TRANSPORTATION SAFETY ADVANCEMENT GROUP
Promoting Technology for Public Safety

TMC-PSAP Data Integration White Paper

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A Community of Transportation Professionals

Pat Noyes & Associates

TMC-PSAP Data Integration
White Paper

Introduction

Traffic or transportation management centers (TMC) are the heart of operations for most transportation agencies. They monitor and evaluate conditions on the transportation system through cameras, detectors, and other instrumentation, and they operate the system through traffic control and information distribution. TMCs often provide communication and dispatching functions for maintenance and service patrols to clear debris, respond to stranded vehicles, or support traffic incident management (TIM). Public safety answering points (PSAP) are the communication centers for public safety response agencies, receiving 911 calls, dispatching responders and resources, and monitoring incident communications. The TMC and PSAP functions together provide communications, data, resources, and situational awareness functions for incidents; however, there is minimal coordination and integration of these centers in ways that can enhance and support incident response most effectively. They each use communication and data systems; TMCs generally run advanced traffic management systems (ATMS) and PSAPs run computer-aided dispatch (CAD) systems, that are rarely integrated to share data and enhance agency efficiency and response effectiveness. This paper looks at the opportunities for integrating TMCs and PSAPs, examples of integration initiatives, and the benefits and challenges of integration.

Types of Integration

TMC-PSAP integration may include physical integration of agencies and functions through colocation of centers, voice integration through radio and cellular communication, and integration of data through data feeds and data sharing across systems. Each of these can occur to different degrees and each provides its own set of opportunities and challenges.

Colocation

Colocation of PSAPs and TMCs provides an opportunity to increase communication and build cooperation and coordination between transportation and public safety agencies. Colocation has been implemented at the local, regional, and state levels with varying levels of effectiveness. In some cases, the TMC is located in the same building as the state patrol with the intention to bring transportation operators and law enforcement together for enhanced coordination and to build relationships across the two agency cultures. In some cases, the two agencies simply function in the same building, on the same floor, or in a shared operations room. Physical proximity of agency personnel provides opportunities for interaction and information sharing. Without the proper space configuration and an environment conducive to information exchange, the effectiveness of colocation varies a great deal (USDOT FHWA, 2019).

Voice integration

Voice integration between centers can include radio and telephone integration. Some agencies establish shared radio frequencies for incident information exchange and communication. Cellular communication through shared networks with the opportunity to provide priority to incident responders is in place between agencies through various cellular providers. FirstNet is an independent authority within the United States Department of Commerce's National Telecommunications and Information Administration (NTIA) with a mission to ensure the building, deployment, and operation of a nationwide broadband network for emergency response. FirstNet was developed to support high-speed, wireless broadband voice and data sharing with priority communications among first responders. These are all helpful to improved, timely communication and shared information on incidents across agencies.

Data integration

Data integration between TMCs and PSAPs can provide faster notification of incidents automatically from the CAD system to the ATMS. This integration can occur at several levels of complexity, from automated incident alerts, to event record sharing, to event data integration, as discussed below.

Incident alerts

Automating incident alerts from the PSAP CAD system to the TMC can reduce the time and workload associated with activating traveler information and notifications on dynamic message signs (DMS) and 511 services. Alerts to motorists can reduce incident-related congestion and secondary crashes. In 2016, the Clearfield County 911 Coordinator proposed to the Pennsylvania Department of Transportation's (PennDOT) regional TMC that by establishing a direct connection between the 911 Center and the TMC they could decrease notification and reaction time and improve safety on the highways. A microwave antenna was installed on the roof of the TMC to provide a direct data connection between the centers to allow traffic control specialists to see 911 events as they are created in the CAD system. Since this initial pilot program, PennDOT has expanded the program to include additional county PSAPs in the region, with plans to expand to statewide in the future (Pennsylvania Department of Transportation, 2019).

View event record

Providing a one-way data feed from a CAD system to an ATMS provides more information than just an alert. The ability to view event record data in the TMC can improve situational awareness for TMC operators and allow them to pass that information to units in the field, such as service patrols or maintenance units. New Hampshire DOT receives a filtered feed from the NH State Police center through a CAD system interface that feeds directly into the ATMS. Information is translated from CAD codes into ATMS event fields, stripping fields with sensitive information (Heller, 2017).

