



Arterial Management Practices

MoDOT's St. Louis District Six Management Highlights

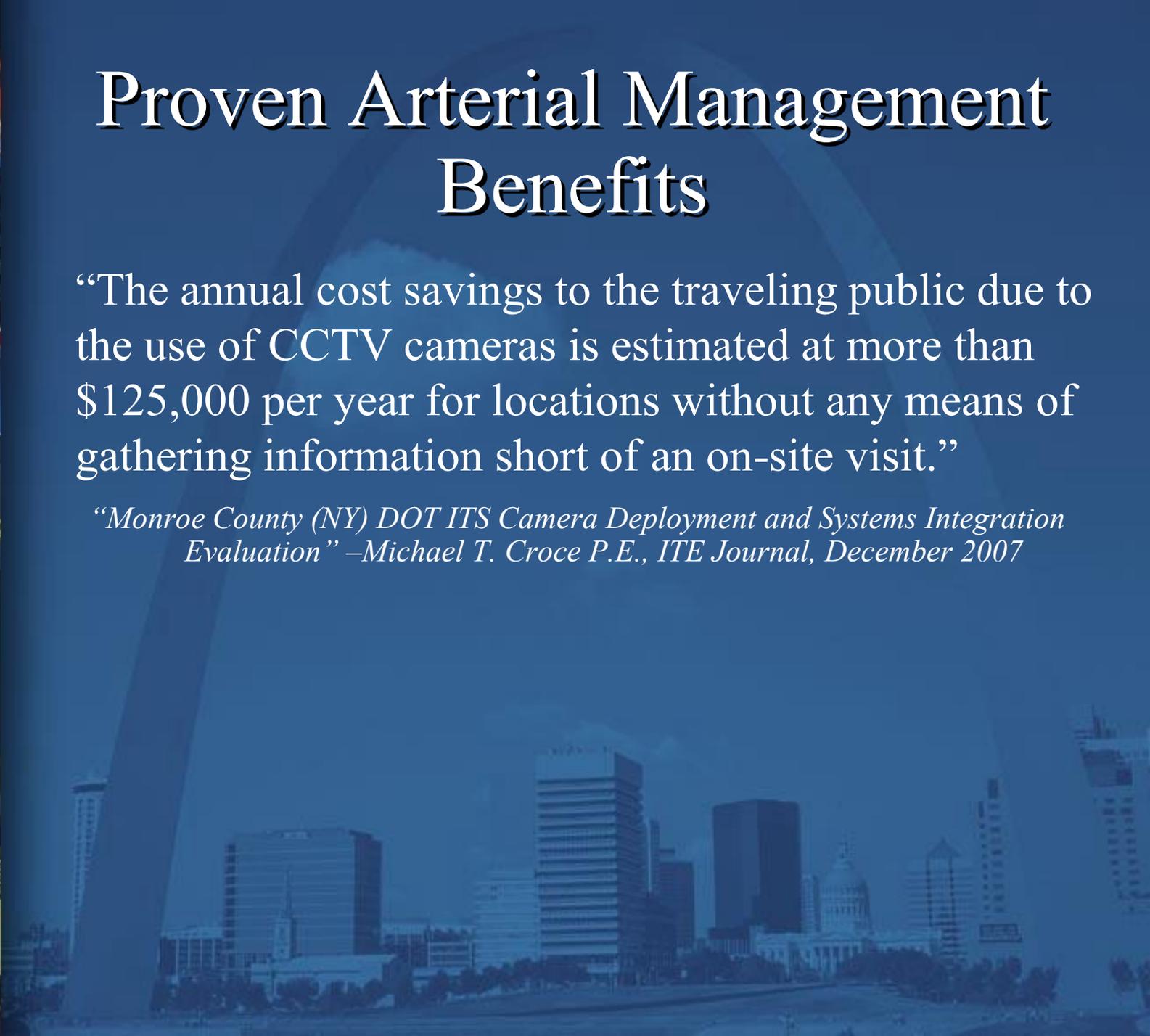
March 17, 2011



Proven Arterial Management Benefits

“The annual cost savings to the traveling public due to the use of CCTV cameras is estimated at more than \$125,000 per year for locations without any means of gathering information short of an on-site visit.”

