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Contributing Author

# Performance ready

## Albuquerque uses ITS to meet MAP-21 requirements

**T**he MAP-21 transportation bill approved by Congress and signed into law by President Obama on July 6, 2012, has clearly taken a giant leap forward by introducing a performance-driven approach to all aspects of transportation planning and programming activities in the U.S.

Unlike past U.S. transport policy, MAP-21 identifies national goals that direct the focus of the Federal Aid Highway Program at federal, state, rural and metropolitan transportation-planning levels. These areas include:

- Safety;
- Infrastructure condition;

- Congestion reduction;
- System reliability;
- Freight movement and economic vitality;
- Environmental sustainability; and
- Reduced project delivery times.

These goals provide direction to the bill over its two-year time frame, and specific performance-based measures and targets that mimic these areas will be established by U.S. DOT rulemaking within the first 18 months. Periodic reporting requirements applicable to states and local government entities apply, which will provide the monitoring and management context for achieving the goals designed to ensure the program has the biggest bang for the buck to improve safety and mobility for all users of the transport system.

With the new policy guidance, the challenge

is now on the transportation-planning process' ability to accommodate the changed paradigm of planning and performance management to deliver on the performance goal areas and associated measures. This article will explore how this can be done utilizing the integration of intelligent transportation systems (ITS) into the transportation-planning process at the Mid Region Metropolitan Planning Organization (MRMPO) in Albuquerque, N.M.

## ITS times 80

Inherent to an objectives-driven planning approach is the need for detailed roadway performance data such as vehicle-miles traveled, roadway speeds and travel times, incident data including response times and associated delay, travel-time reliability, etc.—essentially the roadway data and performance monitoring and management capabilities included in an integrated ITS. ITS can be considered one of the highest-value strategies to improve travel safety and to optimize flow. An archive of these data provides the foundation for performance monitoring and management activities, and clearly, a region's coordinated ITS provides the logical platform to develop the data measures needed to fulfill the MAP-21 transportation-policy directive—a point that has not gone unnoticed in the new transportation bill as it makes reference to ITS more than 80 times.

The transportation-planning process is prescribed in the federal rules as the responsibility of the metropolitan planning organization (MPO). MRMPO administers the transportation-planning process for the Albuquerque Metropolitan Planning Area (AMPA). Regional transportation priorities are identified and projects are programmed among the member agencies of the MPO using federal-aid highway funding through the short range, (and financially constrained) Transportation Improvement Program (TIP) and the long-range Metropolitan Transportation Plan (MTP). MPO responsibilities include administration of the Congestion Management Process (CMP), maintenance of the regional ITS architecture, functional classification and Highway Performance Monitoring Systems (HPMS) reporting. It is in this context that one would

**Figure 1. MRMPO's TIP development process with ITS subcommittee involvement identified.**



Source: MRMPO TIP Policy and Procedures

characterize the MPO as closest to the successful implementation of MAP-21.

The committee structure at MRMPO involves agency representation ranging from elected officials on the Metropolitan Transportation Planning Board (MTB) to the supporting technical committees composed of all levels of staff such as department heads and technical project planners, engineers, managers and the public. It is in this capacity as coordinating facilitator that MRMPO's ability and opportunity to be a central point of regional transportation-planning consensus has proven itself a powerful mechanism in the pursuit of coordinated ITS. To this end, our ITS stakeholders have involved themselves directly or indirectly at nearly all phases of project development ranging from initial project planning, project design and implementation, and finally with coordination among systems operators and data users at project completion.