Merge event records

The notification and one-way data feeds discussed above reduce the time and workload associated with notifying the TMC of roadway incidents. These generally occur through event

records fed from the CAD system to the ATMS. Often, a TMC with cameras, detection devices, and dispatchers talking to field units will have generated its own event record as an incident is detected. The ability to merge CAD and ATMS event records can reduce work effort associated with entering data and the duplication of records for a single event in the ATMS. Minnesota DOT (MNDOT) has implemented this capability in their system to allow single records to be generated from TMC and ATMS records. More information is provided below on the MNDOT system.

Two-way integration

Full two-way integration would enable PSAP and TMC personnel to automatically access event data generated by operators in each center. This would include real-time data sharing between a PSAP CAD system and an ATMS or TMC system; the automatic flow of event data between systems, including updates to event information; and the ability of PSAP call takers and TMC operators to initiate event records in their systems. It would also provide the opportunity to merge events as needed to simplify event tracking. A fully integrated system would provide a single source for event data and allow public safety and transportation agencies to access the data for operational and planning analysis. Such integration would maximize information sharing and coordination between PSAPs and TMCs. It is also the most complex form of integration and faces numerous challenges, many of them are discussed in the Challenges section below.

Examples of Integration Applications

To appreciate the range of approaches, successes, and challenges in integrating TMCs and PSAPs, it is helpful to look at examples from different agencies. The following five examples look at statewide integration, regional or district-level integration within a state DOT, integration with state police CAD systems and with local agency CAD systems, and a cross-border, international application. In each example, the impetus and evolution of the integration have occurred in different ways and point to some of the benefits and the challenges that must be addressed to effectively integrate TMCs and PSAPs.

Florida Highway Patrol and SunGuide Integration

Florida DOT's SunGuide Software is an advanced traffic management system (ATMS) developed inhouse starting in 2003. It enables TMC operators to manage multiple subsystems to support highway operations, including traffic incident management. The initial release was deployed in 2005 and integration with the Florida Highway Patrol's (FHP) CAD system was added in 2009. This integration provides a one-way feed from the FHP CAD system to SunGuide and the TMC operators, enhancing incident notification and information. (Florida Department of Transportation, n.d.)

The original Concept of Operations for Florida Highway Patrol Computer-aided Dispatch Data in SunGuide Software (FDOT SunGuide, 2009) provides an illustration of the interface between FHP CAD and SunGuide, shown in Figure 1.

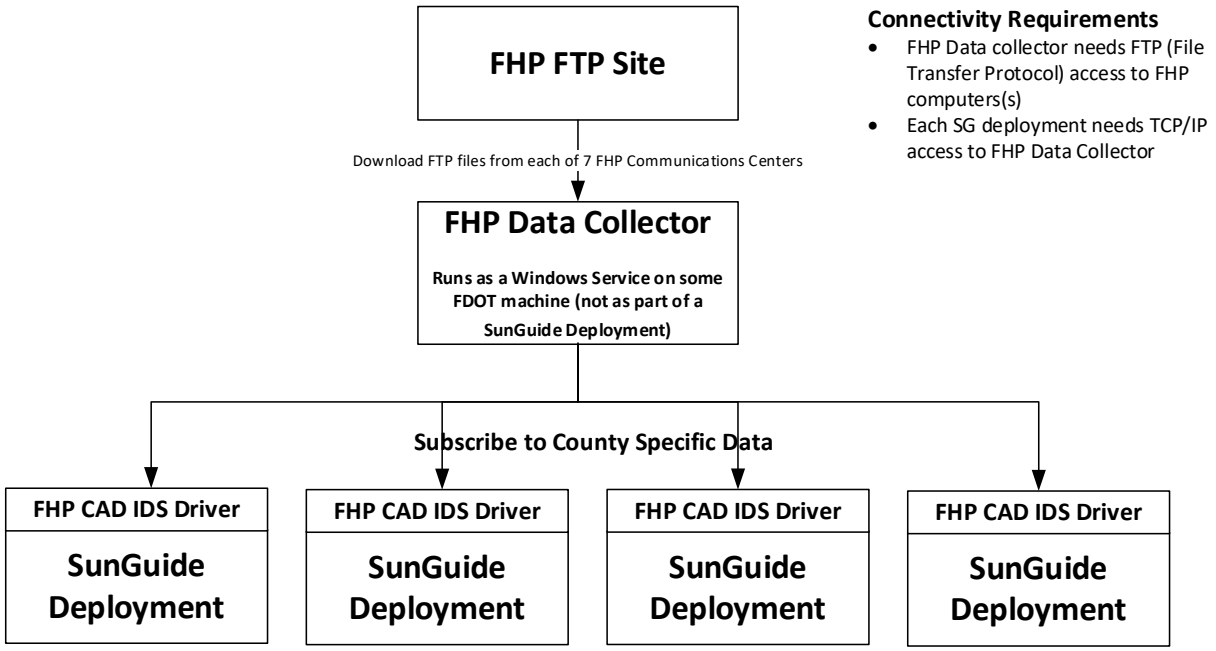

Figure 1: FHP CAD Interface Implementation Concept (FDOT SunGuide, 2009)