“Monroe County (NY) DOT ITS Camera Deployment and Systems Integration Evaluation” –Michael T. Croce P.E., ITE Journal, December 2007





Arterial Management Goals

- ❖ Stable Coordination Plans
- ❖ Proactive Signal Maintenance
- ❖ Active Integrated Corridor Management
- ❖ Regional Partnerships



Arterial Management Tools

- ❖ Robust communication network with dedicated upkeep
- ❖ Central signal control
- ❖ Networkable signal cabinet components
 - MMU (Malfunction Management Unit)
 - Video Detection Systems
 - Uninterruptable Power Supply (UPS) Systems



Arterial Management Tools

- ❖ “Traditional” ITS Devices
 - CCTV Cameras
 - Dynamic Message Signs
- ❖ Emerging New Technology
 - Arterial Travel Time Systems
 - “ACS-Lite” Adaptive Signal Control

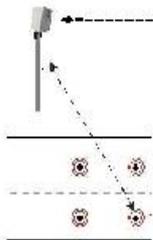


District Six Arterial System Philosophy

- ❖ Leverage existing freeway ITS communication foundation onto arterials
- ❖ Projects and signal upgrades developed utilizing “Arterial System Architecture”
- ❖ Move to IP over Ethernet signal cabinet components and integrate older “serial” devices
- ❖ Phased upgrade priority to strategically incorporate arterial management tools

Central Signal System Device Architecture

MID-BLOCK DETECTOR SITE



Ethernet & Power (POE)

DYNAMIC MESSAGE SIGN (DMS)



