

Challenges in Building and Operating a TMC for a Local Government

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Abstract:

RCOC (Road Commission for Oakland County) serves the residents of Oakland County Michigan which is the most affluent county in the state of Michigan. Since the inception of the field of ITS RCOC has been a national leader. Expertise goes back to the early nineties when RCOC established its first Traffic Management Center in the city of Troy.

RCOC's "FASTTRAC" (Faster and Safer Travel through routing and advanced controls.) is the ITS umbrella under which RCOC has deployed different ITS technologies, and operated its Traffic Operations Center for more than 25 years. It has grown from a small operational field test to a sophisticated and operational Traffic Operations Center (TMC).

RCOC has constantly maintained a real time Traffic Management Center with several updates over the years. Today, it is a state of the art facility that has over 250 state and local CCTV Cameras, 750 SCATS signals, over 850 fixed time signals, modem based 4g LTE cellular communication to over 900 locations through public private partnership with AT&T, almost 2000 overhead detection cameras, and a real-time traffic website.

This paper will share some of the long and short-term experiences that RCOC went through over the last 25 years in developing in depth expertise in the field of ITS.

Introduction

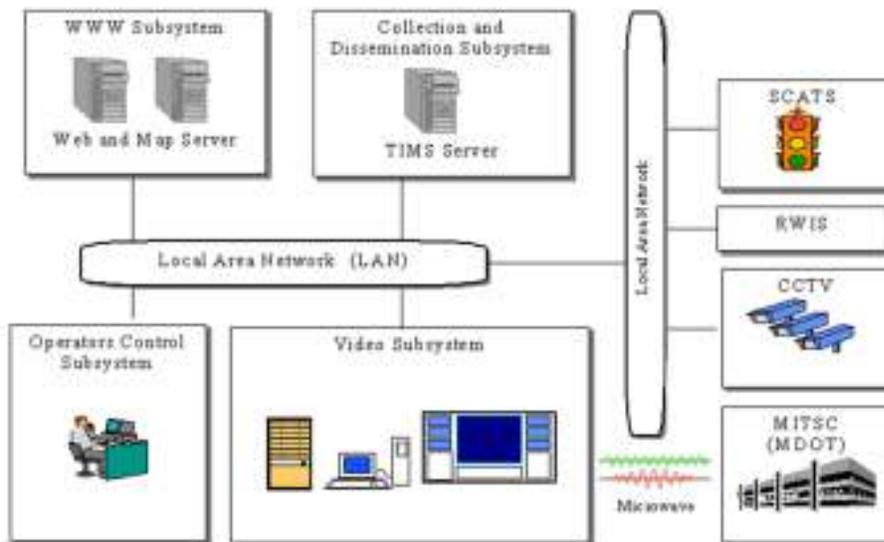
The Road Commission for Oakland County (RCOC) has been in the Intelligent Transportation Systems (ITS) business since the inception of this field.

RCOC serves Michigan's second most-populous county, located just north and west of Detroit Michigan. At 900 square miles and more than 1.2 million people, Oakland County boasts the largest county road system in the state.

RCOC has long been respected nationally among road agencies as a leader in innovation and technology. It was one of the first local road agencies to venture into the world of ITS in the early 1990s, establishing its adaptive traffic-signal system in 1992.

The System, known as Faster and Safer Travel through Traffic Routing & Advanced Controls (FAST-TRAC), started with 28 signals in the city of Troy and has grown to more than 750 signals today, making it the second largest such system in North America.

FIGURE 1 shows system architecture of FASTRAC TIMS and SCATS system.



RCOC was also one of the first local road agencies in the nation to establish a traffic operations center (TOC). More than 25 years later the agency has rebuilt its TOC several times, each time upgrading to the latest technologies. Additionally, the agency was one of the first to initiate the testing of ITS technologies and applications on local roads.

RCOC's ITS staff has become adept at managing and attaining funds and selecting technologies to maximize the effectiveness of those funds. Over the years, RCOC has maintained the same core signal operations software (SCATS) while updating the supporting tools regularly.

Where are we today?

