Solutions
  - ITS/CVO and CVISN
  - New Hire (CVO Specialist)
  - Implement CVISN projects
    - $2.5m from FMCSA
    - 1-1 local match

Tunnels/Bridges ITS

- Deficiencies
  - Lack of OH vehicle protection
  - Lack of Centralized location to monitor CO, drainage, ventilation system 24/7.

Solutions

- OH vehicle protection/enforcement system
- Integration of SCADA to TMC

Systems Availability

- Deficiencies
  - Lack of failsafe of failover feature in systems
  - Lack of redundant TMC facilities at different locations
  - Lack of disciplines to backup and store key information
  - Lack of redundant communications

Solutions

- Redundant TMC
- Communication
- Add failsafe and failover features
- Backup and store key information in different places
- Build redundant communication links

Systems Disciplines and Process

- Deficiencies
  - ITS Architecture
  - SEMP
  - SOPs in O&M
  - LR ITS Plan
  - ITS elements in DDOT blue book
- Solutions
  - Incremental development
  - Enforcement of disciplines and process
  - Ground works for ITS disciplines
  - ITS on-call project

Traffic Operations

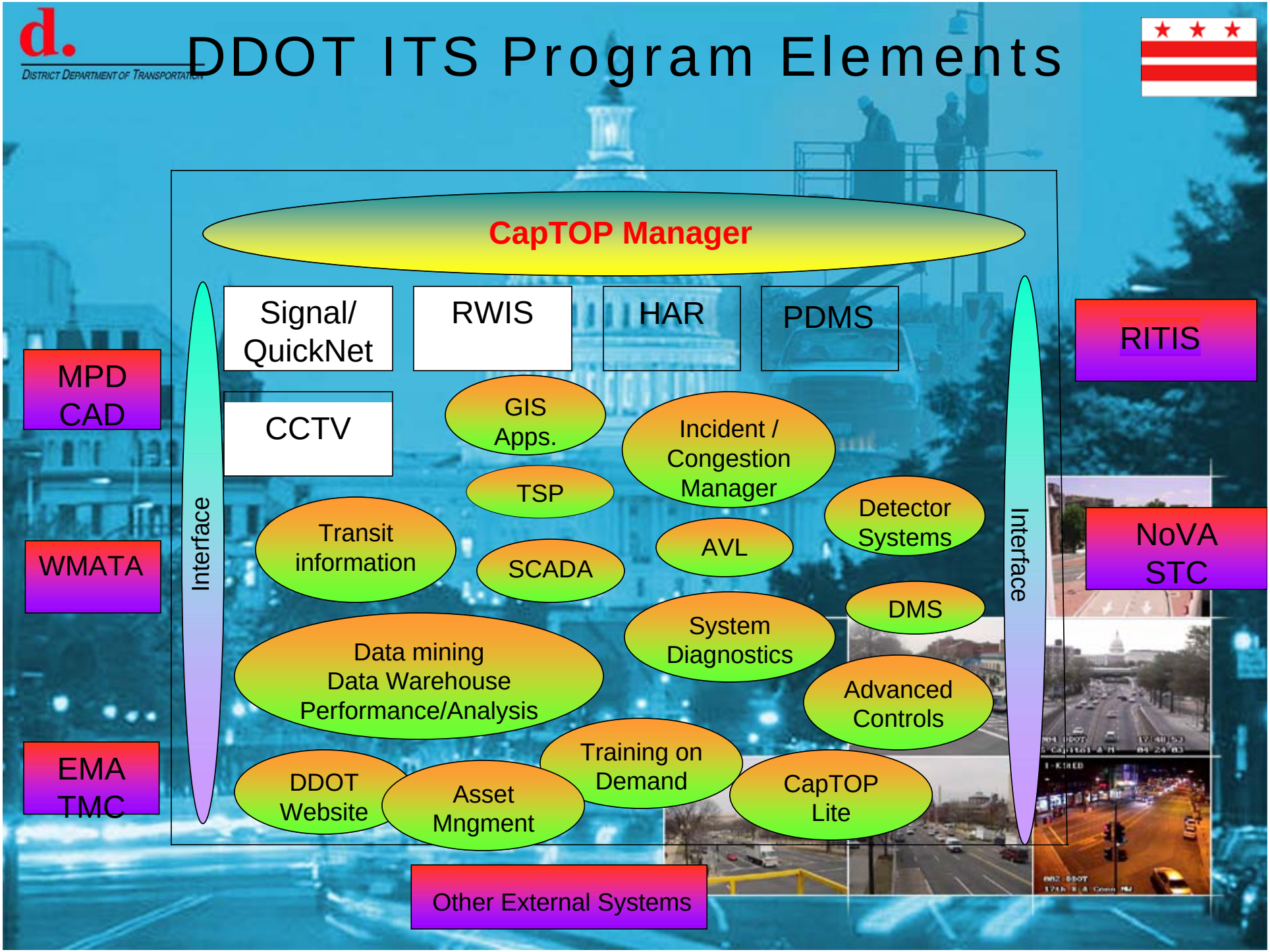
- Deficiencies
  - Lack of sophisticated TMC central software
  - Data collection, processing and data access
  - SOPs
  - Performance measures
  - More auto/semi automated incident response software
  - ITS/Transit
  - Inventory and asset management to keep track of operations inventory, costs, trends of costs
  - Gaps among traffic operations, work zones/construction activities and traveler's information

