

Regional Transportation Management Center Co-location White Paper

Prepared By

**ITS Florida
TMC Co-location Task Force**



Prepared For

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Executive Summary

Overview

As Intelligent Transportation System (ITS) infrastructures are built within major metropolitan areas throughout the nation, Transportation Management Centers (TMCs) play an increasingly critical role in ensuring that these deployments are well managed and are successful in achieving their intended goals and objectives. Within the State of Florida, there are currently 22 TMCs in the planning, design, construction or operations phase. As can be expected, there appears to be an excellent opportunity to realize capital, operating and maintenance cost savings by co-locating two or more agencies within these new facilities. Furthermore, co-location of TMC partners would enhance integrated operations, particularly when there is sufficient co-dependency among the agencies. While physical co-location may achieve significant savings, “*virtual linkages*” may also achieve similar operational efficiencies.

TMC Workshop

The ITS Florida TMC Co-location Task Force conducted a one-day workshop on June 21, 2005 to debate the issues associated with co-location with the intent of developing recommendations to present to the ITS Florida Advisory Council. The participants in this workshop included representatives of various Florida Department of Transportation (FDOT) Districts, Counties, Florida Highway Patrol (FHP), Emergency Management and Task Force members. The purpose of this white paper is to weigh the advantages and disadvantages of co-location for multi-agency, multi-jurisdictional partners within these TMCs to:

- Improve the efficiency of traffic, incident, emergency and transit management;
- Provide real-time, useful and timely information so travelers can make smart travel choices;
- Yield construction, operations and maintenance cost savings; and
- Assist in the provision of all governmental services that depend on the surface transportation infrastructure to accomplish their mission.

Recommendations

In general, it was agreed that “*people, systems and operational integration*” are precursors to successful physical co-location. It is also understood that many agencies are willing to share information but will only do so without relinquishing control. Although physical co-location does not necessarily apply to every region, the opportunities for success are enhanced by accomplishing the following:

- Comparing mission statements of each partner to determine consistency and mutual dependencies;
- Establishing the degree of need for face-to-face interaction and cooperation among partners;
- Selecting a TMC Champion to provide multi-agency leadership;
- Developing a Concept of Operations inclusive of funding participation;
- Facilitating people integration at all levels among the TMC partners;
- Defining, measuring and achieving TMC performance measures;
- Providing fiscal savings in terms of construction and recurring operations & maintenance costs;
- Using performance measures to support public recognition of benefits; and
- Providing useful, timely and accurate data to make better and faster decisions.

It is recommended that the lead agency sponsoring the TMC project initiate the aforementioned suggestions beginning at the early stages of project development.

Summary

In summary, TMC co-location does not apply to every region. In certain cases, only virtual linkages will be achievable in providing measurable improvements in the capabilities associated with ITS deployment. A successful TMC needs to deliver “*win-win*” results. The guidelines presented herein should be considered in determining where co-location would be successful.

1. Introduction

In recent years, the State of Florida has emerged as a national leader in ITS deployment. An important component of the ITS programs is the development of TMCs to serve as command and control centers for these infrastructures. A summary of the TMCs, their status and partners is summarized below.

Summary of TMCs within Florida

FDOT District 1		
Collier County TMC	Under Construction	Collier County Transportation
Fort Myers TMC	Preliminary Design	FDOT, FHP, Motor Carrier Compliance
Manatee County TMC	Preliminary Design	FDOT, Cities, County
FDOT District 2		
Jacksonville TMC	Operational	FDOT (Existing District 2 TMC)
Jacksonville TMC	Preliminary Design	FDOT, JTA, FHP, 511, Fire, Rescue, Sheriff
Gainesville TMC	Pre-Planning	FDOT, Alachua County, Gainesville Signals
FDOT District 3		
Pensacola TMC	Pre-Planning	FDOT, City of Pensacola Signals
Tallahassee TMC	Pre-Planning	FDOT, City of Tallahassee Signals
FDOT District 4		
Broward SunGuide TMC	Operational	FDOT, BCTED, BCT, FHP
Palm Beach ITMS TMO	Operational	FDOT (To be replaced after I-95 Construction)
Palm Beach TMC	Under Construction	FDOT, Palm Beach County Traffic Engineering
Northern Counties TMC	Planning	FDOT, Other State Partners
FDOT District 5		
Orlando SunGuide TMC	Operational	FDOT, FHP, FDLE, OOCEA, 511
FDOT District 6		
FDOT 6 SunGuide TMC	Operational	FDOT, FHP, 511, Security
MDX TMC	Pre-Planning	MDX ITS, MDX Toll Ops, MDX Info Systems
Miami-Dade Traffic TMC	Pre-Planning	ATMS, Others (e.g., Miami-Dade Transit)
FDOT District 7		
Tampa SunGuide TMC	Under Construction	FDOT, FHP
THCEA TMC	Under Construction	Tampa-Hillsboro Expressway Authority, City
Hillsborough County TMC	Preliminary Design	County Signals, Sheriff, Traffic, Port, HARTline
Pinellas County TMC	Pre-Planning	Pinellas County, St. Petersburg, Clearwater
Florida Turnpike		
Pompano Beach TMC	Operational	Florida Turnpike Enterprise (Expansion)
Turkey Lake TMC	Operational	Florida Turnpike Enterprise