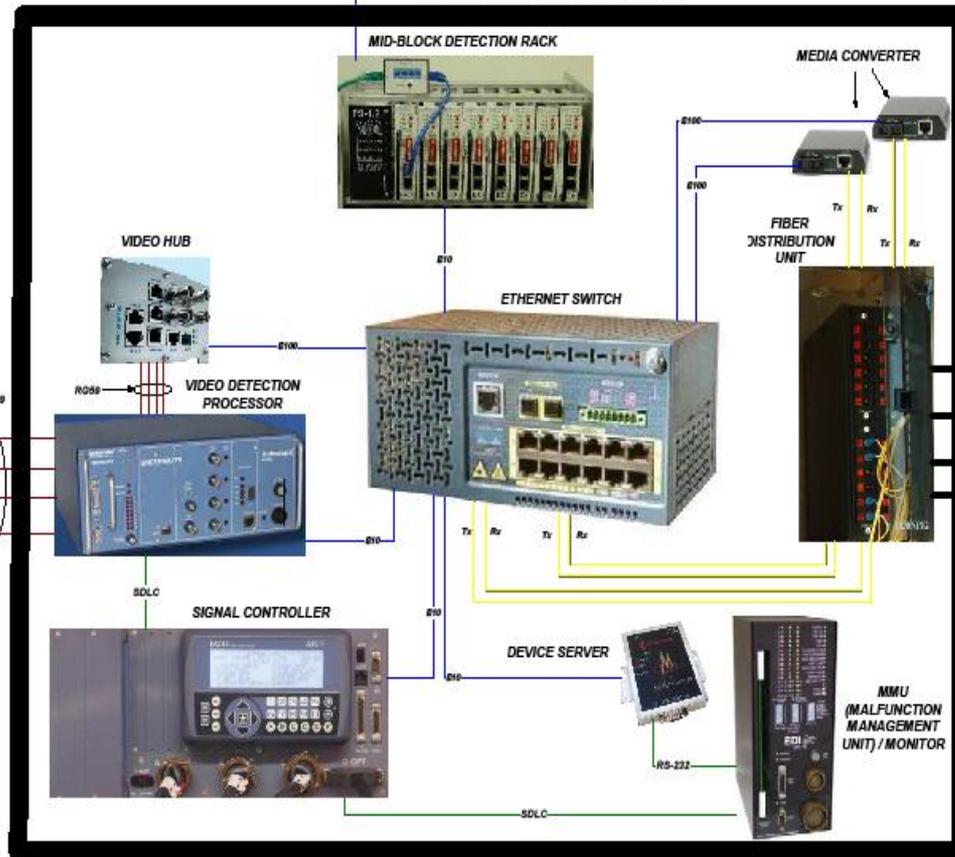
PAN/TILT/ZOOM (PTZ) CAMERA



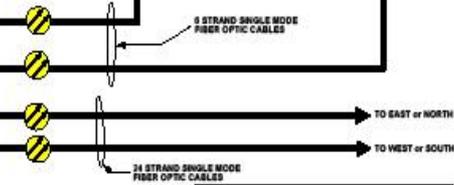
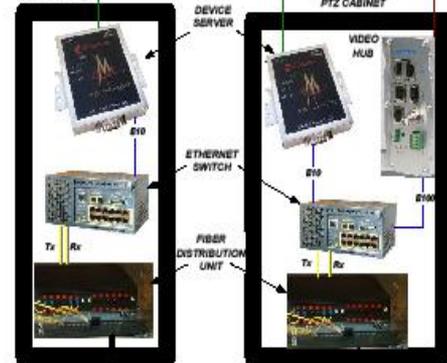