FDOT has eight primary TMCs and several smaller ones. Most of the TMCs are colocated with FHP and all of them are integrated with the FHP CAD system. There is not system-level voice integration between FHP and FDOT but the TMC operators have radio communication with FDOT Road Rangers, FDOT's freeway service patrol. FHP CAD data flows into a centralized, statewide database that is integrated with FDOT's SunGuide. Additionally, two FDOT districts are currently pursuing integration with local PSAP CAD systems. As one of the earliest deployments of ATMS-CAD system data integration, SunGuide benefitted from early knowledge of events on their roadways prior to current levels of instrumentation and detection devices. The CAD data continues to provide early notification of incidents on roadways without instrumentation. The greatest benefit to FDOT is early, high quality, reliable data.

SunGuide receives limited, filtered event data from the CAD, presented to TMC operators on their work screen. Operators can accept it as a valid event and turn the information into a SunGuide event. Data is filtered on event type, mostly crashes, and some information is stripped out for privacy. Each CAD event has a unique identifier and each SunGuide event has an identifier. These two identifiers can be tied together in the SunGuide database. FHP also assigns case numbers to its records. These have been harder to correlate and there are discussions at FDOT about how to tie these to the events.

Virginia Department of Transportation Realtime Traffic Incident Management Information System

The Virginia Department of Transportation (VDOT) has five Operations Regions. The Northern Operations Region Traffic Operations Center (TOC) is colocated with the Fairfax County PSAP and

the Department of State Police (VSP), providing an opportunity to talk across organizations and leading to better relationships between agencies and personnel. It also provides an opportunity to work closely during large events that impact the transportation system. The VDOT Safety Service Patrol (SSP) has a shared frequency with VSP, supporting coordination on freeways covered by SSP. TOC operators receive a view only data feed from VSP that can be transcribed into the TOC's system as a new event. The new event maintains the VSP identifier but cannot be merged directly into the ATMS. The feed is one-way and events created in ATMS do not feed to the VSP CAD system. Notification of events that are detected by the TOC or called in by SSP are provided to the VSP PSAP in person or by phone. In addition to the feed from VSP, the Fairfax County PSAP also provides a data feed to the ATMS. The TOC is working with Prince William and Loudoun Counties to bring their event data into the ATMS. The goal is to obtain CAD data feeds from all the counties and cities in the region. Issues with sensitive information have been a concern and VDOT and public safety response agencies are working together to ensure that adequate filters are in place to limit the data in the feed.

The benefits of integration experienced by the local response agencies include the ability to reach more of the traveling public in the region by combining information across the region and providing that through VDOT's public information services. Integration has also improved VDOT's maintenance response on secondary and county roads by providing TOC operators with timely incident information. One of the main challenges to bringing more local agencies online is the cultural difference in different areas of the state. VDOT is working to address concerns with sensitive information and build trust between agencies. By expanding integration with more local PSAPs, VDOT is working to improve response and enhance public information.

Minnesota Department of Transportation RTMC-MSP CAD Integration

Minnesota Department of Transportation's (MnDOT) Traffic Management Center (TMC) has a goal of "awareness of every incident on the metro freeway system." This includes crashes, stalls, debris on the road, fires, and anything else that can impact the flow of traffic. They are dedicated to pinning it down on a camera within 20 seconds of dispatch and initiating a triage process that includes sending the Freeway Incident Response Safety Team (FIRST) service patrol, deploying overhead signs, and working with the Minnesota State Patrol (MSP) dispatch to verify incident locations. Incident awareness comes through monitoring cameras, MSP dispatch radio, and through the MSP CAD system. Since 2002, the TMC, Maintenance, and the MN State Patrol dispatch have been colocated with a shared operational floor at the Regional Transportation Management Center (RTMC), seen in Figure 2.