The FDOT and FHP have a Memorandum of Understanding that encourages TMC co-location. During the fall of 2004, Mark Reichert, of the Florida Transportation Commission, prepared a position statement regarding TMC co-location. This was followed by a paper prepared for the FDOT by PBS&J entitled “*Florida’s Transportation Management Centers and Co-location*”.

The ITS Florida Advisory Council organized a task force to review this paper and develop recommendations regarding TMC co-location. The task force members met with other potential TMC partner agencies on June 21, 2005 to address the issues associated with co-location with the intent of developing recommendations to present to the ITS Florida Advisory Council. This white paper presents the results of the workshop.

2. *Workshop Discussion*

Summary highlights of the discussions that occurred during the workshop are presented below:

- **Mission Statements** – Development of TMCs need to understand and compare the consistency and interdependencies of various mission statements of potential TMC partners.
- **Desire for Co-location** – Development of TMCs need to establish the desire for physical co-location of partners at the executive, management and operations levels.
- **People Integration** – Development of TMCs need commitment from management, as well as agency staff of partnering agencies, to work in a collaborative manner in achieving the shared mission statement of the TMC.
- **Redundancy** – Development of TMCs need to consider redundancy as part of the Concept of Operations to address emergency situations.
- **Systems Engineering Process** – The Systems Engineering Process should be utilized in guiding co-location decisions of TMC partners. Applying the systems engineering process to address the requirements of the various partners is very complex, particularly in sharing data and dispatching systems. Ideally, it is a process that should be applied at the beginning of any TMC development cycle. The same process can be applied to existing agency operations in order to assess “co-location” versus “virtual linkages” and then to support the integration of agency operations.
- **Performance Measures** – FDOT’s performance measures related to incident response, travel time reliability and customer satisfaction should be used, as well as others, to gauge the success of TMC co-location. Similarly, the measures of success utilized by potential partners need to be examined to assess the impact of co-location.
- **Timely Decisions** – Selection of TMC partners should consider the importance of jointly making timely decisions among partnering agencies pertaining to incident, traffic, transit and emergency management and other municipal services as well as dissemination of real-time traveler information.
- **Working Relationships** – Decisions to relocate operational staff away from potential partners’ existing facilities to the TMC needs to consider the tradeoffs associated with reducing their current face-to-face interaction among current partners within the same agency.
- **Synergy** – TMC co-location should result in synergy where the “*whole is greater than the sum of its parts*”.
- **National Incident Management System (NIMS)** – As the NIMS program is implemented in the near future, the Incident Command System needs to be incorporated at all levels of operation for each partnering agency to address such issues as span of control, planning and logistics, timely decision-making, and incident management of multiple events.
- **Funding Commitments** – Partnering agencies need to secure funding commitments to support their share of recurring operations and maintenance expenses as well as initial design and construction costs.
- **TMC Design Compromises** – Design of the TMC needs to be sensitive to the needs of each partner in terms of making compromise decisions regarding the layout of the control room, video wall display system, computer room, security systems and other parts of the facility. A balance between the specific needs of each of the partner agencies needs to be established.