- Solutions
  - New TMC software -- CapTOP
  - Enforcement of disciplines, SOPs and process
  - ITS projects
    - CapTOP
    - Detector
    - Signal
    - CMS
    - CCTV
    - RWIS
    - Asset management
    - SOPs
    - ATIS

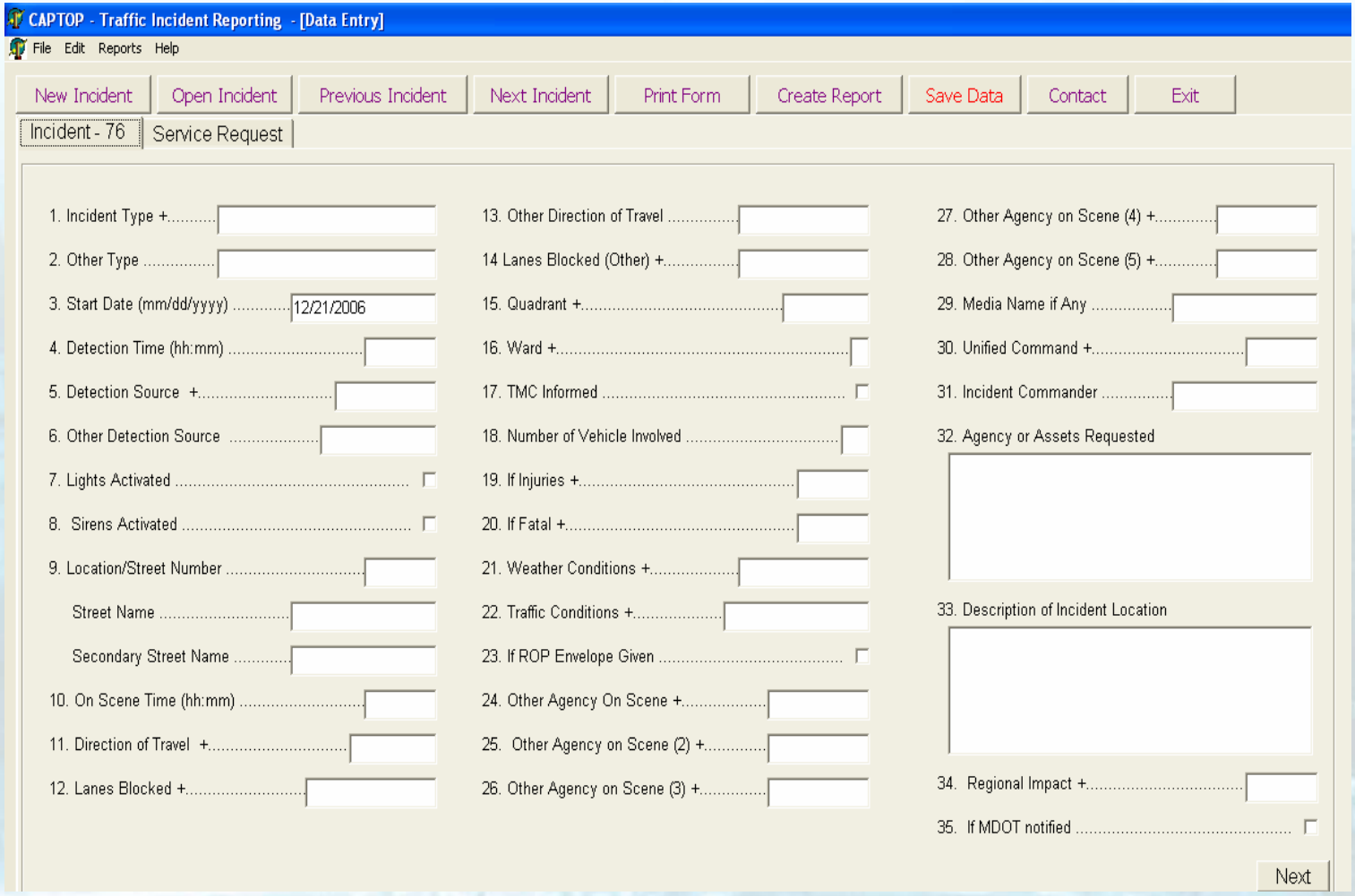
CapTOP Software (Phase 1 completed)