Today, RCOC operates one of the largest communications systems in North America based on a cellular AVPN network. The agency maintains more than 2000 I.P.-based devices reporting to its operations center. Additionally, RCOC has more than 100 local closed-circuit television (CCTV) cameras and access to more than 200 Michigan Department of Transportation (MDOT) freeway cameras.

In fact, RCOC is one of the few agencies that has started to send detection-camera video back to the operations center for more effective programming and planning. RCOC also has ability to share its video resources with both external and internal customers. The agency also operates a real-time traffic website providing vital information to motorists.

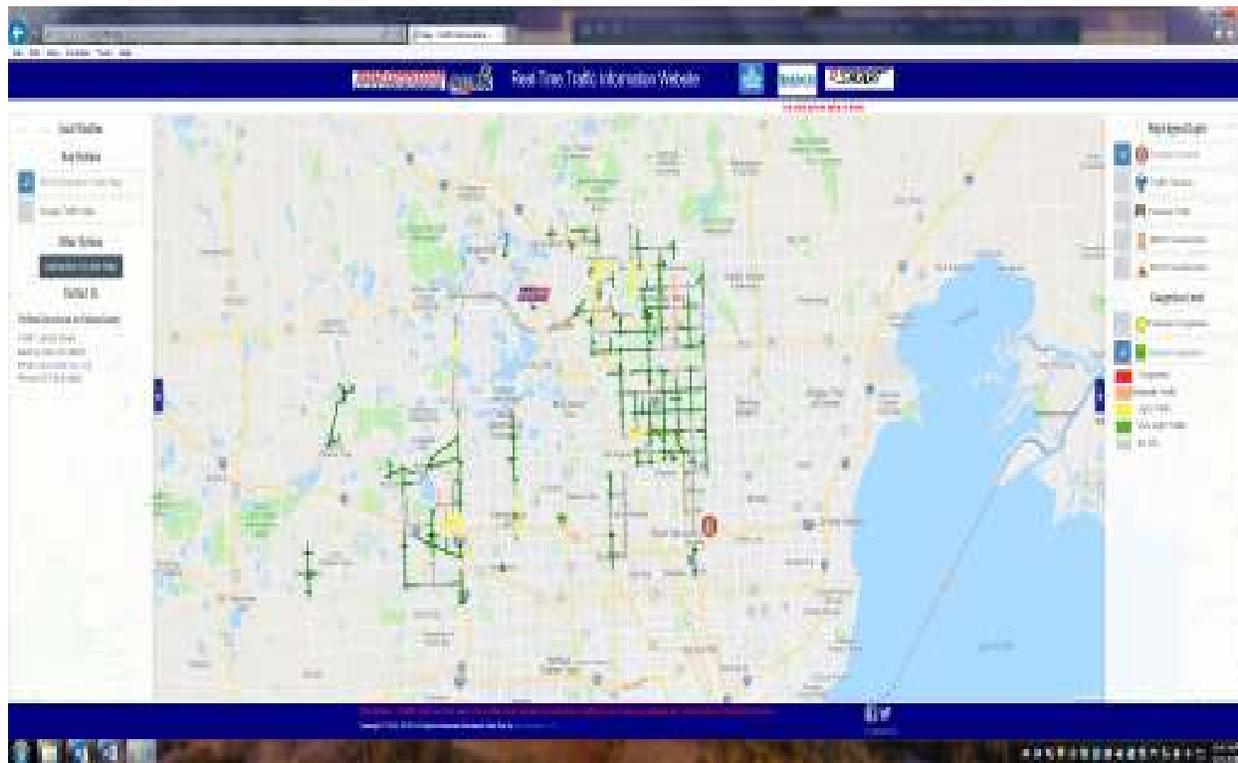


Figure 2 RCOC Realtime Website

RCOC has been a long-term partner with the Federal Highway Administration (FHWA) and the State of Michigan in ITS initiatives. More recently, RCOC has partnered with Oakland County general government (the Road Commission is an independent unit of government) in a cutting-edge connected-vehicle initiative. Agency staff are also involved in multiple national and state connected-vehicle forums representing RCOC.

