TDMS – A Traffic Data Repository for Government and Business Use

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Presented by:

Mark Catchpole
ADOT Multimodal Planning Division
Transportation Analysis Section
Traffic Monitoring Team
Phoenix, Arizona
The objective of this presentation is to -

- Help attendees gain a better understanding of the purpose and intent behind the TDMS application.
- Explain its role and significance.
- Demonstrate some of its basic tools and features.
Traffic Monitoring Program

Traffic Monitoring defined –

- A systematic process for the collection, analysis, summary, and retention of highway vehicular traffic data.

- Includes provisions for developing and reporting reasonable estimates of vehicle travel activity measures that are generated on a road or street network.
Traffic Monitoring - Relative Statutes, Mandates and Procedural Guidelines

- Statutes and Mandates
  - Federal (23 CFR Part 500 Subpart B) – A continued operation of a Highway Traffic Monitoring Program is required to be maintained by each state.
  - State – There are no known state statues that specifically mandate traffic monitoring programs.

- Guidelines
  - FHWA Traffic Monitoring Guide (TMG)
  - AASHTO Guidelines for Traffic Data Programs
Primary Uses of Traffic Data

- Satisfies traffic-related HPMS data requirements
- Inputs to highway and pavement design criteria
- Generates vehicle travel estimates (current and projected)
- Supports Air Quality initiatives and mandates
- Provides input to Travel Demand Modeling activity
- Provides data for various traffic studies (i.e. vehicle crash analysis and rates, intersection improvements, etc.)
- Used to justify road or street reclassification requests
Other Stakeholders of Traffic Data

- Community development / Chamber of Commerce
- Private enterprise (realtors, developers, appraisers)
- Research (marketing, economic, etc.)
- Academics
Some Key Terms of the Business

- Raw count – the traffic count as recorded by the counter
- AADT – Average Annual Daily Traffic
- DVMT – Daily vehicle-miles of travel
- Coverage / short-term count – temporary 24 or 48 hour count
- ATR – Automatic traffic recorder
- Intrusive versus non-intrusive counting
- TMG – Traffic Monitoring Guide
Traffic Counting Methods

- Pneumatic road tubes (Intrusive)
  - Most common form of counting
  - Pros — easy and inexpensive to obtain
  - Cons — Over-counts and potentially risky

- Magnetic induction loops (Intrusive)
  - Typically not used as much as road tubes
  - Pros
    - Provides more accurate count results
    - Safer to obtain counts with (esp. for high volume / high speed roads and streets
    - Ensures set location consistency
  - Cons
    - Intrusive – installation disturbs pavement
    - More expensive to accommodate

- Non-intrusive devices (radar, laser, etc.)
  Do not cut into or otherwise interfere with road
Basic Types of Vehicular Traffic Data

- Volume
- Vehicle Classification
- Vehicle Length
- Speed
- Weight
Data Types – Traffic Volumes

- Basic measurement of highway usage
- Highway segments counted in 15 minute recording intervals
- Directional counts are captured where feasible
Data Types – Continuous Traffic Counters

(Also known or referred to as ATR stations)

- Over 300 locations statewide
- Records various traffic information 24/7/365
- Station data is collected by telemetry
- ATR network includes FMS detector stations located on urban freeways in metro Phoenix (and in the near future – Tucson)
- Data is used to “factor” short-term counts
- Best and most comprehensive source of traffic data available
VEHICLE CLASSIFICATION:

Categorizing vehicles in a traffic stream according to the number of axles, axle separation and number of vehicle units.

Vehicles are counted and classified into 13 different types (FHWA “Scheme F”). Class 4 and above are considered commercial Vehicles.
Data Types – Vehicle Lengths

- 5 recording bins based on overall length ranges
- Available only from ATR stations
- Not as desirable as classification data (can not discern number of axles and axle spacing)

Vehicles are categorized and recorded based on overall lengths:

- Bin 1: ≤ 6 feet
- Bin 2: 6 to 19 feet
- Bin 3: 19 to 55 feet
- Bin 4: 55 to 75 feet
- Bin 5: > 75 feet
Data Types – Vehicle Speeds*

- Average
- Binned (based on min / max ranges)
- 85th percentile

* - Speed data can be sensitive information. Release and availability is restricted by ADOT at this time.
Data Types – Vehicle Weights

- Collected at ATR stations equipped with Weigh-In-Motion (WIM) sensors
- Geared towards monitoring commercial truck traffic
- Captures vehicle axle weights and spacing (in addition to volume, class and speed data)
- Limited coverage now, but will be significantly expanded over the next several years
Traffic Data Products

- Current AADT volumes
- Forecasted AADT volumes
- Design Hour Factors
- Vehicle classification data
- Truck travel estimates
- Vehicle speed data
- ESALs (Equivalent Single Axle Loadings)
The Transportation Data Management System (TDMS)

What is it?