- **Build It and They Will Come** – There is some merit in over-sizing the facility in order to accommodate future partners (e.g., homeland security, transit, 511) that were not included during its initial development.
- **Function Before Form** – Architectural / Engineering design efforts should begin with a thorough analysis of programming requirements, then finalize the facility design based on function as first priority and aesthetics as a lesser priority.
- **Make Partners Look Good** – TMC partners need to be sensitive to making their partners look good as well as their own operations. This will improve multi-agency, multi-jurisdictional relationships as well as achieving shared TMC performance measures.
- **Sharing Information** – Success of TMC co-location is largely dependent on sharing information to improve the decision support process for all partnering agencies. This needs to be accomplished without partners relinquishing control. There is a need to develop procedures to facilitate the efficient yet controlled sharing of data, video and voice functions among the partners (e.g., employing special signal timing plans along diversion routes). This will require mutually agreeable database management, mining and access control processes, a hierarchy of video access and control and standardized voice procedures for joint-use communications networks.
- **More Than a Physical Presence** – Complete TMC co-location should be more than a physical presence. TMC co-location needs to foster better communication among partners and integration of systems to achieve maximum benefits.
- **Flexible Growth** – TMCs should be flexible in expanding to accommodate growth in term of additional agency staff to be assigned to the building as well as additional systems. A system of virtual connections needs to be capable of expanding its communications network (i.e., voice and data) and database size and processes to accommodate inclusion of other agencies. For example, the Atlanta TMC was initially conceived as a two-story building. The third and fourth floors were added to accommodate Georgia DOT Traffic Operations staff. Several TMCs have included training facilities within the TMC building as a way of outreaching to other units within DOT as well as other agencies who train there. A flexible design would also facilitate attracting future partners with additional funding sources (e.g., homeland security).
- **System Speed** – Development of TMCs need to be careful that the speed of data and video transmission to partners is not degraded by adding more complexity.
- **Private Sector Participation** – The private sector should be considered as potential partners for co-location (e.g., Information Service Providers, media, universities, data re-sellers).
- **Centralized Dispatching** – Currently, public safety centers dispatch additional equipment in both directions for highway calls and often "*dial up*" other dispatch centers to assist where boundaries exist. They have no up-to-the-minute data as to current highway conditions or best access. Minutes are lost with emergency responders delayed in traffic or responding to inaccurate 911 calls. Centralized dispatch centers are often planned independently of TMC goals and objectives. As a subset of TMC co-location, there should be planned "*virtual*" links to and from Public Safety (if they are not co-located) to provide the vital information that could reduce minutes in arrival times, improve incident management and place real-time traffic information in front of dispatchers. Public Safety Communications directors should be participants in TMC co-location efforts.

The above discussion points were used as a basis for developing an analysis process, recommendations and critical success factors for TMC co-location.

3. Analysis Process

During the course of the workshop, it was suggested that a structured analysis process be considered during the planning phase of a TMC. Specifically, the process should consider the following analysis tasks:

- Define the region.
- Who are the Potential TMC Partners?
 - What is their mission?
 - What is the relationship among the missions?
 - Identify top-level performance measures.
- Identify the value of co-location.
 - Identify capital, operating and maintenance cost savings.
 - Identify increased mission capabilities of potential partner agencies.
- Conduct trade-off analyses.
- Consensus-Building:
 - Identify institutional issues (i.e., legal, fiscal, operational, security).
 - Prepare top-level system operational concept.
 - Obtain agencies' commitment: (i.e., budgetary, legal, personnel, facility).
- Revise Concept of Operations (i.e., roles, responsibilities, operational protocols, funding, etc.).

The above process would provide guidance in the analysis and selection of potential TMC partners in accordance with system engineering principals. It would also lead to a decision as to whether or not physical co-location or virtual linkages best serves the needs of the partner agencies.

4. Recommendations

The recommendations developed as a result of the TMC Co-location Workshop are summarized below. These activities should be performed during the early stages of project development by the lead agency sponsoring the project.

