Decision Support Systems for FDOT District 4 TSM&O

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Transportation Systems Management & Operations (TSM&O) Overview

- TSM&O is a program based on measuring **performance**, **actively managing the multimodal transportation network**, and delivering **positive safety & mobility** outcomes to the traveling public.
- TSM&O practices involve "**taking back**" the capacity lost to congestion, incidents, construction, weather, and traffic control delay.
- **Current Challenges in South Florida**

  Congestion
  - Travel time variability as a result of less than optimal system operation
  - Inconsistent operating treatment of arterials

  Institutional
  - Inconsistent plans for operating improvements
  - Variety of stakeholders involved

  Funding
  - Lack of finances allocated toward improving operations

Transportation Systems Management & Operations (TSM&O) IN FDOT District Four

Where FDOT District Four stands now

- Nationally recognized Intelligent Transportation Systems (ITS) Programs on limited access facilities
  - Freeway Management throughout Broward, Palm Beach, and Treasure Coast Counties
- Growing Arterial Management Program
- TSM&O Focus Areas
  - Freeway & Arterial Management
  - Freight and Goods Mobility
  - Work Zone Management
  - *Integrated Corridor Management* (***future***)

Broward SMART SunGuide Regional TMC

FDOT District Four's Arterial Management Program (AMP) in Broward County

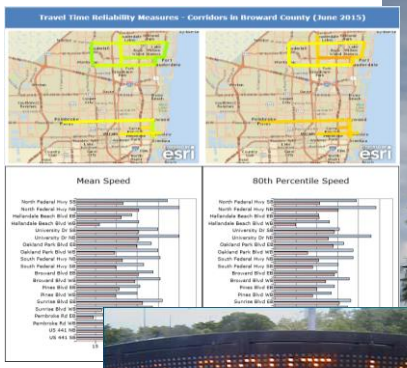
FDOT District Four's ITS Operations in Broward County

- FDOT-Maintained ITS Devices and Various Software
  - Closed Circuit Television cameras (CCTV)
  - Dynamic Message Signs (DMS)
  - Microwave Vehicle Detection (MVDS)
  - Bluetooth Travel-Time Origin And Destination units (BlueTOAD)
  - Highway Advisory Radio (HAR)
  - SunGuide Software
- Interagency Coordination
  - South East Florida Regional TMC Operations Committee
  - Broward County Traffic Engineering Division
  - FL 511 Interactive Voice Response System (IVR) and website www.FL511.com
  - *Local Law Enforcement and Fire Rescue (**future**)*

FDOT District Four's Arterial Management Program (AMP) in Broward County

FDOT District Four AMP Strategies

- Performance Monitoring
  - General Traffic Performance
  - Travel Time Reliability
  - *Signal System (**future**)*
  - *Transit System Performance (**future**)*
- Traveler Information Dissemination
- Event & Incident Management
- Traffic Signal Retiming Activities – through coordination with BCTED
- Interagency Coordination
- *Integrated Corridor Management (**future**)*



Development of Decision Support Systems

- As part of previous FDOT Research Center projects, FIU developed two tools designed to support **both off-line and real-time** planning as well as operation decisions associated with the Transportation System Management and Operations (TSM&O).
  - **ITS Data Capture and Performance Management – ITSDCAP**
  - **Integrated Regional Information Sharing and Decision Support System – IRISDS**
- Both tools are integrated into a data analytic environment that **captures data from multiple** sources and utilizes the data to support TSM&O partner agency decisions.