- A cloud-based on-line application for processing, storage and retrieval of all types of vehicle traffic information
- Developed by Midwestern Software Solutions (MS2), Ann Arbor, Michigan
- One of a number of modules for managing and reporting various types of traffic or highway information (i.e. pavement, crashes, signing, travel demand, etc.)
- MS2 TDMS clients include –
  - 10 state DOT agencies
  - 130 COG, MPO, county and municipal agencies
  - Highway Departments in Canada and Africa
  - Private firms, research and educational institutions
TDMS – Advantages and Key Features

- Combines the power of the internet and GIS technology to provide the user with tools to obtain voluminous sets of traffic data
- Provides a centralized repository for traffic data storage, retrieval, analysis and reporting
- Contains built-in tools for uploading, validating and posting traffic data
- Used to process raw count data into average annual daily traffic volumes
- Contains built-in tools for performing data searches, generating reports and graphical displaying of information
- Requires no software purchase and installation
- Cloud-based – requires no hardware to store massive amounts of data
- Instantaneous count results are possible to provide end users and stakeholders
Why did ADOT buy into TDMS?

- To replace an existing contracted traffic data processing service that –
  - Was becoming expensive to annually subscribe to
  - Had no graphical interface
  - Was not cloud-based and accessible on-line
  - Could not provide for direct data uploading

- To better facilitate assembly of traffic data for the annual HPMS data submittal to FHWA

- To make it easier for stakeholders to obtain and use traffic data collected on State Highways
TDMS Chronology

- 2007 – ADOT purchases a TDMS site license from MS2 and begins using the application for processing and reporting its traffic data (http://adot.ms2soft.com/).

- 2010 – A project investment justification is initiated and a federal grant for $187,000 is requested by ADOT to extend the TDMS capability to include local government agencies.

- 2011 – The investment justification is approved and the grant is awarded to ADOT so it can purchase permanent TDMS site licenses and web portals for each Arizona COG and MPO.
2012 – ADOT informs the COGs and MPOs of the creation of their TDMS websites. MS2 later conducts a series of instructional webinars with each. These were typically held during a monthly COG or MPO street TAC meeting.

2012 to present – MS2 provides administrative and technical support to COG or MPO member agency staffs as needed.

http://cag.ms2soft.com/  (Central Arizona Governments)
http://cypmo.ms2soft.com/  (Central Yavapai Metropolitan Planning Organization)
http://fmpo.ms2soft.com/  (Flagstaff Metropolitan Planning Organization)
http://mag.ms2soft.com/  (Maricopa Association of Governments)
http://nacog.ms2soft.com/  (Northern Arizona Council of Governments)
http://pag.ms2soft.com/  (Pima Association of Governments)
http://seago.ms2soft.com/  (Southeast Arizona Government Organization)
http://wacog.ms2soft.com/  (Western Arizona Council of Governments)
http://ympo.ms2soft.com/  (Yuma Metropolitan Planning Organization)
TDMS Site Administration

- Each COG / MPO serves as its own site administrator
- COG / MPO creates user accounts for each member agency
- Local agencies collect traffic count data on their road or street network
- Local agencies upload, validate and post count results
Reasons why ADOT extended TDMS to the COG and MPOs

- To better facilitate FHWA traffic data reporting requirements
- To ensure consistency with derivation of AADT volumes
- To develop more accurate estimates of vehicle travel activity which provides better performance measures and transportation policy decisions
- To expand the concept of a centralized and standardized traffic data repository that can be used by multiple stakeholders in and out of government
- To promote the concept of data sharing
- To provide local government agencies with a free tool to archive, process, validate, display and retrieve traffic data they collect on their roads and streets
TDMS Demo Time
The TDMS application accommodates traffic monitoring activities that are basic and necessary functions for a highway agency to perform.

Data generated from a traffic monitoring system produces critical measures of highway usage and performance. What gets measured can get managed.

A traffic count should be collected once and used many times. The TDMS application is a tool that allows for multiple users of traffic data.

ADOT assistance is available for local agency traffic monitoring (i.e. buying equipment, setting up a count program, traffic data collection).

Misconceptions and misunderstandings about traffic counting abound.

"Not everything that counts can be counted. Not everything that can be counted counts."

- Albert Einstein
Questions / Comments / Suggestions