- New TMC Operation Environment (In-House Deployed in May 07) Aiming at
  - Increasing efficiency for TMC daily operations
  - Facilitating/automating operations
  - Establishing a foundation for performance measures
  - Facilitating reporting and statistics generation
  - Addressing DDOT's accountability to obtain continuous funding from FHWA
  - Identifying and tackling "Hot Spots"
  - Estabilishing DDOT's Identify

DDOT ITS Program Elements



CapTOP Software – Incident Management



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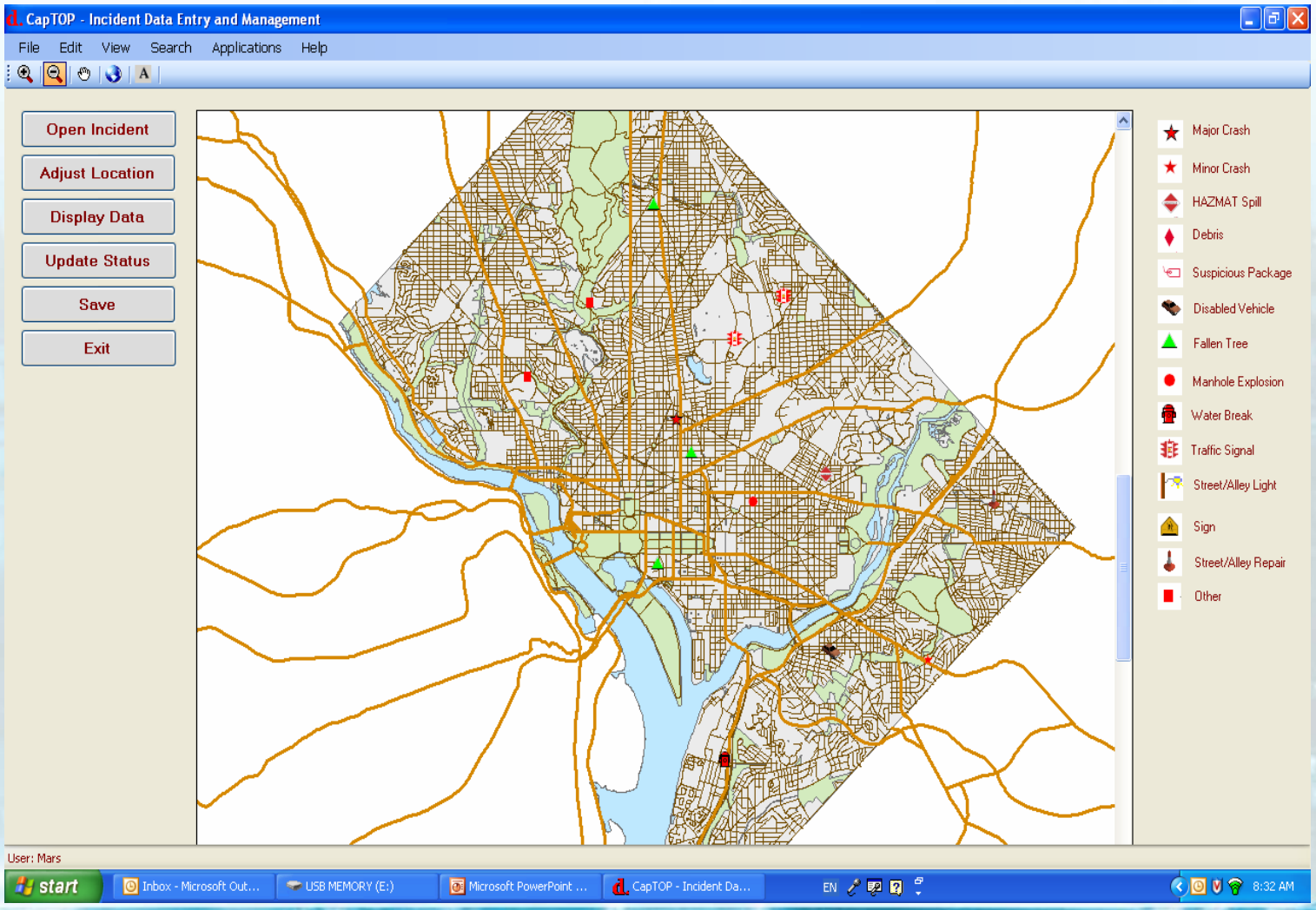
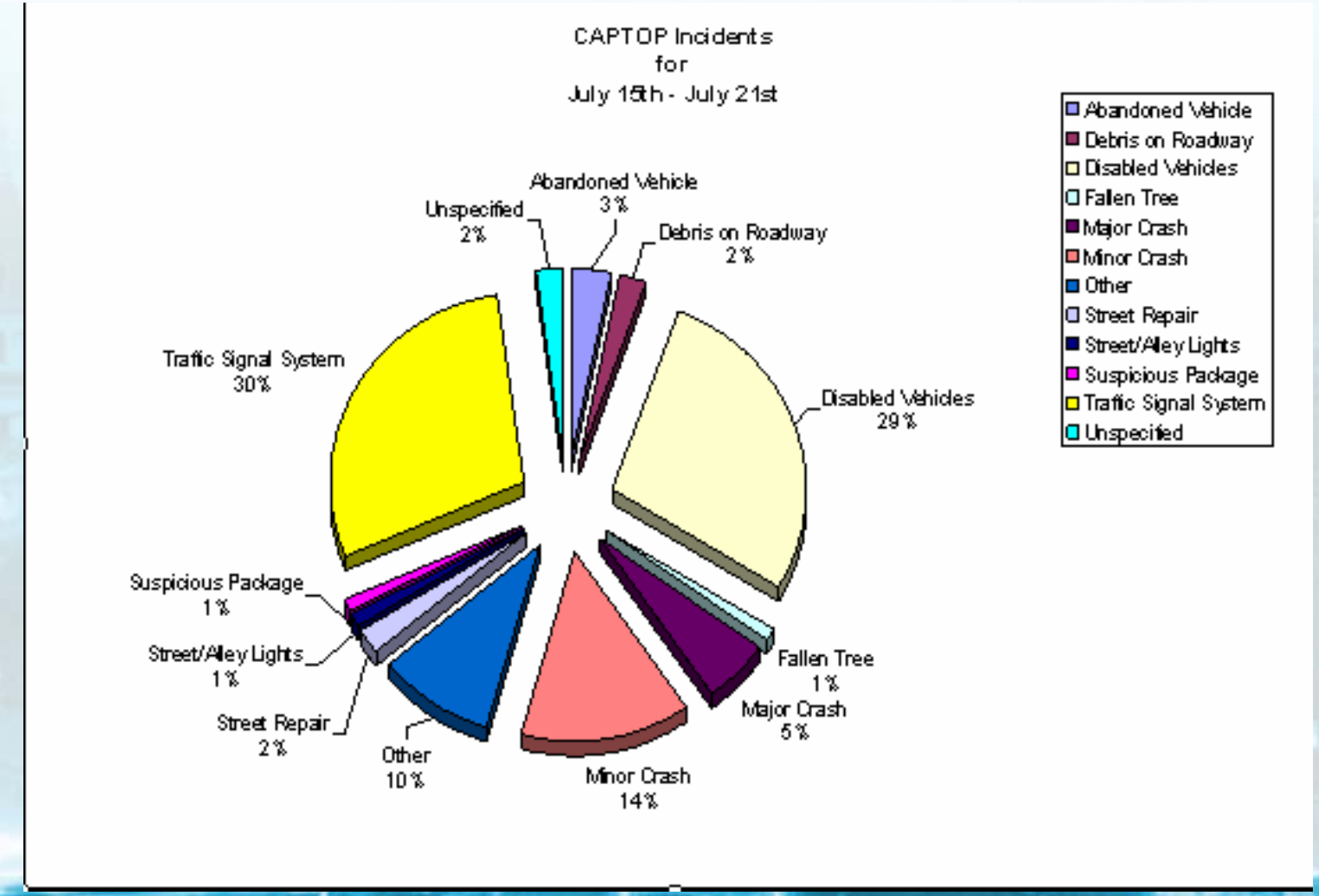
CapTOP Software - Real Time GIS

