

# Best Practices for Virtual TMC Development

Guidelines on Virtual Transportation Management Center  
Development, T3 Webinar, ITS PCB Program

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Braun, Philip (2014). Control of DMS, CCTV, HAR, and 511; Western States Rural Transportation Technology Implementers Forum, June 18, 2014. Basic Data, Look, and Feel.



Virtual TMCs need to use ITS.

What is ITS?

**Intelligent  
Transportation  
Systems**



# What are ITS devices?

- Dynamic Message Signs (DMS)
- Highway Advisory Radio (HAR)
- Closed Circuit Television (CCTV) Cameras
- Road Weather Information Systems (RWIS)
- Detectors - Bluetooth / Wi-Fi / Microwave
- Automatic Traffic Detectors (ATR)
- Commercial Vehicle Systems (Weigh-In-Motion, WIM, CVISN)
- Traffic Signal Systems
- Network Communications – Wireless, Wire Line, Fiber
- Computer Software and Hardware



# I.T. Department

- The “I.T.” department is short for the “Information Technology” department or computer services. This is the business section that provides computer services, programs the department’s computers and PCs, runs the computer rooms, manages the department’s networks, and may now include telephone services.



# 5 Year Plan and Federal Aid

- Federal requirements may require your TMC plans to be included in your 5 year plan.



# Federal Aid Requirements

- FHWA and FTA require that a current ITS Strategic Plan and ITS Architecture be approved before approving funding for ITS projects.
- In addition, a Systems Engineering Analysis is required for all ITS projects submitted for Federal Aid funding



# Recommendations

- Keep control and maintenance of your own ITS devices if you depend on them.
- Keep control of your own fiber optic cables. Don't give it all away.
- If you share a fiber cable with another agency – let them have their own strands or keep their devices on separate strands.
- Share viewing. Share data.
- Use Ethernet based distribution of data and video.



# New Control System Project

- Goals:
  - Statewide Integration and Control of CCTV Video
  - Video sharing between state and local agencies
- License:
  - The state purchased a license that allows for sharing the control system with any agency in the state. Cities, counties, highway districts, street departments, and the media can participate without an extra license fee paid to the software company.

# ITD's State Comm 24 Hr Dispatch



Phil Braun

# Background

- Our state has six districts. 17 years ago we had night watchmen in each district. At night they would dispatch crews as needed for their own district.
- 16 years ago we joined with the “State EMS Communications Center”. This centralized center dispatches transportation crews statewide. It also dispatches for 19 other agencies, include helicopter ambulances, mountain town volunteer ambulance services, Mountain Search and Rescue, and regional hazardous material cleanup groups. In mass causality events – open hospital bed counts are maintained.
- ITD’s centralized State Comm allows the department to meet federal reporting requirements.
- State Comm controls the department’s statewide - permanent DMS-CMS, CCTV, and HAR.

# Virtual Benefits

- The department's new control is network based.
- If State Comm Staff have to leave their building – control of the statewide DMS, CCTV, and HAR devices are available at their backup center.
- When State Comm needed new carpet this summer, we ran the State Comm Backup Center for 4 days. It led us to find that some of the new EMS mountain top radio transmitters were not added to the backup site. Also, the new State 511 map on a 70 inch wall monitor at the main site was not available at the backup site. Taking advantage of a PC at the backup site and wall projector we were able to duplicate the 511 event map.
- When the funding comes in a couple of years, the next generation of radio consoles will run on just two Ethernet wires instead of 50 twisted pairs of analog wires. Using fiber optic lines, this should allow the backup center to use a PC based radio program to reach the department's trucks.



# Virtual Benefits

- Backup centers can be located where ever fiber optic or high-speed communications reach.
- If State Comm gets overwhelmed or they have to leave the building the districts will have their own video wall and can control their own DMS, CCTV, and HAR.
- We share our software with State Police Dispatch Centers. Our highway cameras are displayed on their video walls.
- We share our software with a county 911 dispatch center and another county's TMC.
- We share our software with a university.

Idaho RWIS  
data used at  
88 locations  
and shared  
with the NWS,  
a university, &  
511.