DMS CABINET

PTZ CABINET

TRAFFIC SIGNAL CABINET



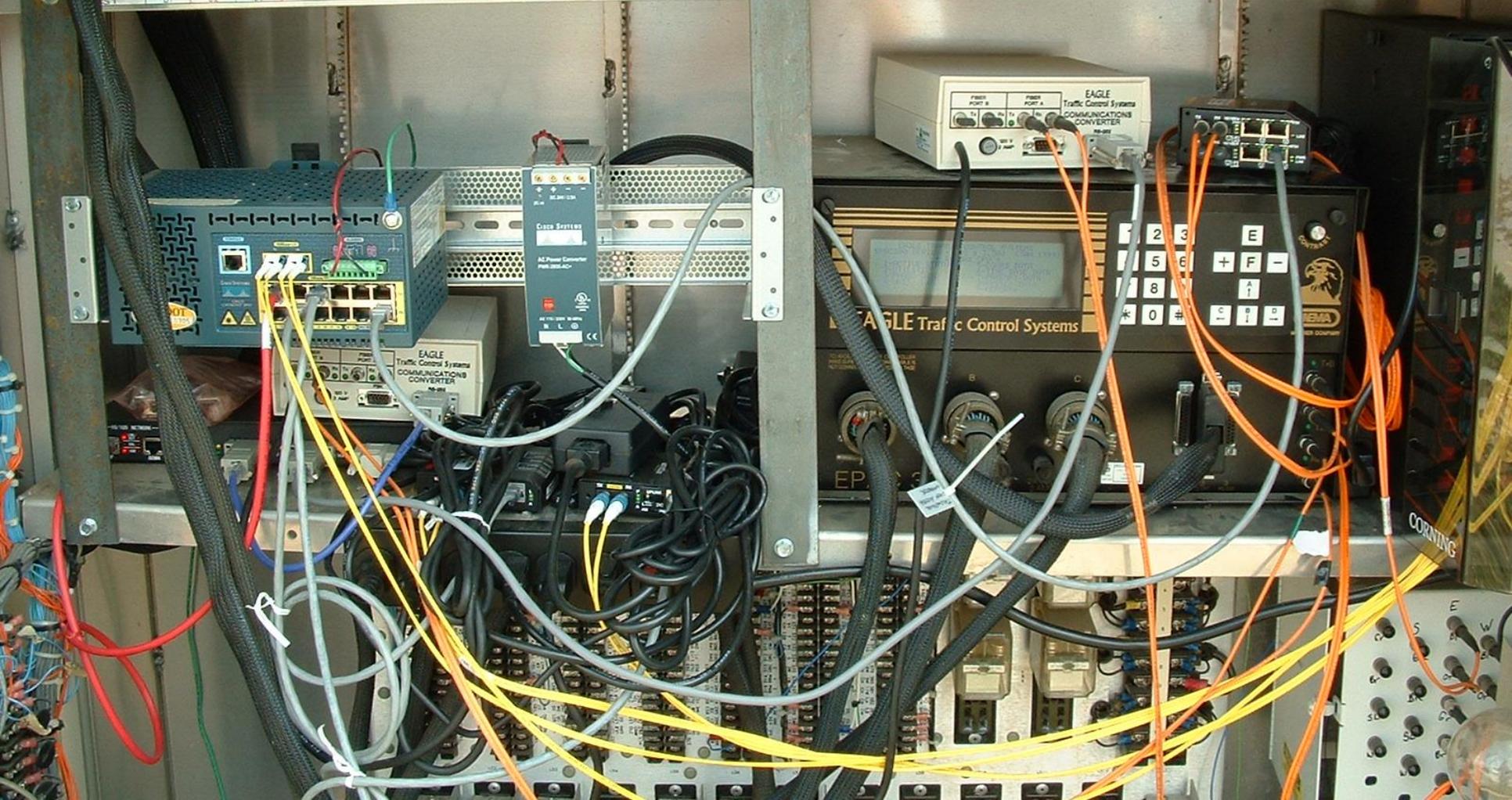
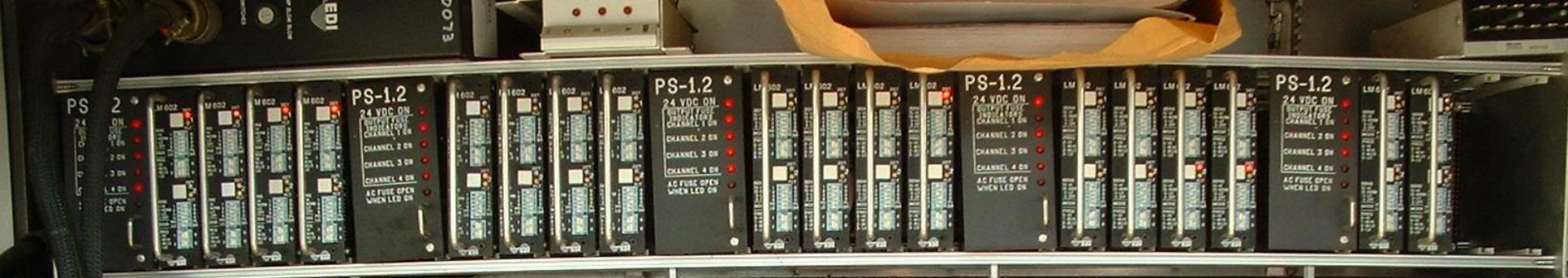
VIDEO DETECTION CAMERAS