MRMPO has integrated ITS into the TIP/MTP development process (Figure 1). Agencies submit projects to MRMPO for consideration. Projects are identified by type to identify primary project purpose to assist in technical assessment for programming considerations. These categories include:

- Capacity;
- Transit;

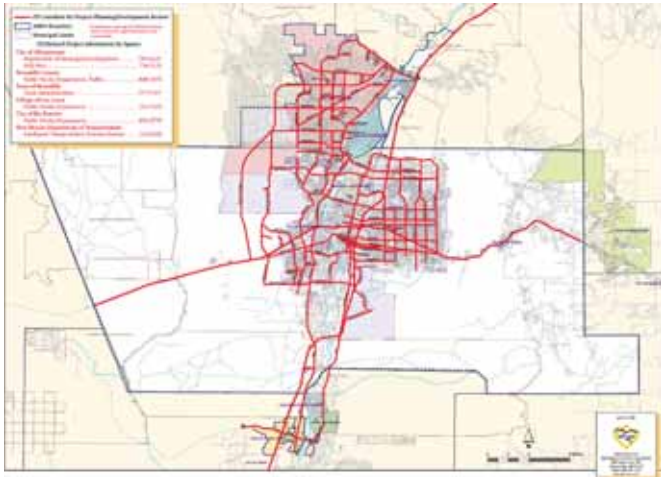
- Highway and bridge;
- Bike/pedestrian;
- Safety;
- ITS/TSM;
- TDM; and
- Misc.

The Project Information Form (PIF) has been modified to include a specific section for ITS by "calling out" ITS as a specific project type or component. Historically, MRCOG had only identified ITS by project type, however, this meant that other ITS elements included in project types such as capacity or transit were not being identified, resulting in ITS under-reporting.

The MRMPO created the ITS Subcommittee, thereby establishing a direct link between ITS planners, engineers and operators and the region's transportation committees and decision-making body, i.e., the Metropolitan Transportation Board. The committee comprises key representatives from each of the MPO member agencies and mimics the other committees such as the Transportation Coordinating Committee and Transportation Program Task Group and works in pursuit of regional ITS goals including:

- Arterial management;
- Freeway management;
- Transit management;
- Incident and emergency management;

**Figure 2. ITS corridors map V1.3.**



Source: MRMPO ITS subcommittee

- Traveler information;
- Transportation-management centers; and
- Roadway operations and maintenance.

ITS stakeholders in the AMPA share a strong sense of system ownership and recognize the value of collaboration. Equipment sharing and deployment coordination along multijurisdictional corridors has increased, including outreach to the area's first responders, key ITS stakeholders not typically involved in the transportation-planning process. This has proven especially crucial as the region pursues the establishment of a regional transportation-management center with transportation and first responders co-locating to share information and resources.

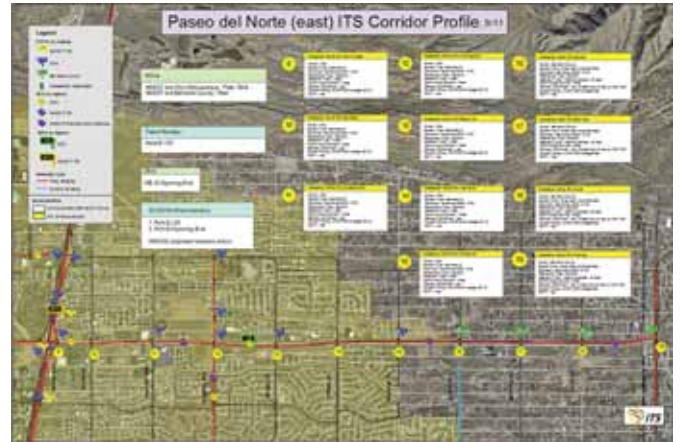
Travel time is a fundamental performance measure in the pursuit of travel and operational-management strategies. Measures such as vehicle travel time, level of service, travel delay and travel reliability are all pertinent data intended to facilitate monitoring and reporting of travel conditions, but must be coordinated in their collection and processing. Advances in mobile-device communications incorporating GPS and Bluetooth are innovative, cost-effective approaches for travel management that can present data-integration challenges and/or data gaps when deployed on the same corridor or within the same system.

In response to these challenges, the ITS subcommittee recently developed a concept of operations for the collection

and utilization of travel-time data on principal arterials and river crossings focused on deployments in the AMPA, the purpose of which is to describe and standardize how a system of data collection will be used by the various stakeholders in a consistent manner to optimize integration and minimize incompatibility issues. The process is consistent with the FHWA "Concept of Operations Template and Systems Engineering Evaluation Criteria" guiding federally funded and regionally significant ITS deployment and establishes a level of coordination and standardization among the ITS stakeholder agencies within the AMPA. The guidance is expected to be expanded upon as a common approach.