# District 3 Office Video Wall In Progress



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# District 1 Office Video Wall



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# PC Control of DMS

Viewer | DMS 3-14: SH 55 @ New Meadows Old School

Last Poll: 2014-02-10 10:51:12

DMS Control

Override

HighImpact

MediumImpact

LowImpact

TravelTimes

Default

Phase 1

Phase 2

Start Time 2/10/2014 10:50

End Time 2/10/2014 13:50 Indefinite

Repeat Sun Mon Tues Wed Thu Fri Sat

Queue Priority Override Position 2

Use Beacons

Brightness Preview Replace Remove Poll New Less <<

Signs with Message Load from Library Add to Library Resend Queue

# PC Control of CCTV



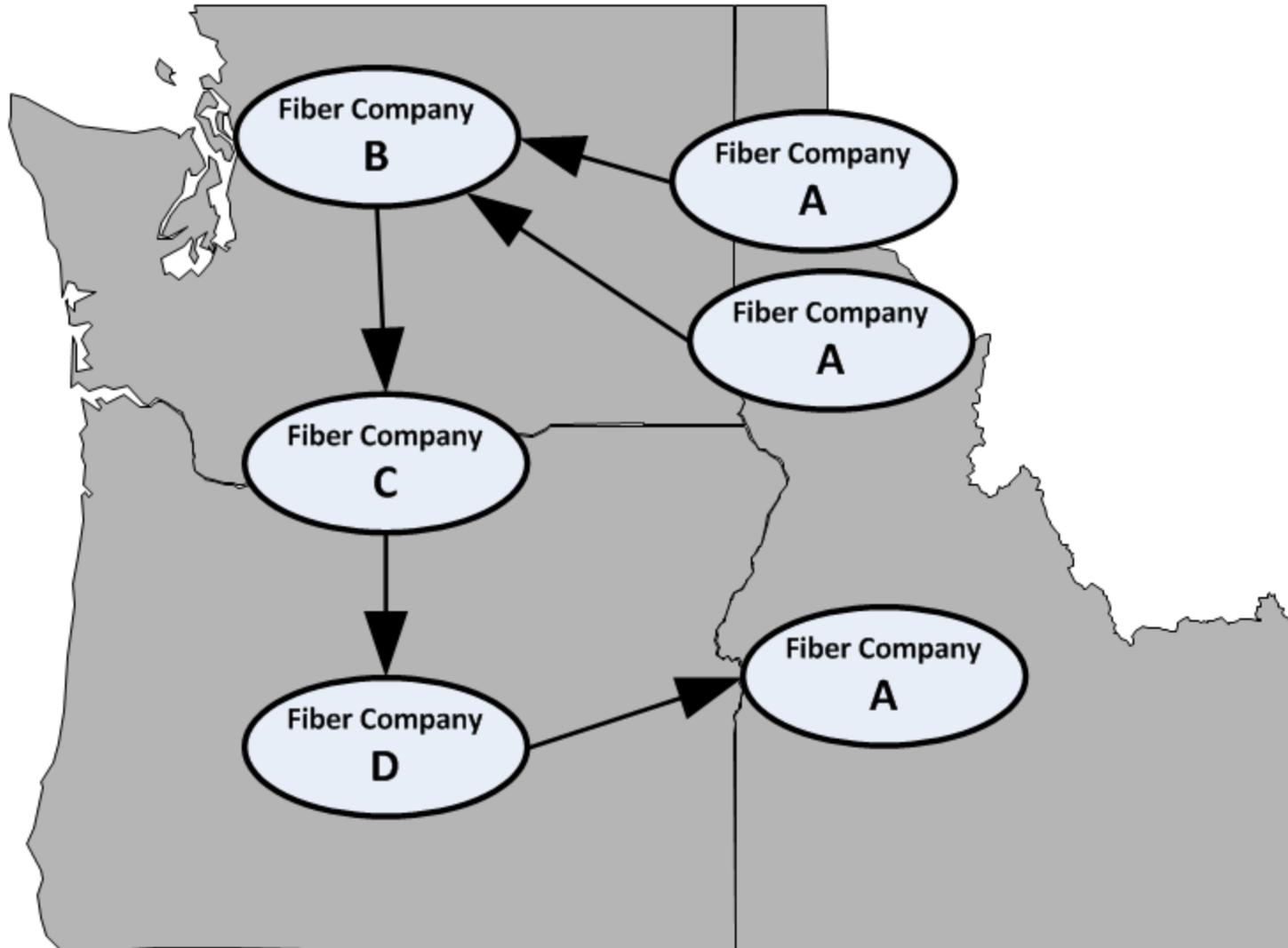
Phil Braun



# Best Practices

- Use a centralized, multi-governmental TMC with individual back up locations.
- Have governance documents on how to solve problems and conflicts in the multi-agency TMC. Have agency functional policies in place.
- Minnesota and Washington State are both trying to consolidate their regional TMC's into one TMC for their state. Lower operating costs is one of the primary goals.
- Don't pass functions to the districts in the day and back to the TMC at night. Pass downs have many failures.
- Use uniform platforms and software.

# Fiber Company Lost Video Packets



# Idaho State Police 24 Hr Dispatch



# Ada County Highway District's TMC



# Ada County Highway District's TMC





# ITD Contracting Process

- ITD held a Pre-Bid Conference. ITD gained much.
- Best Value verses Low Bid. We chose Best Value.
- Basic Scope of Work Defined.
- Value Added Items for Consideration.
  - Adding Modules:
    - Center-to-Center (TMC to TMC).
  - Exchanging or trading out line items:
    - Crestron Touch Pads, Out – 70 Inch Monitor, In.
    - Items no longer needed in the project – exchanged for new items.