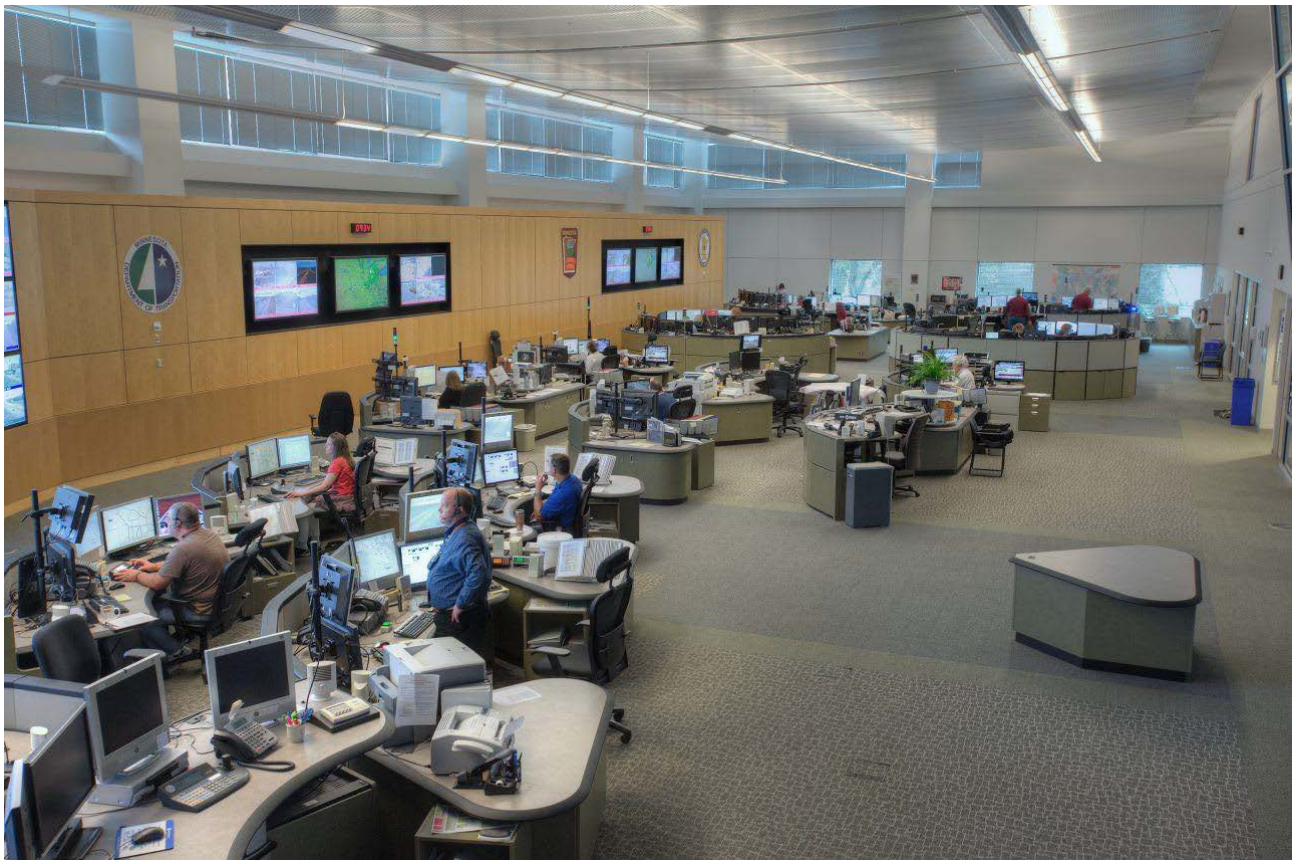

Figure 2: RTMC Dispatch Floor (McClellan, 2017)

The TMC data gathering effort started as early as 1993, with TMC operators entering data in a relational database. In 2001, the TMC received access to an MSP CAD console on which they could view MSP events as read-only. In 2008, the TMC became fully integrated with the MSP Hexagon-Intergraph CAD system, allowing TMC and FIRST operators to create events as well as use MSP events for joint response. The TMC was able to continue gathering important benchmarks, such as lanes and road clearance times and the time it takes for the tow truck arrived. For FIRST, they were able to record the assistance provided: gas, tire change, jump start, and pushing a vehicle out of the lane.

TMC operators receive a linked copy of all traffic related events created by MSP dispatchers that includes location, event type, remarks, and related incident times. TMC and FIRST operators can create their own events for crashes, stalls, and other events that MSP is not responding to. These TMC events can be merged with MSP events as needed for continuity. To address privacy issues, the TMC is firewalled off from law enforcement databases to restrict access to private information. MSP criminal justice information CAD entries are encrypted and unreadable, whereas TMC entries are clear text and readable.