To assist ITS planning and coordination efforts, the ITS subcommittee has identified corridors for ITS planning and project implementation (Figure 2) based on ITS priorities established by individual agencies and regional ITS goals included in the AMPA regional ITS architecture. Of particular importance included on the map legend is corresponding ITS contact information for each stakeholder agency such that any planner, manager or engineer has direct access to the appropriate ITS person, whether in their own agency or another agency. The map is used for a wide range of planning and project-development activities such as agency-development review, land-use plan updates and project-specific support activities. A primary benefit is that it effectively extends the reach of ITS to activities that are beyond the immediate purview of

**Figure 3. ITS corridor profile, Alameda Blvd., CMP Ranking No. 1.**



Source: MRMPO ITS subcommittee

the ITS subcommittee and ITS staff.

A set of ITS corridor profiles comprising deployed ITS infrastructure on a subset of top-ranked CMP corridors (Figure 3) is part of the ITS subcommittee. Elements such as telemetry (fiber, conduit, etc.), dynamic-message signs (DMS), closed-circuit television (CCTV) installations, ownership, transit service and jurisdictional information are included, as well as information such as current signal-timing plans, memorandums of agreement currently in place or needed, etc. This deployment summary information has proven quite informative as stand-alone information among ITS stakeholder agencies, the CMP committee and other MRMPO committees, agency staff review or disseminating to the web via the ITS subcommittee's web page.

Both the ITS subcommittee and the CMP committee are important participants in the MPO's transportation-planning process. The CMP includes many performance measures from ITS and recognizes the contribution to congestion reduction and management afforded by integrated ITS deployment. The CMP congestion toolkit includes a matrix of 20 mitigation strategies comprising three main categories:

- Active roadway management; five strategies total, four explicitly ITS;
  - o Traffic-signal timing and coordination;
  - o Traffic-signal equipment modernization;
  - o Traveler-information devices; and



- o Communications and network surveillance;
- Travel demand management/alternative travel modes; nine strategies total, 4 related to ITS;
  - o Transit queue jumper and priority;
  - o Transit vehicle information;
  - o Electronic-fare collection; and
  - o Parking management; and
- Physical roadway capacity (no ITS).

Increased ITS planning activity has necessitated a common framework for agency ITS infrastructure deployment data for the region. ITS infrastructure is like any other capital asset, and as such is included in agency database and inventory-monitoring activities. Nearly all stakeholder agencies maintain a GIS and include ITS assets in their inventories, therefore a regional ITS geodatabase has been developed that contains all ITS infrastructure within the AMPA. The database resides in the cloud using ESRI's ArcGIS.com platform. A common data schema provides the standardization from which each agency can share the ITS

data. Specific "feature classes" were agreed to, and data attributes specified that meet all user needs, whether the deployment is for interstates or arterials. A breakthrough feature in this approach is that the data are maintained by each respective agency's standard procedures already in place. The feature classes include:

- CCTVs—point feature, with attributes;
- DMS—point feature, with attributes;
- Poles—point feature, with attributes as a central-mounting device for ITS elements;
- Pull boxes—point feature, with attributes;
- Service connections—point feature, with attributes;
- System cabinets—point feature, with attributes;
- Telemetry—line feature, with attributes;
- VDS/sensors—point feature, with attributes; and
- Signalized intersection—point feature with identification and phasing information.

Each feature class contains detailed attributes and domains such as owner, manufacturer, type, serial identification, maintenance history, image, etc., such that the geodatabase will serve the planning and project-development needs of ITS stakeholders as well as provide the level of detail that agency public works inventory and/or roadway-management program requirements.

The integration of ITS into the transportation-planning process at MRCOG began many years ago and was initiated with two primary areas of focus: ITS project coordination and the maintenance of the regional ITS architecture. Its role has expanded to provide an essential environment for meeting the collaborative data collection and cross-jurisdictional performance monitoring needed to meet the requirements set forth in MAP-21. **R&B**

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