Intelligent Transportation Systems (ITS)

Radio Communications and CAD/AVL Upgrade
History of Current Radio System

- Procurement started in 1999
- Aging system with obsolete technology
  - Many parts are no longer sold and difficult to purchase/repair
- As parts fail, the radio coverage declines
  - Loss of communication with operators and supervisors (rail and bus)
  - Loss of visual location of each vehicle
Project Funding

- Federal Highway Administration awarded RTA a competitive $11.6 million (50/50) grant
- RTA has allocated $2.64 million of FTA formula funds (80/20)
- NOACA awarded $760,000 of section 5310 funds (80/20)
# Project Schedule

<table>
<thead>
<tr>
<th>Task</th>
<th>Completion Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dispatch Center Replacement</td>
<td>Complete</td>
</tr>
<tr>
<td>Begin using MARCS (portables)</td>
<td>Complete</td>
</tr>
<tr>
<td>WLAN Installation (Fixed Route)</td>
<td>Complete</td>
</tr>
<tr>
<td>Bus-in-Box Arrival (test units)</td>
<td>Complete</td>
</tr>
<tr>
<td>Proof of Concept</td>
<td>Complete</td>
</tr>
<tr>
<td>Pilot Begins</td>
<td>Complete</td>
</tr>
<tr>
<td>Paratransit Fleet Installation</td>
<td>Complete</td>
</tr>
<tr>
<td>FR Fleet Installation</td>
<td>Complete</td>
</tr>
<tr>
<td>Rail Fleet Installation</td>
<td>April - Fall 2020</td>
</tr>
</tbody>
</table>
Three Pillars of the Project:
1. Radio Replacement
   - Vehicle, handheld and dispatch consoles
2. ITS Computer Equipment
   - Vehicle computers, routers, Wi-Fi, customer data
3. Radio and Cellular Service
   - Agreements with radio and cellular providers
Greater Cleveland Regional Transit Authority

Radio Network

- Main Office Dispatch
- Paratransit Dispatch

- Trains
- Buses
- Paratransit
- Portables
Cellular Network

- Trains
- Buses
- Paratransit

- TransitMaster
- Future Capability
ITS Computer Equipment

- Computer
- MDT
- Mobile Router
- Mobile Radio
- Vehicle Intelligence
<table>
<thead>
<tr>
<th>Feature</th>
<th>Current Technology</th>
<th>Enhanced Technology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vehicle Alarms</td>
<td>Covert alarms are audio only.</td>
<td>Coverts alarms are audio and visual (Future). The visual video will allow RTA to perform a live look into the vehicle.</td>
</tr>
<tr>
<td>Priority Cellular Service</td>
<td>No cellular service</td>
<td>With FirstNet, if there is a major event or catastrophe, RTA has priority over the public. Our cell service won’t slow-down/go out due to high capacity</td>
</tr>
<tr>
<td>Radio Communication</td>
<td>4 Radio Tower with significant coverage gaps</td>
<td>13 towers that covers the entire county and utilizes towers across the state. RTA utilizes the state’s MARCS system created for 1st responders. RTA can now communicate with 1st responders in the event of an emergency.</td>
</tr>
<tr>
<td>Paratransit Contractors</td>
<td>No direct communication or scheduling of vehicles</td>
<td>Direct scheduling of manifests with contractors. Each contractor has a tablet with software application managed by RTA dispatchers.</td>
</tr>
<tr>
<td>Feature</td>
<td>Current Technology</td>
<td>Enhanced Technology</td>
</tr>
<tr>
<td>-------------------------</td>
<td>--------------------------------------------------------</td>
<td>--------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Navigation</td>
<td>No navigation available. Route books and maps are utilized.</td>
<td>Turn-by-turn navigation including re-routes, special events, etc.</td>
</tr>
<tr>
<td>Pre-Trip Inspection</td>
<td>Operators review their vehicle and complete paper forms for defects.</td>
<td>Operator performs the inspection (paperless) on the new vehicle tablet (future)</td>
</tr>
<tr>
<td>Predictive Maintenance</td>
<td>Limited monitoring tools</td>
<td>Real-time predictive maintenance and monitoring of vehicle components. This allows RTA to monitor vehicles and inform operators/maintenance of errors before the vehicle breaks down.</td>
</tr>
<tr>
<td>Vehicle Location</td>
<td>Poll rate = 1 minute</td>
<td>Poll rate = 15 seconds Reliability real-time data for Transit App</td>
</tr>
<tr>
<td>Equipment Maintenance</td>
<td>No maintenance available due to obsolete parts</td>
<td>Long-term maintenance contracts with all vendors</td>
</tr>
</tbody>
</table>
### Key New Features

<table>
<thead>
<tr>
<th>Feature</th>
<th>Current Technology</th>
<th>Enhanced Technology</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Wi-Fi</strong></td>
<td>No Wi-Fi</td>
<td>Complimentary Wi-Fi on all RTA buses and trains</td>
</tr>
<tr>
<td><strong>Enhanced Data</strong></td>
<td>Significant loss of reliable data</td>
<td>Accurate data including, but not limited to ridership, cellular usage, real-time information, vehicle diagnostics, etc.</td>
</tr>
</tbody>
</table>

**Fields Available for App Developers:**
1. Vehicle Number
2. Vehicle Latitude and Longitude
3. Vehicle Odometer
4. Vehicle Speed
5. Vehicle Type
6. Vehicle Position
7. Trip Updates
8. Alert and Delay Updates
9. Stop Time Updates
10. Bus Load/Bus Load % (Coming soon)
Civic Technology

**Goal:** Provide key technology and data to enhance our community

*RTA Free WIFI Locations*

*WIFI Enabled Vehicles*
- 180 Buses at Hayden
- 170 Buses at Triskett
- 24 Trains at Rail

*Greater Cleveland Regional Transit Authority*
TransitMaster
Internal Management
of Buses/Trains

Greater Cleveland Regional Transit Authority
Previous Radio Coverage

Four radio towers provide data and voice coverage.
13 radio towers provide voice coverage within county
Telematics: Vehicle Intelligence

Utilization Report - Monthly
Refreshed on Thu, Nov 07, 2019 at 08:37:28 AM Eastern Standard Time

<table>
<thead>
<tr>
<th>Name</th>
<th>Engine (hr)</th>
<th>Fuel (gal)</th>
<th>Odometer (mi)</th>
<th>Idle (hr)</th>
<th>Idle Fuel (gal)</th>
<th>% Idle (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1704</td>
<td>6.772</td>
<td>25,389.84</td>
<td>104,629.5</td>
<td>1,832.45</td>
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<tr>
<td>1801</td>
<td>15,305.2</td>
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<td>258,955.05</td>
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<td>38.26</td>
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<tr>
<td>2829</td>
<td>21,566.85</td>
<td>21,401.9</td>
<td>222,116.2</td>
<td>3,259.6</td>
<td>-</td>
<td>15.09</td>
</tr>
</tbody>
</table>
Programming Radios

670 Mobile Radios
225 Portable Radios
Greater Cleveland Regional Transit Authority

Programming Tablets/Routers

110 Paratransit Tablets

500 Mobile Routers
Equipment Storage and Wi-Fi

Built new rack to store 70+ skids of equipment

Installed new Wi-Fi network at each garage
Bus Pilot Program

Video Chats to review connectors, wiring schematics, equipment
Bus-in-a-Box Training

Lead Installation Crew
Mobile Office for Project

Each Bus gets 3 new Antennas
Install new Rail Equipment

Onboard testing
Greater Cleveland Regional Transit Authority

Hayden Installation

Gillig Installation