The RTMC uses CAD data to support real-time incident management through shared awareness, eliminating duplicate record and data entry, and increasing interagency coordination with MSP 911. Calls to MSP make up more than two-thirds of the TMC CAD events. Additional functionality is

enabled through a module purchased in 2014 that allows a clear text XML output from CAD that can be ingested by the ATMS software IRIS, RTMC's open source software developed in-house. It also pushes data to the CARS511 and IRIS public feeds.

The process of moving from a view-only CAD workstation in the TMC to the current level of integration took almost 5 years. Key milestones included colocation of the TMC and MSP in the RTMC in 2002, and the joint decision between MSP and MNDOT to allow integration of TMC events in 2007, with a goal of it being in place before the 2008 Republican National Convention. In 2008, MnDOT and MSP signed an Interagency Agreement to share data between their systems to enable MnDOT to assist MSP in executing its mission to "provide for the safe, efficient movement of traffic on Minnesota's roadways" (Minnesota Department of Transportation, 2008).

Deployment has benefited from the positive relationship between MnDOT and the Department of Public Safety through over 20 years of TIM committee interaction. CAD integration greatly benefits the interaction between the FIRST units and troopers and has allowed FIRST to take on greater responsibilities such as impounding abandoned vehicles. The efficiency gained through using Patrol events allowed the TMC's coverage area to increase over fivefold (by lane miles, number of cameras, and number of overhead signs) while remaining with the same staff complement for the past 20 years. Overall, the leveraging of TMC expert staff and equipment with public safety/911 dispatch has benefited the public with quicker and more efficient emergency response to those in need, which also reduces incident duration time, which leads to less incident-caused congestion and potential for secondary incidents.

Maryland Department of Transportation, Frederick TMC

The Maryland Department of Transportation (MDOT) has a Statewide Operations Center and three regional centers. Two of the regional centers are colocated with law enforcement. The Frederick center is colocated in the Frederick County Law Enforcement Center with Maryland State Police (MSP) and the Frederick County PSAP for local response agencies, located on the same operations floor. In the other two locations, MSP and MDOT are not located in the same rooms, which limits communication between agencies. Colocation in the same room enhances communication and allows operators to confirm information across agencies.

Communication between agencies is supported through the Maryland First 700 MHz radio system. MDOT, MSP, and some local agencies have radio access on the system and those agencies that do not can be patched. In 2016, MDOT and MSP signed an MOU that gave TMC operators direct access to County CAD data in the Frederick Center. The primary goal of the initiative was to improve notification and TMC situational awareness of incidents and events on the highway system. The live feed also saved a phone call from MSP to the TMC to notify them of an incident on the highway, as required by agreement between the two agencies. The ATMS could see external event records and import data directly into an event record in the system. The records in both systems were linked and ATMS records could be updated in a one-way link from the CAD to the ATMS. MSP gave direct access to the Frederick Center with predefined areas of responsibility, geography, and type. Problems with the traffic-related filter and the ability to hide certain fields created concerns with sensitive data being provided to the ATMS. Changes needed to the feed

required work outside the existing contract with the CAD vendor, and funding and contracting mechanisms were not available to address these needs. Due to these issues, the event feed to the ATMS is no longer live.

MDOT is also working to integrate MDOT and CAD data statewide. In 2018, an MOU was finalized between MDOT State Highway Administration (SHA), Maryland Transportation Authority (MDTA), Maryland Transit Administration (MTA), MSP, and the Department of Natural Resources (DNR) to establish an interface between the Maryland Statewide CAD system and the SHA Coordinated Highways Action Response Team (CHART) to retrieve and display non-criminal incident data for traffic related incidents. The purpose of the MOU was to enhance situational awareness and improve the speed of agency response. MDOT and allied agencies continue to work through issues with sensitive information being distributed through the feed.

The Niagara International Transportation Technology Coalition

The Niagara International Transportation Technology Coalition (NITTEC) is celebrating 25 years as a binational organization formed to facilitate coordinated regional transportation and address delays at the US/Canadian border in western New York State and southern Ontario. NITTEC is a multi-agency coalition with five policy members, nine general members, and 28 affiliate members representing transportation agencies, public safety, border enforcement, emergency services, and recovery in US and Canada. Their mission is “to improve mobility, reliability and safety on the regional bi-national multimodal transportation network through information sharing and coordinated management of operations.” NITTEC coordinates centralized, 24/7 operations and traffic management services for the bi-national region, including incident management, traffic operations, and traveler information.

