Implementation of Advanced Transportation Management System (ATMS) in D.C.

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Developed initial version of ATMS functional requirements in 2009

Revised ATMS FRD in 2013

The FRD covers:

- Graphic User Interface Requirements
- Subsystem Requirements (CCTV, Traffic Detection Stations, Permanent Count Stations, Dynamic Message Signs, Signal Interface)
- Incident Management Requirements (Incident monitoring, emergency management, traveler information requirements)
- Data Sharing Requirements
- Database requirements and Reporting Functions
Operator Response to Crashes

1. Receive Information/Notification Phase
   - Dispatch ROP
   - Dispatch TCO
   - CCTV Camera Search
   - HPO, Fire/Emergency Medical Service

2. Verification Phase
   - Incident Confirmed?
     - YES
     - Traffic Affected?
       - YES
       - DDOT Asset Damage?
         - YES
         - NHS ROUTE?
           - YES
           - Notify Agencies/Service Providers:
             - HSEMA
             - MPD
             - FEMS
             - EMA
             - DPW
             - McLean
             - PEPCO
             - WASA
             - SIOP
           - Send E-mail?
             - DDOT-IPMA Asset Mgmt Corp
             - Risk Management Specialist
         - Send E-mail Alert:
           - TOA Managers
           - ROP Supervisor
           - TCO Supervisor
           - Signals Supervisor
           - DDOT PIO
           - DDOT Director
     - NO
     - Notify Regional Partners:
       - MATOC
       - VDOT
       - MSHA CHART
       - Arlington City
       - Montgomery City
       - Prince George City
     - Return to Normal Phase
   - NO

3. Response/Notification Phase
   - Event Monitoring
     - Open Incident LOG (CapTop)
     - Update Incident LOG (CapTop)

4. Clearance Phase
   - CLOSE INCIDENT
ATMS Deployment Schedules

- Initial deployment in November, 2015
- Functionalities in the initial Deployment
  - Map interface for incident creation/visualization
  - Video control system
  - Event management modules
  - Traffic information system
  - ROP dispatching module
- Release One is already implemented (August 2016)
- Release Two (September 30, 2016)
- Release Three (December 31, 2016)
Dynamic response

Travel times on major corridors

Motorist Assistance Module on mobile devices

Automatic vehicle locating (AVL) display of roadway patrol trucks
Example of ATMS
ATMS’ Event Management Module
ATMS Module for Personnel Dispatching
Video Control Module
QuicNet Interface to DDOT signal system
- Monitor signal operations

Citywork interface
- Create work orders through ATMS interface for maintenance of ITS subsystems
- Manage work orders

Tunnel management system interface
- Monitor the traffic operations in the tunnels
- Data communication with the tunnel ATMS

Video wall management

Reporting functions
The Waze data consists of

- Traffic jam data
- Traffic incident alerts data

The Waze traffic jam data contains

- GPS data for the road segments
- Delay of jam compared to free flow speed
- Current average speed on the target segments
- Traffic congestion level (0 = free flow, 5 = blocked)

The WAZE traffic incident alerts contains

- Locations
- Report time
- Incident Type
- Reliability (1–10)
Waze Incidents vs ATMS Incidents

- Determine if an incident in Waze and an incident in ATMS incident are the same one
  - Incident Type
  - Location (Map Distance < 1000ft)
  - Incident Time (Gap of reporting time < 1 hour)

- Retrieve data from both systems for one month

- Compare the incident report times
  - For 26.5% of the identified incidents, ATMS reports earlier than Waze
  - For 73.5% of the identified incidents, Waze reports earlier than ATMS
# Recent Waze Reports

## Unusual Traffic

<table>
<thead>
<tr>
<th>Street Name</th>
<th>Alert Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>DC-295 S, Washington</td>
<td>DYNAMIC</td>
</tr>
<tr>
<td>K St NW, Washington</td>
<td>DYNAMIC</td>
</tr>
<tr>
<td>Florida Ave NW, Washington</td>
<td>DYNAMIC</td>
</tr>
<tr>
<td>I-66 E</td>
<td>DYNAMIC</td>
</tr>
<tr>
<td>I-395 N, Arlington</td>
<td>DYNAMIC</td>
</tr>
<tr>
<td>Maine Ave SW, Washington</td>
<td>DYNAMIC</td>
</tr>
<tr>
<td>Independence Ave SW, Washington</td>
<td>DYNAMIC</td>
</tr>
<tr>
<td>N Henry St, Alexandria</td>
<td>DYNAMIC</td>
</tr>
</tbody>
</table>

## Waze Streets Reports

<table>
<thead>
<tr>
<th>Street Name</th>
<th>Travel Time (mins)</th>
<th>Travel Speed (mph)</th>
<th>Compare to Usual</th>
<th>Alerts</th>
</tr>
</thead>
<tbody>
<tr>
<td>I-395 NB +</td>
<td>23</td>
<td>20</td>
<td>Slower than usual</td>
<td>ACCIDENT Position</td>
</tr>
<tr>
<td>Constitution Ave - (US 50 EB ) +</td>
<td>13</td>
<td>11</td>
<td>Slower than usual</td>
<td></td>
</tr>
<tr>
<td>I-295 SB +</td>
<td>34</td>
<td>17</td>
<td>Slower than usual</td>
<td>HAZARD Position</td>
</tr>
<tr>
<td>Independence Ave EB +</td>
<td>19</td>
<td>8</td>
<td>Slower than usual</td>
<td>HAZARD Position</td>
</tr>
<tr>
<td>Constitution Ave (US 50 EB ) +</td>
<td>18</td>
<td>9</td>
<td>Slower than usual</td>
<td></td>
</tr>
<tr>
<td>I-695 EB +</td>
<td>17</td>
<td>17</td>
<td>Slower than usual</td>
<td>ACCIDENT Position</td>
</tr>
<tr>
<td>14 St SB +</td>
<td>25</td>
<td>9</td>
<td>Slower than usual</td>
<td>HAZARD Position</td>
</tr>
<tr>
<td>14 St NB +</td>
<td>25</td>
<td>9</td>
<td>Slower than usual</td>
<td>HAZARD Position</td>
</tr>
<tr>
<td>New York Ave WB +</td>
<td>18</td>
<td>15</td>
<td>Slower than usual</td>
<td>HAZARD Position</td>
</tr>
<tr>
<td>16th St SB +</td>
<td>26</td>
<td>14</td>
<td>Slower than usual</td>
<td></td>
</tr>
</tbody>
</table>
Future Integration of the Waze Data into ATMS

- Use Waze as a new data source for incident detection
- Develop a program to retrieve the Waze congestion and incident data
- Display the Waze incident data on the ATMS map interface
- ATMS to share data feed to Waze
A project to develop multi-functional OBUs

New OBUs have the following components:
- DSRC antenna and Cellular Modem
- OBDII for connecting to car to retrieve the required information
- Camera
- GPS Antenna
- Pothole detector
- Weather sensors (if car cannot provide the information)

Display the information from OBUs on the ATMS user interface

Monitor the health of OBUs

Distribute the TIM messages to OBUs through ATMS
New communication systems
More ITS devices deployed in the field
Integrate with future roadside DSRC equipment
Questions

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