MTA’s Accident Mapping System

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Agenda

➢ Maryland Transit Administration (MTA) Overview
➢ Accident Mapping System Need
➢ Accident Data in the System
➢ System Features
➢ Uses/Effectiveness of System
➢ Questions/Comments
Maryland Transit Administration

➢ Fourteenth Largest Transit Agency in US
➢ Over 110 Million Passenger Trips Annually
Accident Mapping System Need

- Over 700 buses + 38 light rail vehicles + congested Baltimore City streets = Accidents
Accident Mapping System Need

➢ Existing Tool (Bus Mapping Application) allowed users to visualize where bus accidents were happening.
➢ Enhanced Accident Mapping System (AMS) includes:

**New Data**
- Light Rail and Metro Accidents/Incidents
- Claims Cost Data
- Supervisor Zones

**New Functionality**
- Expanded Data Querying
- Interactive Charting Tool
- Export to CSV
- Improved Reporting
Accident Data in System

- MTA collects data for every accident or safety incident on the system in its Accident Reporting System database. (SQL Server)
- Data is exported monthly from Accident Reporting System database rail and bus tables.
- Over ten years of accident GIS data in Mapping System (January 2007 – March 2017)
- Six months of claims data in Mapping System.
Accident Data in System

- Data processed through model (ESRI ModelBuilder):
  - Creates views that query required data.
  - Removes unwanted characters and standardizes addresses before geoprocessing data.
  - Projects the data, adds & populates fields.

- 97% of Accidents are Currently Mapped
  - Up from 75% when project began
  - Many accidents occur at intersections or are reported to nearest intersection.
Accident Data in System

➢ Accident data from internal ArcGIS Server services
➢ ESRI Basemaps (Streets, Imagery, Gray Canvasses)
➢ System consumes several external ArcGIS Server services from Maryland Integrated Map (MD iMap [http://imap.maryland.gov](http://imap.maryland.gov)) including:
  ▪ Statewide 6-inch imagery service.
  ▪ MTA Bus, Light Rail, Metro Routes and Stops
  ▪ Geocoding service
Accident Mapping System

LOCATION SEARCH
Begin typing address or MTA stop/facility name

BUS ROUTES
Search & add bus routes to map

BASEMAP
Switch to imagery or street map

FILTER PANE
Expand the menus to filter accidents using criteria

EXPAND/COLLAPSE ALL
filter menus

ZOOM ARROWS

REPORTS
Summary (by mode) for all accidents that meet filter criteria

CLUSTERING
View bus accident clusters by supervisor zone.

FIND ACCIDENTS
Refresh map to reflect updates to filters

ACCIDENT SYMBOL COLOR

MAP LAYERS
Click to view on map

COUNTS and CLAIMS
Click to switch map between Counts and Claims

Legend
Counts

Bus LR M

MTA Facilities
Bus Stops
Light Rail Line
Light Rail Stops
Light Rail Switches
LR Grade Crossings
LR Pedestrian Crossings
Baltimore Metro Line
Baltimore Metro Stops

Leaflet | Esri, NAVTEQ, DeLorme
Accident Mapping System

- **Transit Modes**
  - Bus, Light Rail, and/or Metro

- **Bus Departments**
  - Division or Mobility Provider

- **Date**
  - Date Range: 01/01/2015 to 12/31/2015
  - Time Range: All Day
  - Peak Hour Range: Peak AM: 6:00 AM - 9:00 AM, Peak PM: 3:00 PM - 6:00 PM

- **Preventability**
  - Preventable and Non-Preventable
Accident Mapping System

- **Accident Codes**
  (Over 200 different codes)

- **Bus Routes**

- **Bus Model Year**

- **Supervisor Zone**

- **Keyword**
  - Using keywords in accident description.