Most recently, RCOC updated all hardware and software at its TOC, turning it into a state-of-the-art facility.

Main Facets of RCOC Traffic Management Center

SCATS System and its Benefits

There have been several studies performed on the operational and safety benefits of the FASTTRAC system. Some of the core benefits are:

1. Travel time improvements of 20% reduction in AM peak; 32% reduction in off-peak and 7% reduction in the PM peak.
2. Over 50% reduction in severe traffic crashes (that result in incapacitating injuries)
3. Real time control of traffic signals and resolution of citizen concerns in a quick manner
4. More efficient traveler information via the website
5. Engineers can maintain the system from the office. Troubleshooting and problem solving is much easier than going to the field for these tasks

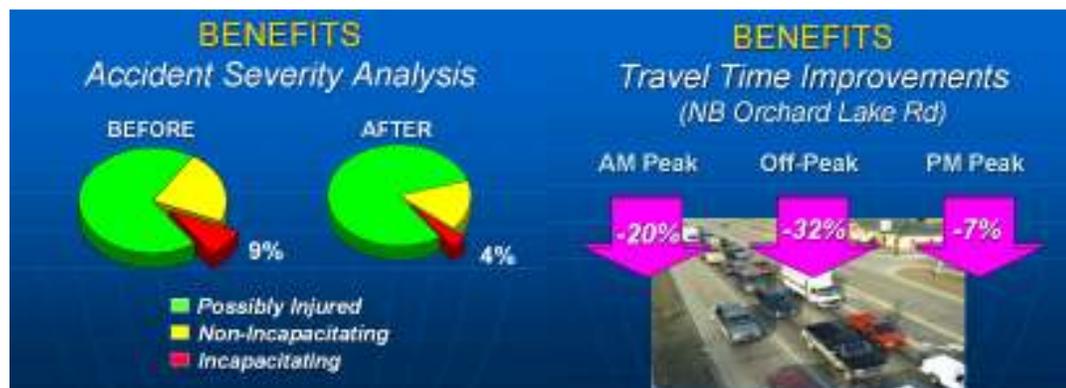


FIGURE 3. BENEFITS OF RCOC SCATS SYSTEM

CCTV

1. Over 110 Local cameras reporting to the operations center facilitating the everyday operations
2. Access to over 250 MDOT freeway cameras for SE Michigan freeways
3. Helping RCOC create new partnerships with state and local governments by sharing resources