In 2006, NITTEC envisioned an integrated system between the Erie County CAD system with the NITTEC ATMS to share information pertinent to the responsibilities of NITTEC and public safety responders. It was based on a center-to-center controller between the two systems to selectively distribute event messages filtered by type and location. Figure 3 illustrates the flow of information between the two systems through the Intelligent Information Integration Broker (I3B). Erie County public safety was interested in incidents detected through the NITTEC traffic operation center’s (TOC) cameras and information in the ATMS related to maintenance and construction information. Information about the nature, location, and schedule of closures and restrictions was important for response vehicle routing. NITTEC’s TOC was interested in notification of events on or near the expressway system and information pertinent to their management (Dynamics, 2006).

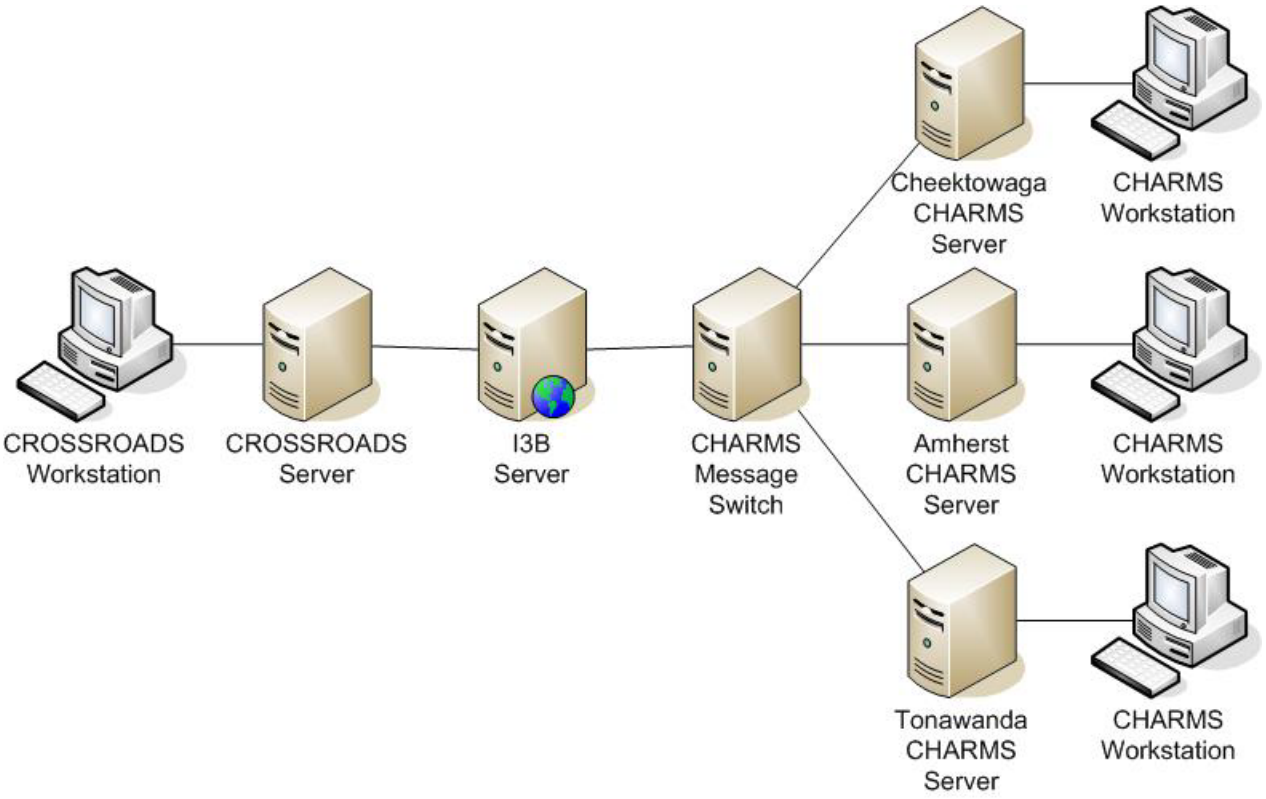

Figure 3: NITTEC Integrated System Configuration (Dynamics, 2006)

Today, NITTEC runs a TOC for western New York with center-to-center communications with partners in eastern Ontario, Canada. It operates intelligent transportation system (ITS) devices owned by its partner agencies and supports multiple committees, including a TIM Committee that meets monthly. NITTEC also facilitates TIM training programs to improve coordination, integration, and implementation of effective incident management processes. The TOC is colocated with the transit agency but not with any public safety entities. NITTEC has center-to-center communication with the Erie County Central Police System, which automatically sends traffic-related events from the CAD system to the ATMS. Communications are one-way from CAD to the ATMS. The ATMS also receives data from the Ontario Ministry of Transportation across the border. NITTEC is currently looking at updating the integration of CAD and ATMS data. The updates will bring in more local agencies and provide two-way data exchange.