MTA Accident Mapping System

- Transit Modes
- Bus Departments
- Date
- Preventability
- Accident Codes
- Bus Routes
- Bus Model Year
- Supervisor Zone
- Keyword

Find Accidents
Accident Mapping System

Bus Accidents: Greenmount Ave & 22Nd St

Timeframe: 06/01/2016 - 12/30/2016 12:00 AM - 11:59 PM
Total Accidents: 5
Total Claims: $0.00

Accident Count by Bus Model Year

<table>
<thead>
<tr>
<th>Year</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008</td>
<td>5</td>
</tr>
</tbody>
</table>

Claims by Bus Model Year

<table>
<thead>
<tr>
<th>Year</th>
<th>Claim</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008</td>
<td>$0.00</td>
</tr>
</tbody>
</table>

Legend

Counts
Bus LR M
0-5
5-10
10+
MTA Facilities
Bus Stops
Light Rail Line
Light Rail Stop
LR Grade Crossings
LR Pedestrian Crossings
Light Rail Switches
Baltimore Metro Line
Baltimore Metro Stops
Accident Mapping System

➢ Dynamic link to Google Street View
## Accident Mapping System

### Location Specific Reports

<table>
<thead>
<tr>
<th>Search Parameters:</th>
<th>Search Results:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date Range: 01/01/2016 - 12/30/2016</td>
<td>Total Accidents: 5</td>
</tr>
<tr>
<td>Timeframe: 12:00 AM - 11:59 PM</td>
<td>Preventable: 3</td>
</tr>
<tr>
<td>Type(s): All</td>
<td>Non-Preventable: 2</td>
</tr>
<tr>
<td>Division(s): Bush Trans, Eastem MTNCE, Eastem Trans, Kirk Trane, Northwest MTNCE, Northwest Trans, Commuter Bus, Training</td>
<td>Total Claims: $0.00</td>
</tr>
<tr>
<td>Code(s): All</td>
<td>Top Accidents By Code</td>
</tr>
<tr>
<td>Routes(s): 8-NB, 8-BB</td>
<td>46</td>
</tr>
<tr>
<td>Model Year(s): All</td>
<td>18A</td>
</tr>
<tr>
<td>Keyword(s): All</td>
<td>47A</td>
</tr>
<tr>
<td></td>
<td>18</td>
</tr>
</tbody>
</table>

### Accident Claims Description:

- 46 - DeBakey With A Fixed Object
- 18A - Other Vehicle Hit Bus In Rear In Loading Zone
- 47A - Bus Hit Pedestrian Speed Bump And Hit Pedestrian
- 18 - Hit From Onramp On Passing Bus

### Number of Accidents by Month

<table>
<thead>
<tr>
<th>Month</th>
<th>Number of Accidents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan</td>
<td>0</td>
</tr>
<tr>
<td>Feb</td>
<td>0</td>
</tr>
<tr>
<td>Mar</td>
<td>0</td>
</tr>
<tr>
<td>Apr</td>
<td>0</td>
</tr>
<tr>
<td>May</td>
<td>0</td>
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<tr>
<td>Jun</td>
<td>3</td>
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<td>Jul</td>
<td>3</td>
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<td>Aug</td>
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<tr>
<td>Sep</td>
<td>1</td>
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<tr>
<td>Oct</td>
<td>0</td>
</tr>
<tr>
<td>Nov</td>
<td>0</td>
</tr>
<tr>
<td>Dec</td>
<td>0</td>
</tr>
</tbody>
</table>
Accident Mapping System

➢ Download data to .csv file
Accident Mapping System

➢ Interactive and compound charting

![Graph of Number of Accidents by Month and Accident Type](image-url)
Accident Mapping System

- Intranet-based web mapping application
- Built using ArcGIS for Server for data services
- Built using Leaflet js library - flexible, lightweight
  - D3 used for charts, accident points and clustering
  - Redux – a data storage/processing library
- Optimized for large data sets
Uses/Effectiveness of System

• Bus Accidents ‘Hot Spot’ Report & Posters
  – communicate via outreach to Bus Divisions and Training Dept. for raising awareness and reducing accidents
Before

- 2011/2012 – 33 Accidents
Uses/Effectiveness of System

Baltimore Fort McHenry Tunnel Toll Plaza

- Two steel I-beam columns & insufficient clearance width 133''─ 124'' = 9''
  - Make operators aware of the likelihood of the accident
  - Alert them to reduce speed upon entering the toll plaza
  - Restrict them from using narrow lanes

10 in 2010/12
1 in 2015/16
(70% reduction)
After

- 2013/14 – 13 Accidents
- 2015/16 – 10 Accidents
- 2017 YTD – 2 Accidents
Uses/Effectiveness of System

➢ Light Rail Accidents
  - **Collisions** along the LR corridor on Howard St. in CBD of Baltimore City
  - **Mixed traffic, narrow and one-way roads**, high volume of pedestrians, faded lane marking, etc.
  - **A tool to prioritize the locations** for rigorous traffic study and safety assessment
Questions/Comments
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