Development of Decision Support Systems

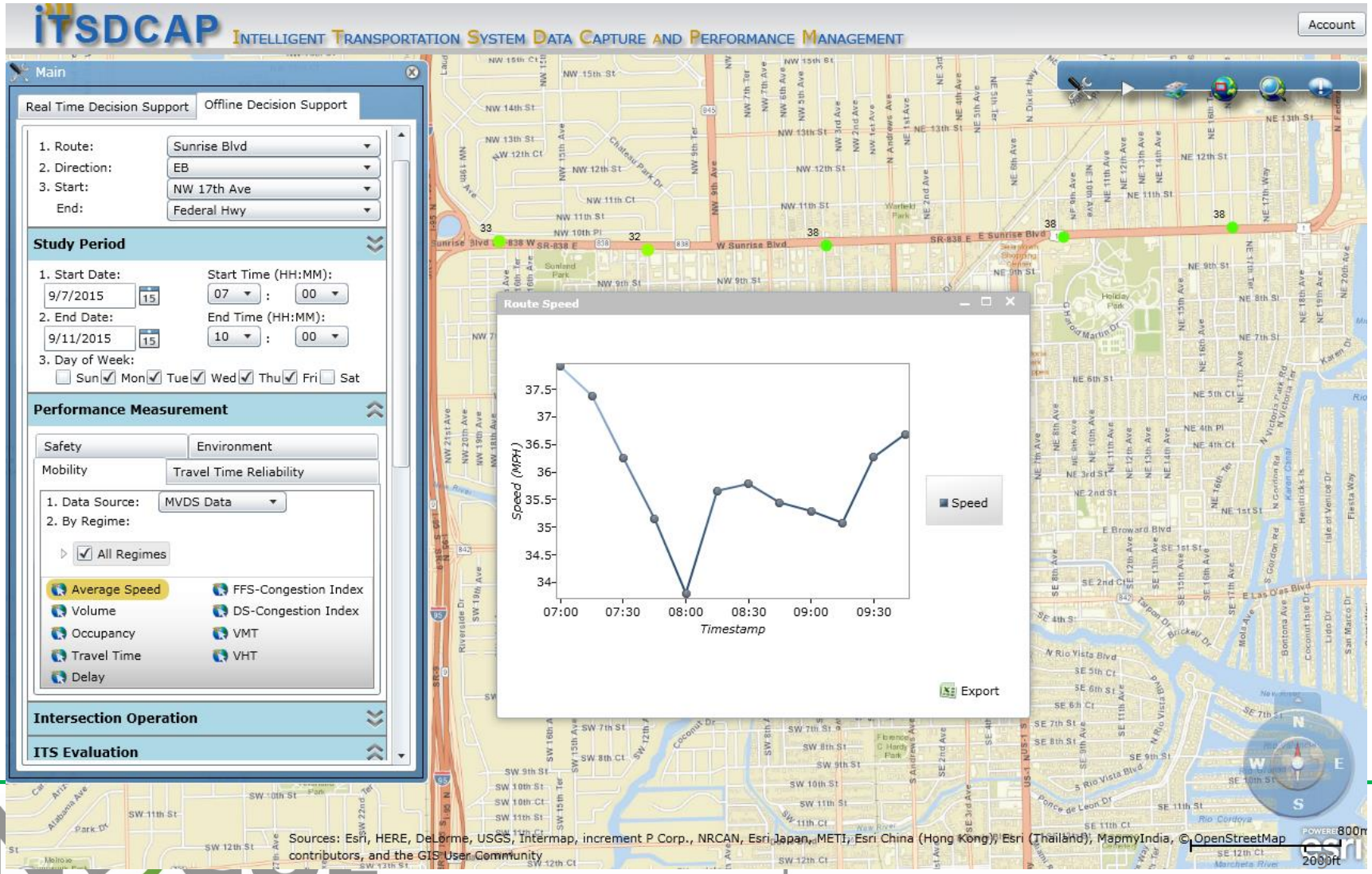
- **ITSDCAP** captures data from multiple sources, estimates various performance measures (**mobility**, **reliability**, **safety and environmental**), performs data mining techniques, support benefit-cost analysis, and allows the visualization of data.
  - *Data is utilized from multiple sources available to FDOT & partners*
  - *Original version was a desktop tool that mainly focused on freeway corridor performance measurements and required the installation of add-on software*
- **IRISDS** is a proof-of-concept web-based system that displays regionally shared information in real-time and provides a decision support environment for transportation system management agencies in a region.
  - *Allows the prediction and visualization of incident impacts in real-time (duration, delays, queues, secondary incidents, and diversion rate)*
  - *Allows the estimation of general travel-times based on bus Automatic Vehicle Location (AVL) data*