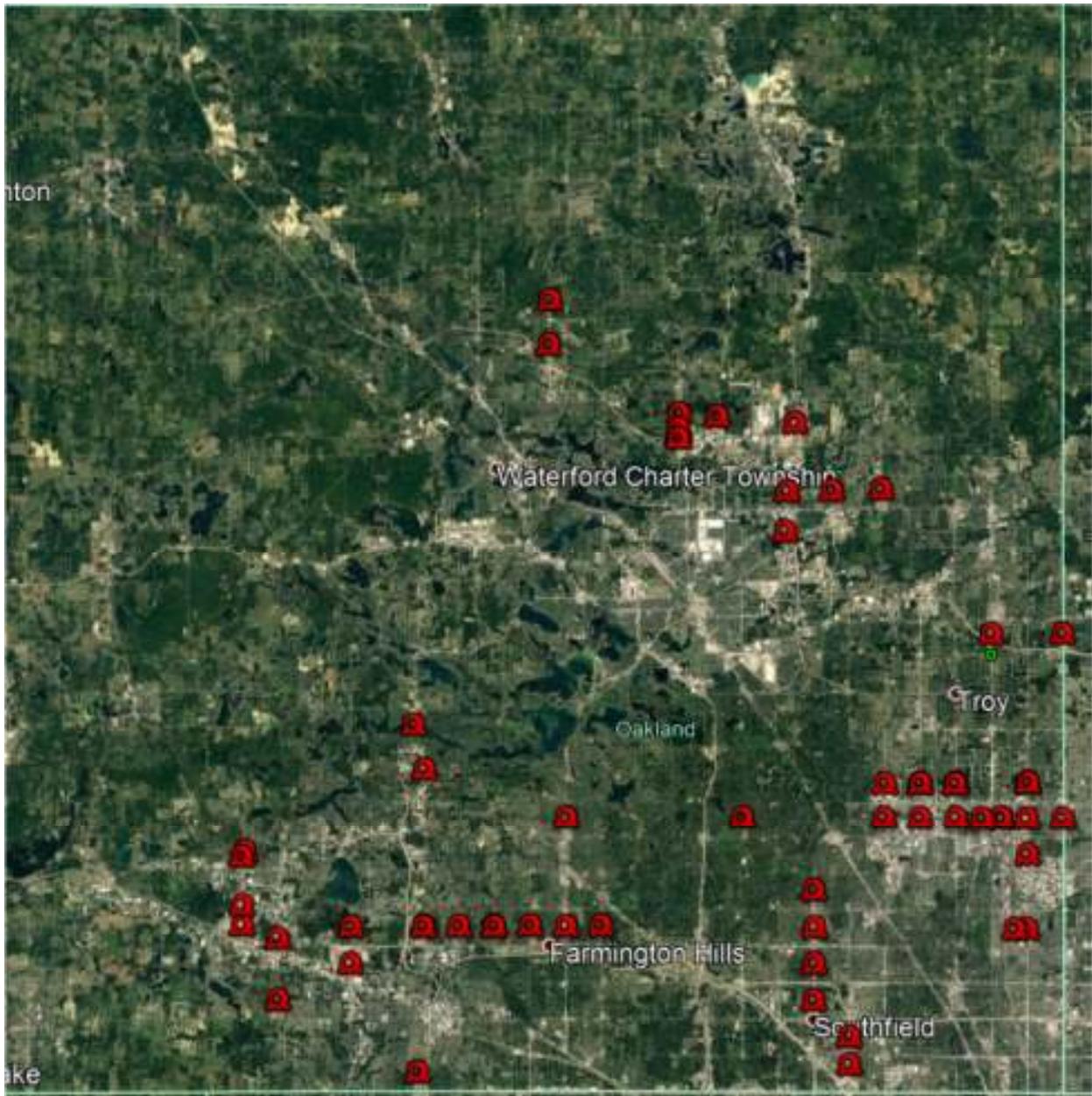


Figure 4 shows the location of all the local cameras installed by RCOC

AT&T / RCOC Public Private Partnership

AT&T has been partners with RCOC since the inception of SCATS. After a detailed review RCOC recently heavily reinvested into upgrading the communications to its traffic signals. Today there are on AT&T AVPN with more than 2000 IP devices reporting to the new system. All this information is coming back to the TOC for more efficient operations. This Public private partnership has worked well for both sides and has been a real success story of collaboration.