The benefits of the current system are getting information faster and getting more information. It allows the TOC to get equipment to the incident faster, implement quick clearance, and work more effectively with tow operators. Public safety responders in the region are open to data and information sharing, as they have seen advantages during weather events and incidents. As a coordinating entity that facilitates communication across agencies, public safety agencies have learned that just one call to the NITTEC TOC initiates resource and traffic management support.

Potential Benefits

TMC-PSAP integration at any level provides enormous benefits to both the DOT and public safety agencies. Some of the benefits have been discussed in the example applications above. The following is a list of potential benefits agencies can derive from integrating centers and their systems.

Faster notification of incidents

The most commonly experienced benefit of integration is faster notification of incidents. For TMCs with limited instrumentation such as cameras, event notifications from state or local PSAPs provide quick, reliable notification of incidents on the highway system. These can be automated through CAD to ATMS feeds or can be more informal through voice or in-person notifications in colocated facilities. Notification from TMC operators to PSAPs can also inform public safety agencies of incidents detected through DOT instrumentation in a similar manner, through event record sharing and alerts, voice communication, or in-person.

Improved incident response and quicker clearance

Faster notification and more reliable incident information based on incident responder updates can improve incident response and quicker clearance, improving safety for responders and the traveling public. Quick clearance reduces incident-related congestion and backups, which also improves safety by reducing the potential for secondary crashes.

Reduced workload/time through automation

Each level of integration and improved communication improves efficiency. Automated notifications between centers can also save staff time and workload associated with phone calls, emails, or other notifications of incidents. Systems that import records between CAD and ATMS, or allow records to be merged, can also reduce workload and improve record accuracy through automated data input and sharing.

Enhanced situational awareness

Integration of information between TMCs and PSAPs can enhance situational awareness for all agencies. TMCs can provide information from their cameras, detectors, and field units through event records shared from their systems to PSAPs. Public safety responders provide incident information and updates to their PSAPs, which then update their event records that are shared with the TMC and included in geographic information system (GIS) mapping. Colocation allows interagency communication and coordination at the center that supports DOT field units and public safety responders, providing additional incident information.

Enhanced access to resources

Timely and reliable information can support better resource allocation through quicker notification to all agencies and more specific information about the type of incident, location, extent of impact to the system, and special resource needs. With the availability of critical incident information, the DOT can support public safety responders with service patrol vehicles and personnel, maintenance resources, and traffic control and diversion techniques. This can reduce the exposure of first

responders on scene, reduce impacts to the traveling public, effectively allocate resources, and improve patient outcomes.

Improved communications and coordination

By sharing incident information across agencies as it becomes available, communications and coordination between the DOT and public safety agencies is enhanced. Timely data and updates from incident responders can be shared from the PSAP to the TMC through event record updates and face-to-face communications in a colocated center. This also supports enhanced relationships across agencies with different missions and cultures, creating a more collaborative environment for managing incidents.

Improved data for DOT operations and planning

Sharing incident data in real-time from CAD to an ATMS allows TMCs to track, analyze, and evaluate the impacts of incidents and incident response on the transportation system. The TMC uses ATMS software to manage and operate the transportation system and CAD data can provide a real-time source for incident data and analysis, improve data to populate traveler information systems, and support system planning and investment decisions. The data can be used to identify locations and conditions that would benefit from safety projects or ITS deployments, it can help determine trends in incidents and the effectiveness of incident response and operational strategies, and it can support real-time decision making to enhance system safety and reliability.

Challenges

There are numerous challenges to implementing TMC-PSAP integration. Challenges exist in working across agencies and systems, and the challenges become more complex as the level of integration is increased. This section discusses some of the more common challenges.