Goals of "Decision Support Systems for TSM&O" Project

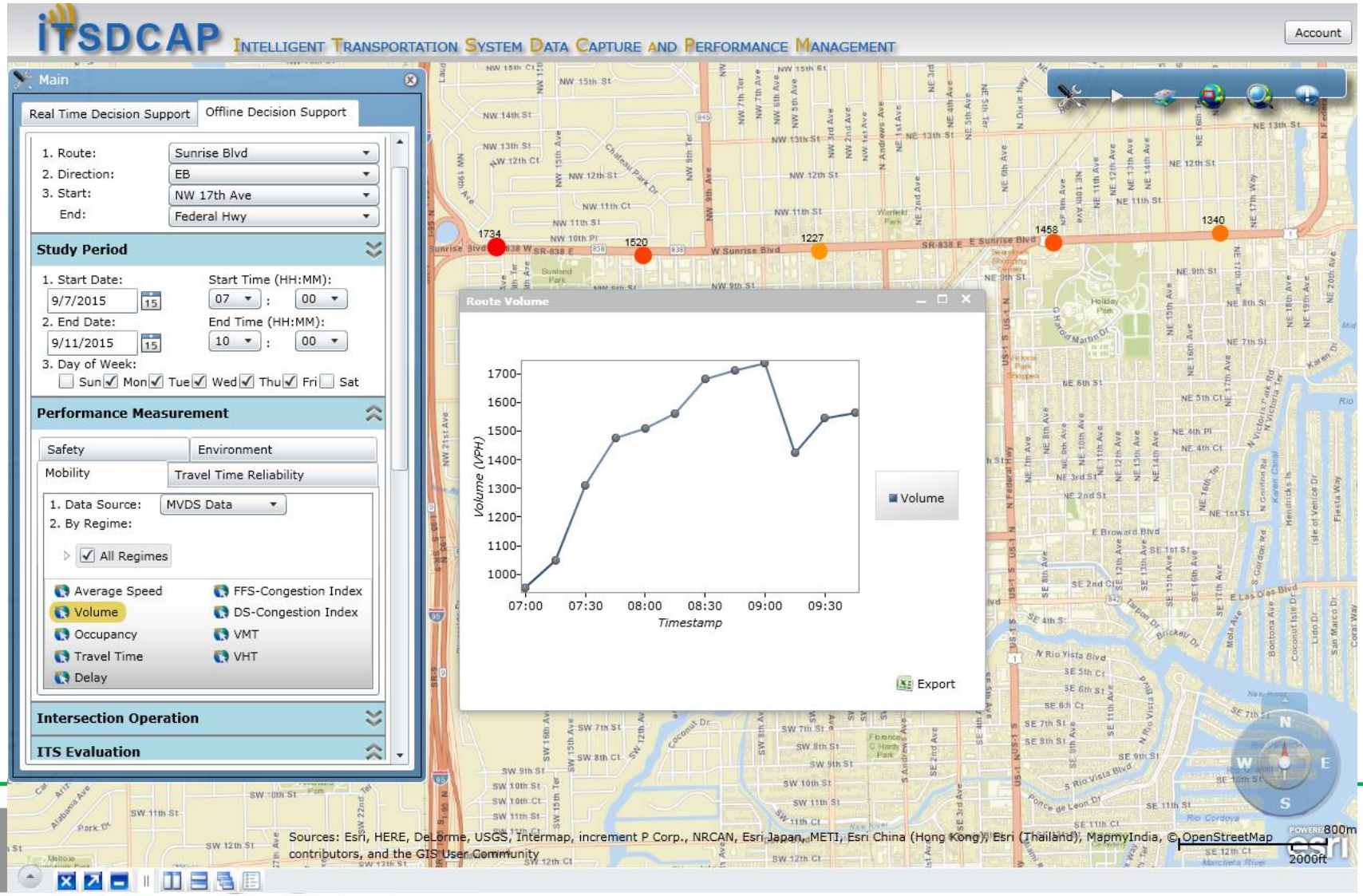
To produce a decision support environment that supports the objectives and activities of the TSM&O program.

- Integrate ITSDCAP and IRISDS into a single web based environment
- Inclusion of Arterial data
- Provision of an environment for information sharing between agencies
- Benefit-cost analysis of TSM&O strategies
- Estimation of the impacts of construction and maintenance
- Incorporation of predictive modeling
- Incorporation of decision support tools
- Easy incorporation of related FDOT and national research products