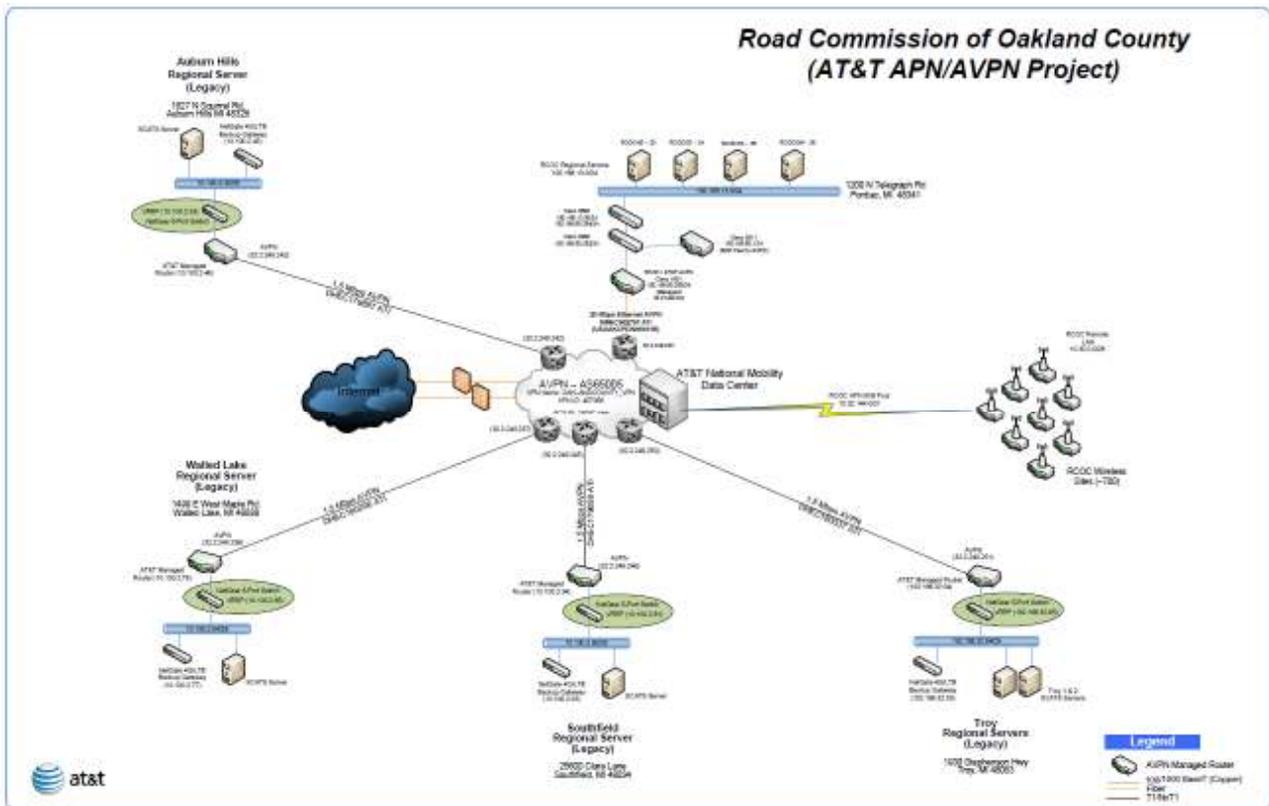


Figure 5 shows RCOC/ AT&T Cellular network.

Lessons Learned and Conclusions

- Technology driven – keeping up with changing technologies. It is important to test new technologies to an extent and then focus on the successful ones
- Testing innovation / Deploying proven concepts - starting very small and then as time goes on, consolidate on the success and move along with focused approach. This is one of the key factors for successful deployment of ITS operations.
- The 21st century is an age of information and our customer's (drivers in Oakland County) expect real time information and very fast resolution to any concerns they have. The RCOC website and its easy access from a mobile phone have addresses some of these challenges.
- Train and retain qualified personnel
- As an agency RCOC has learned to be prepared to test multiple technologies and only a few will materialize for permanent field installations
- Adaptive signals bring significant value to the table in terms of superior operations for internal and external customers
- It is challenging to install and operate ITS under the umbrella of civil engineering/public works environment (bidding, contracts management, construction, etc.)
- Communications upgrade brings options to expand the system and support future growth
- RCOC to leverage this public-private-partnership with AT&T to maximize available funds for deployment and reinvest in to their system more efficiently
- The anticipated operational cost for communications maintenance is much lower than the current system and frees cash to perform other maintenance and/or new capital improvements

- The upgrade also established a greater level of security for critical systems that need to be sheltered from public view and route through AT&T network.
- With the deployment of leased 4G cellular services, the system will be able to achieve high level of bandwidth to support multiple applications from a single traffic signal

- An upgraded communication system will provide RCOC improved adaptive signal system efficiencies including reduced system down time and improve user delay cost on the roadway.

- It will help support partnerships with internal and external stakeholders including first responders, neighboring counties, and MDOT to provide real-time camera feeds when responding to incidents.
- The deployment provides RCOC enhanced virtual security for the entire system.

- Staff can maintain systems from the office and make changes remotely to use their time efficiently.
- The installation will provide flexibility of installing new devices quickly, timely and with minimal effort.
- First local community to transition signal system to a leased wireless network.