- **Mission Statements** – The initial step in assessing the need for co-location among partners is to understand their mission statements (e.g., FDOT is responsible for the operation and maintenance of the state highway system). TMC co-location should focus on those partners sharing similar mission statements (e.g., Open Roads Policy, Quality of Life, Economic Prosperity) and on those potential partners (i.e., public and private) who would benefit from increased cooperation and connectivity to the TMC function. Mission statements of potential partners should be compared to determine consistency and interdependencies for co-location.
- **Purpose and Need** – The next step is to determine the purpose and need of the TMC by using the system engineering process as a guide. This assessment should consider the tradeoffs in co-location versus partial co-location or virtual linkages. Tradeoff analyses should be conducted to assess the impact of forming new partnerships through co-location versus separating existing relationships with staff in the same agency.
- **TMC Champion** – The region should identify and select an energized champion to lead the development of the TMC; to build consensus among partners; to secure the funding; to develop and implement the shared mission/vision; to develop interagency agreements; and to resolve disputes. This may be an agency-neutral person who represents the region; a FDOT-funded position; or a passionate TMC staff member.

- **Concept of Operations** – The Concept of Operations should address the specific roles and responsibilities of each TMC partner; who will be maintaining what equipment; who will be responsible for building maintenance; who is the landlord and who are the tenants; defining a dispute resolution process; what are the funding sources for each phase of design, construction, operations and maintenance; and other logistics.
- **TMC Partner Selection** – TMC partners should be selected based on the findings of the above considerations. In addition to public sector partners, private sector partners should be considered as well (e.g., Information Service Providers) in terms of how will they support the shared mission statement; the level of interaction with public sector partners; and what funding sources they bring.

In addition to the above recommendations, it is suggested that partnering sessions be conducted on a continuous basis before, during and after construction (prior to move-in) as well as on a regular basis after member staff have been re-located to the TMC. This will mitigate the potential for disputes to linger, thereby improving the partnership that is required for success.

5. Critical Success Factors

Success of TMCs should not be measured merely by how many partners are co-located into one system or facility, but rather how do these “*partnered*” TMCs produce meaningful results. The following critical success factors are recommended as the basis for a successful TMC project:

- **People Integration** – There is a need to establish people integration at the executive, management and operations levels.
- **Achieving Performance Measures** – The shared mission and vision statement among the partners should provide the basis for the defining, assessing and reporting performance measures to gauge the success of the TMC.
- **Fiscal Savings** – Co-location should yield measurable cost savings in terms of initial capital costs as well as recurring operations and maintenance costs.
- **Public Recognition of TMC Benefits** – Performance measure benefits and cost savings should be an integral component of an effective public information program regarding the TMC as part of the overall regional ITS program.
- **Better Data to Make Better Decisions** – TMCs should be re-assessed on a periodic basis to ensure the continual improvement of results. These results should generate better data to make better and faster decisions.

These critical success factors should serve as the starting point, and be re-visited on a periodic basis (e.g., annually), to ensure that TMCs are performing to their potential in accordance with its goals and objectives as well as strategic and business plans.

6. Summary

In summary, the success of TMC co-location is a complex issue that requires a structured analysis approach in order to make timely and rational decisions so as not to impede the schedules of future deployments. This white paper provides the basis for making the right decisions.

TMC Workshop Participants

The following participants attended the TMC Co-location Workshop on June 21, 2005 and contributed to the recommendations presented in this white paper.

- Bob Edelstein, TMC Co-location Task Force Chairman (DMJM Harris, Inc.)
- Peter Vega, FDOT District 2
- Dong Chen, FDOT District 4
- Steve Corbin, FDOT District 4
- Jesus Martinez, FDOT District 6
- John Easterling, Florida Turnpike Enterprise
- L.A. Griffin, Task Force Member (OOCEA)
- Chris Dellapietra, Florida Highway Patrol
- Bob Williams, Miami-Dade Public Works
- Murali Pasumarthi, Broward County Traffic Engineering
- Glen Margolis, Broward Emergency Management Administration
- Ethan Loubriel, DMJM Harris, Inc.
- Tip Franklin, Task Force Member (Viasys Services, Inc.)
- Jim Reynold, Task Force Member (PB Farradyne)
- Bob Murphy, PB Farradyne
- Blair Marsden, Kimley Horn, Inc.
- Jay Calhoun, Task Force Member (Gray Calhoun & Associates, Inc.)
- Tahira Faquir, PBS&J, Inc.

In addition, valuable input was provided by Mark Reichert (Florida Transportation Commission), Charles Wallace (ITS Florida, PB Farradyne), Mike Pietrzyk (Task Force Member – Former Chairman, TSI), Lorin Krueger (Task Force Member, LK Consultants) and K.K. Saxena (Task Force Member, Kimley Horn).