# Contract Management

- Followed Risk Management Process of Best Value
- Use Phased Implementation.
- Value Added Items for Consideration Included
  - Added DMS and HAR control to scope
  - Center to Center Module Option Exercised March 2014



# Subsystem Health

- Virtual TMC systems allow Administrators and IT Staff to remotely identify broken or unreachable equipment without being at the TMC.



# CCTV Issues

- Integration of old Analog CCTV Cameras
- Save future costs by moving to network IP cameras with a h.264 compression standard.
- The deployment of HD cameras by a partner agency has been suspended until network fiber loops can be upgraded to hardened 10 Gigabit Switches.

# UPS (Uninterruptable Power Supply)

Use on:

Controller

Modem

Or

Switch

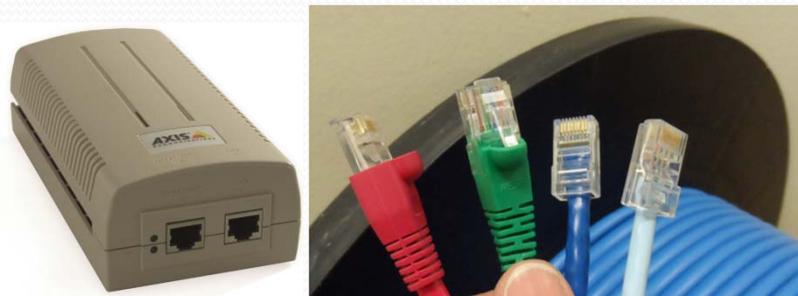
Cell Booster



Use a  
Private Network  
IP Address when  
using cell service.



# Subsystem Success – CCTV Example



[www.loweringsystems.com](http://www.loweringsystems.com), [www.axis.com](http://www.axis.com),  
[www.ruggedcom.com](http://www.ruggedcom.com), Wire Photo: Phil Braun



# CCTV Integration Success

- AXIS Q6042-E PTZ Dome Camera

+

- MG<sup>2</sup> Pole with Lowering Device

+

- Axis PoE Power Injector

+

- Rugged Comm – RS900 Ethernet Switch

+

- Belden 7919A CAT5e Cable

=

Winning Combination



# Hardware Integration

- Four Cameras Styles Were Selected By The I.T. Section For Instant Approval For Three Years.
  - Approval means it works on our network.
  - Approval does not mean the deployment location has enough bandwidth.
  - Approval does not mean the deployment location has electrical services.
  - Approval does not mean the deployment location has network services, cell services, fiber optic connections, user approval, structural support.



Questions on all 3 presentations