Decision Support Systems Usage for Active Arterial Management

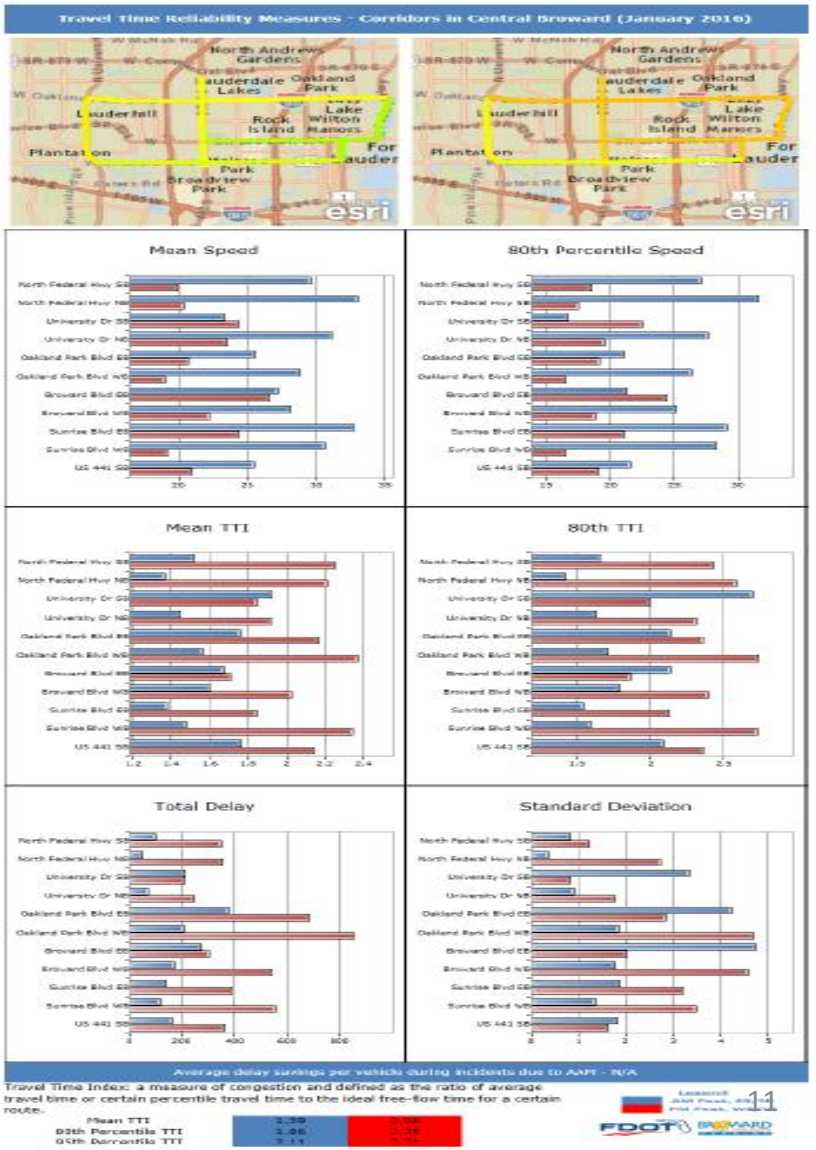


Decision Support Systems Usage for Active Arterial Management



Decision Support Systems Usage for Active Arterial Management

- AMP Operations Team will access the **Offline Decision Support** tool to select the desired study period for regional evaluation
  - **County-Level Summary** provides overall performance including estimated benefits
  - **Regional-Level Reliability** provides an analysis of travel-time performance
  - **Corridor-Level Reliability** offers an in depth analysis of individual corridors within the AMP project limits



Decision Support Systems Usage for Active Arterial Management

Benefits of ITSDCAP's Offline Decision Support Tool

- Analysis of **performance dashboard** data helps operations staff and partnering agencies have a better understanding of overall system performance
- **Recurring congestion hot-spots** can be identified to work towards the development of improved traffic mitigation plans
- **Data can be shared** with county signaling agencies to determine need for making future signal timing adjustments
- Evaluation of frequently reported locations of crashes can help determine any potential roadway safety issues

Vision for Future Utilization of ITSDCAP's Real-Time Decision Support Tool

- As more historical data becomes available, ITSDCAP can suggest plans for mitigation to operational users in real-time
- Stored mitigation plans will save time for operational reaction and may help reduce negative traffic impacts to motorists
- Utilizing an integrated system will benefit multiple agencies that may need to coordinate actions for incident management purposes

Decision Support Systems Usage for Active Arterial Management

- Next Steps for District Four:
  - New TMC Contract for Traffic Signal Retiming to use ITSDCAP
  - Improve data inputs to ITSDCAP
  - Refinement of Operator Standard Operating Guidelines
  - Develop FDOT process for regular post event assessment using ITSDCAP and other tools
    - Recurring congestion
    - Work zones
    - Special events
    - Weather