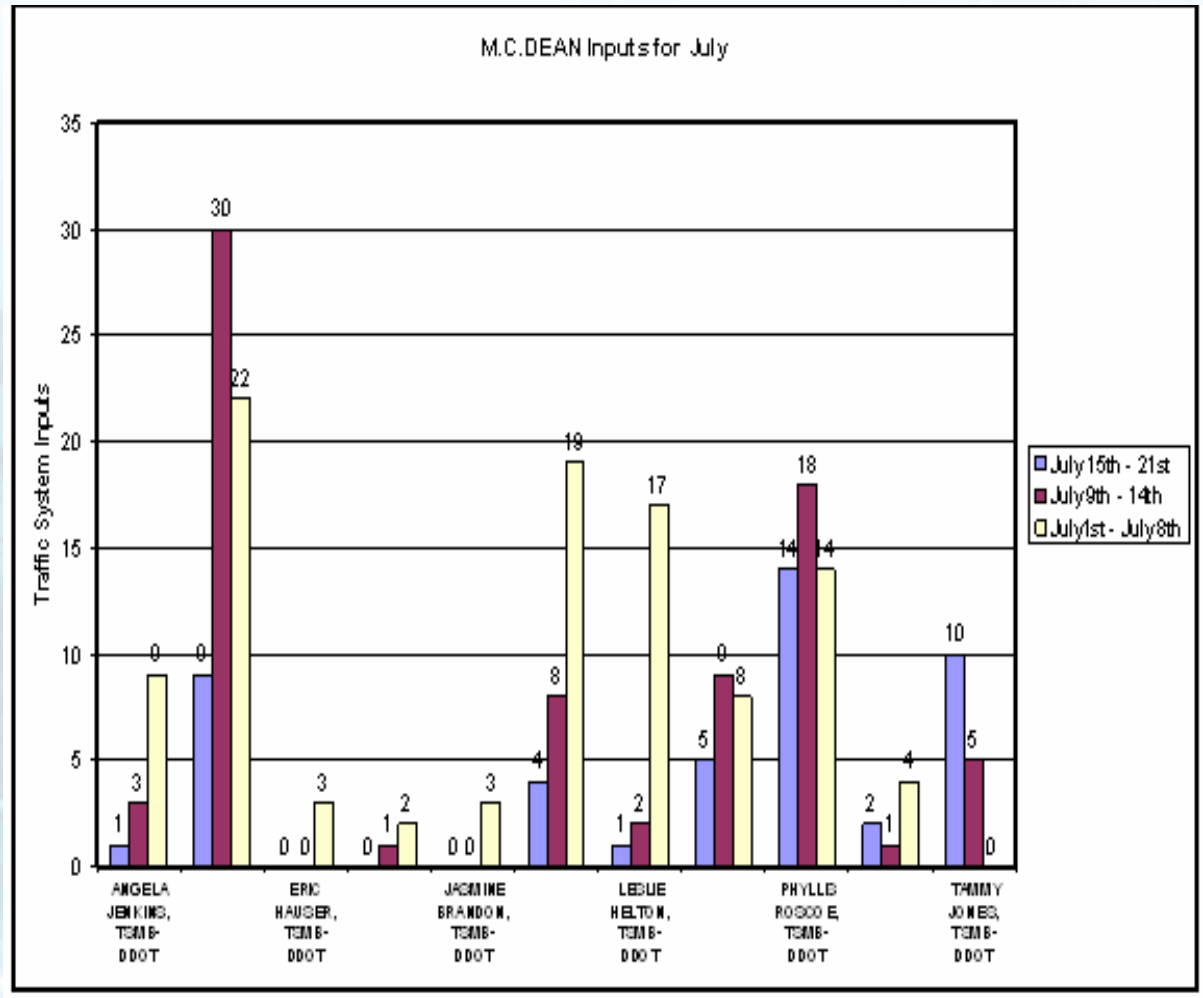


District Department of Transportation

A peek into TMC/CapTOP Statistics



A peek into Operators' Performance



ITS Program Goals (2006 – 2015)

Goals

Promote traffic operations efficiency and safety as well as congestion reduction via effectively deploying core ITS technologies to monitor and improve performance measures.

ITS Program Outlook (2006 – 2015)

- Focus on Foundation Building (2006 – 2009)
  - ITS Plans/SEMP/Design/Studies
  - Detectors, DMS, Signals, RWIS, CCTV, Comm, ATMS Software
- Focus on Develop Enabling Technologies (2009-2012)
  - Starting systems Infrastructure Construction
- Focus on Operations Advances (2009 - 2015)
  - Deploy enabling technologies and new operations strategies to reduce congestion, improve safety and increase operations efficiency.
  - SOPs
  - Transitions to newer systems
  - Raise the bar to service the city