KEY	
	FIBER OPTIC CABLE
	SINGLE MODE FIBER OPTIC JUMPER
	ETHERNET
	VIDEO
	SERIAL
	WIRELESS

NOT ALL DEVICES
MAY BE PRESENT AT
EVERY CABINET

NOT TO SCALE





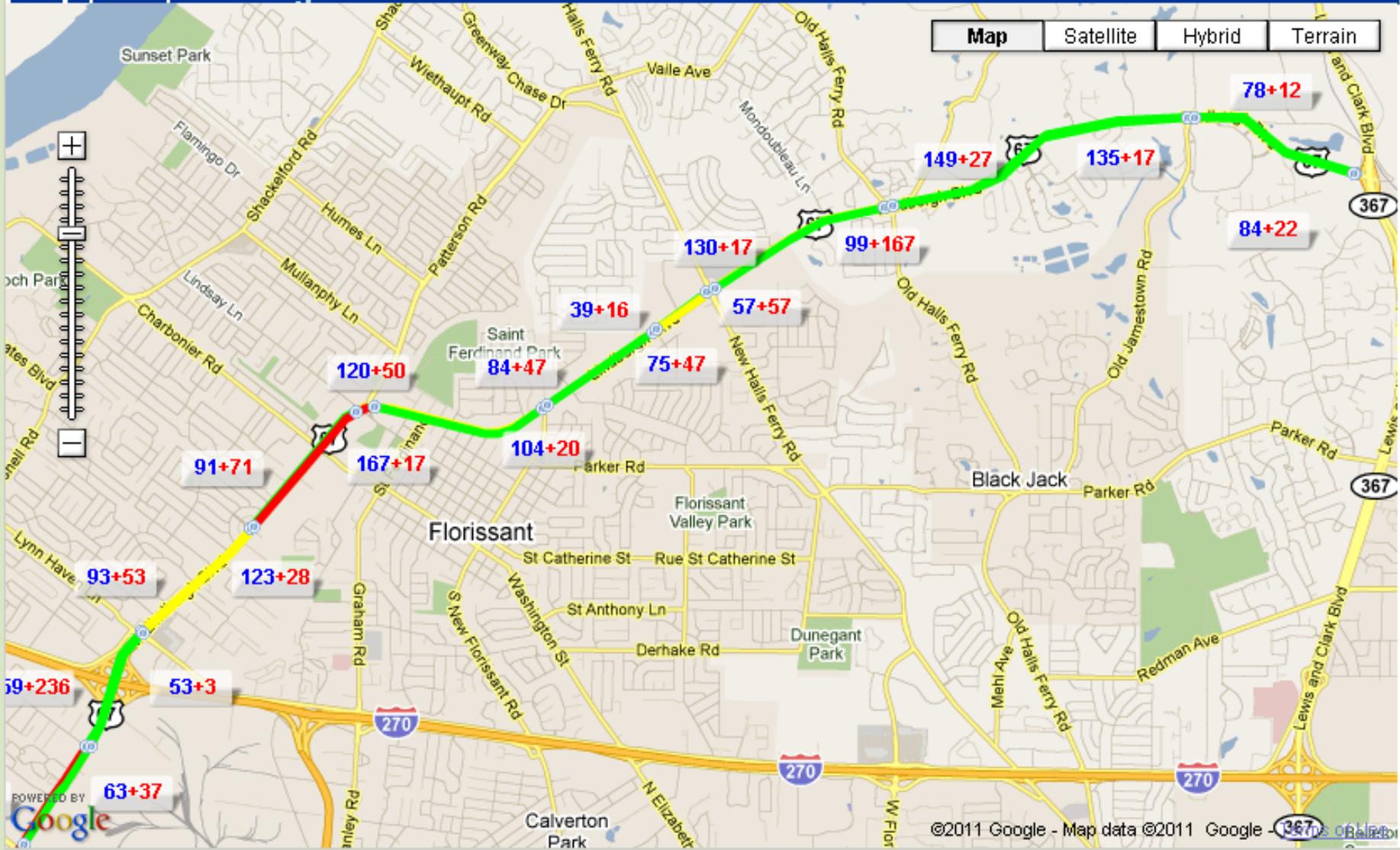
District Six System Components

- ❖ Central Signal System: June 8, 2006 – IP addressable controllers and serial over fiber controllers all on same system
- ❖ Other cabinet devices on-line: MMU's, video detection processors & cameras
- ❖ CCTV's and DMS's installed on arterials
- ❖ Only agency in the country to be displaying live travel times to multiple arterial destinations on DMS – 5 systems

Map | List | Reld Engine

?

Map Satellite Hybrid Terrain



Mid Rivers 9 MIN
I-64 / US 40 14 MIN





District Six System Components

Currently

	<u>Total</u>	<u>3/1/11</u>	<u>%</u>
Controllers Centrally Communicating	978	855	87%
Signal Cabinets w/ Ethernet Switches	978	586	60%
Remotely Accessible Video Detection System (ability to view & manipulate zones)	418	253	61%
Video Detection w/ Streaming Video	418	229	55%
MMU(s) remotely accessible	978	145	15%
Arterial CCTV		78	
Arterial DMS		28	
Arterial Travel Time Systems (miles)		57	
UPS currently online		37	