System integration

Statewide or regional integration between TMCs and PSAPS often includes multiple agencies with multiple centers (TMCs and PSAPs). Particularly with PSAPs, there are state patrol/police PSAPs and county or city local public safety communications centers; and for transportation agencies there may be both State and local TMCs. Full integration between transportation and public safety operations and communications requires integration of multiple agencies, multiple centers, and multiple systems. This generally requires implementation of a centralized data hub that can import, analyze, filter, and export data needed by the different partner agencies. Starting with a filtered feed from the state patrol CAD system to the state TMC is the least complex. To include fire-rescue, EMS, and local law enforcement data in the system increases the complexity. Effective integration requires leadership, formal processes, and standards.

Data integration is challenged by the use of different systems, often commercial and proprietary, collecting and storing different data fields for different needs and applications. Bringing the data together usually requires changes to the system and the data configuration to align fields and filter

data to limit sensitive information. This takes strong partnerships between agencies and coordination with system vendors.

Information overload

The purpose of system integration is to simplify and streamline the flow of information through the automation of data sharing. If this is not done effectively, TMC operators may experience the additional information as a challenge and a monitoring activity in addition to monitoring system cameras, detectors, ITS devices, radio communication with service patrol and other field units, and phone calls from staff, other agencies, and DOT customers. PSAP-generated alerts and data sent to TMC operators should be designed to enhance situational awareness and simplify, rather than complicate, operator actions (USDOT FHWA, 2019).

Data security and sensitivity

Anytime data is shared across systems there are concerns with data security. This is particularly important when the source records in Public Safety CAD systems include personally identifiable information (PII). Because these agencies are also connected with Criminal Justice Information Systems, care must be taken to shield crime, intelligence, and similar sensitive data. Similarly, certain health and medical information about individuals is protected by the Health Insurance Portability and Accountability Act (HIPAA) and should also be considered sensitive. Integration of TMC and PSAP systems must address data and system security issues in a way that ensures that sensitive information, such as criminal activity and personally identifiable information, is stripped from the record prior to TMC access, or hidden behind a firewall.

Interagency resistance to integration

The agencies that have been most successful in integrating TMCs and PSAPs have been those with a shared appreciation for the opportunities provided through enhanced coordination and communication through integration. Cultural differences and trust issues between transportation and public safety agencies must be understood and addressed in order to advance center-to-center integration. Much of the resistance comes from a lack of understanding of benefits integration offers and of the shared objectives between agencies. Each agency has its mission and culture, creating different perspectives and objectives in their management of incidents and incident information. Data requirements and data sensitivity, as well as the purpose and need for data collection, vary across agencies. Understanding the variations is essential to addressing the different needs for partner agencies in center integration. Issues of data governance, data retention, and responses to Freedom of Information Act data requests require clear policies and agreements.

Practice scenarios and drills are extremely helpful in bringing different agency cultures together to prepare participants for real incidents when they occur. It is also important that all agencies involved in integration follow nationally adopted incident management principles (NIMS) to establish a clear chain of command and common terminology in their response and communications.

Resources

Costs associated with TMC-PSAP integration are often a challenge to implementation. It is common to have expenses associated with system add-ons or changes to accommodate the sharing of data from the CAD system to the ATMS or vice versa. There are costs associated with data hubs used for the extraction, analysis, and sharing of data between systems, and for communications upgrades for data sharing. Colocation requires new or reconfigured facilities to accommodate all participating agencies. The cost of these investments may fall upon one agency or be shared across participating agencies. If changes are needed to the CAD system to accommodate data sharing and the DOT is willing to provide funding, there may be contracting complications across agencies that limit the ability to complete the changes.

Staffing to support integration is another important resource to consider. New applications and data integration often require additional staff capabilities for one or more agencies. These need for additional resources or capabilities can limit the effectiveness of integration or create additional costs.

TSAG Recommendations

There is a growing interest in TMC-PSAP integration to support multiagency communication, coordination, and data sharing. To support the advancement and implementation of integration, TSAG recommends that the USDOT develop a pilot program to support agencies interested in integration. This would include technical, institutional, and funding support to allow agencies currently integrating systems to expand their efforts and to allow agencies that have not yet initiated TMC-PSAP integration to explore opportunities to do so.

Additional research on the benefits of TMC-PSAP integration would support the development of a business case for integration, identifying the opportunities, and would address the common challenges faced by agencies interested in center-to-center integration. Opportunities to expand the use of incident data to support initiatives such as AACN pilots, connected vehicle data integration, and connected responder applications should be explored to maximize the return on investment in the integration and sharing of data across agencies.

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