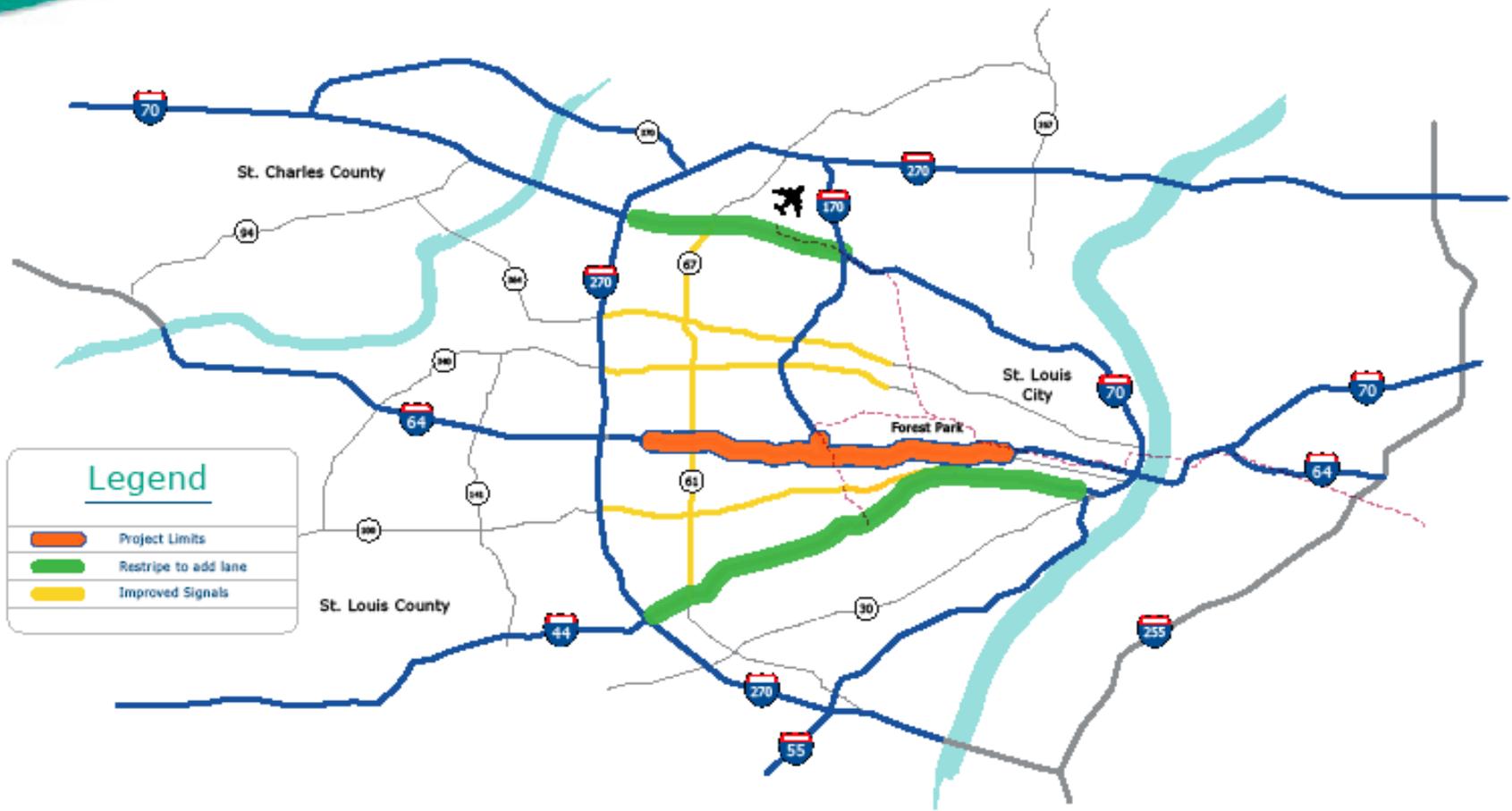
Arterial Monitoring Efforts – Success Story

For years, minimal organized program (basic signal malfunction response) until the announcement of:





IMPROVEMENTS TO REGIONAL ROADS



Legend

- Project Limits
- Restripe to add lane
- Improved Signals





I-64 Project Arterial Monitoring Plan

- ❖ Install workstations at TMC dedicated to arterial system
- ❖ TMC manned for 18 hours per weekday & core weekend hours by engineers familiar with signal operations
- ❖ Validate public arterial complaints, coordinate on-street observers, utilize CCTV views, identify hardware failures, & adjust programming as needed
- ❖ Integrate the arterial system needs with freeway operations at the TMC
- ❖ Set up daily data collection at limited locations



How Well Did It Work?





Current & Near Future Practices

- ❖ Engineers staff arterial monitoring stations at TMC during peak hours
- ❖ Direct routing of arterial system alarms
- ❖ Build up of data collection
- ❖ Building of “diversion plans” for signals
- ❖ Regular TMC staff operational procedures
- ❖ Inter-agency signal system access



Lessons Learned

- ❖ Freeway diversions to arterials greatly limited – “finesse” usually needed
- ❖ False positive alarms must be controlled
- ❖ Integration efforts take time – lots of time
- ❖ Data integrity has to be ensured
- ❖ System reliability is a must



Long-Term Arterial Management Goals

- ❖ Regional arterial management system cooperation
- ❖ Full integration of signal devices
- ❖ More detailed, better automated arterial incident alarms (roadway and equipment)
- ❖ More efficient delivery of traveler information
- ❖ Experiment with new technology



End Of Show

Questions?

