

Federal Transit Administration's Track Inspection and Track Asset Management Research and Demonstration

Raj Wagley

Sr. Transportation Specialist, FTA

Abhay Joshi

Program Manager, MARTA

Alexander Keylin

Sr. Engineer I, TTCI

Jennifer Zahaczewski

Engineer, ENSCO, Inc.



2018 Rail Conference

Agenda

- History of Rail Inspection Technology
- Research and Demonstration Overview
- ATIS Phase I Overview
- Anticipated Project Schedule
- Project Status
- Future Activities and Benefits



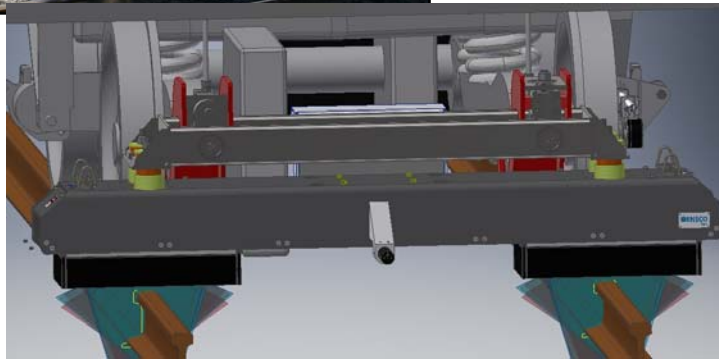
Evolution of Track Inspection



Manual Inspections
Conducted During Track
Walks



Automated Inspections
From Dedicated Inspection
Vehicles



Autonomous
Inspections
From Revenue
Service Vehicles



Automated vs. Autonomous

FTA Office of Innovation, Research and Demonstration's vision is to demonstrate improved safety by enhancing conditional awareness through the integration of *autonomous* inspection systems.

Automated Inspection

Measurements collected by specialized equipment with operators trained to collect data and conduct inspections



Autonomous Inspection

Process of inspecting track from revenue trains using unattended instrumentation with minimal direct involvement.



Research and Demonstration Overview

- MARTA partnered with ENSCO Rail to fulfill FTA's vision to demonstrate ATIS technologies in an operating transit environment in Atlanta, GA.
- MARTA and ENSCO Rail will install ATIS on revenue service equipment and demonstrate benefits such as:
 - Limiting exposure of track inspectors and maintenance crews to right-of-way activities;
 - Migrating scheduled/reactive maintenance to predictive maintenance using data analytics;
 - Achieving a higher level of transit service as characterized by worker safety, cost efficiency and overall ride quality.



Team Roles and Responsibilities



Federal Transit
Administration

Sponsor, Demonstration Guidance



Grantee, Demonstration Site
Manager, Operational Subject
Matter Expert



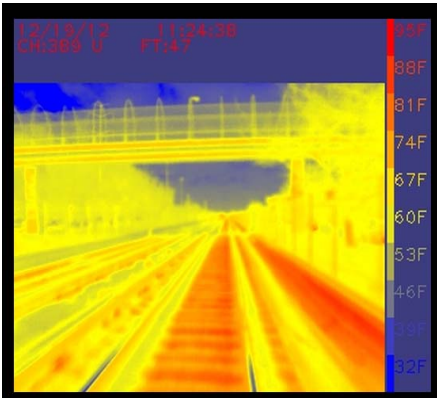
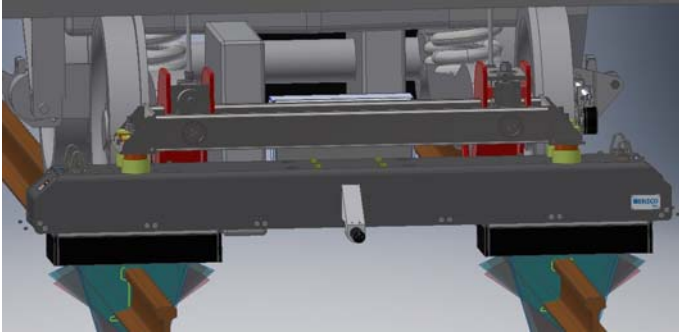
Technology Developer, Designer,
Fabricator, Installer



Demonstration Oversight and
Technical Subject Matter Expert



Technical Approach



- MARTA will evaluate the following technologies in Phase I:
 - Autonomous Track Geometry Measurements
 - Vehicle/Track Interaction Monitor to identify track issues that impact ride quality
 - Thermal Imaging System to identify third-rail issues
- Establish method to automatically detect location of anomalies throughout system
- Conduct comparative analysis of data provided by ATIS technologies to current data products.

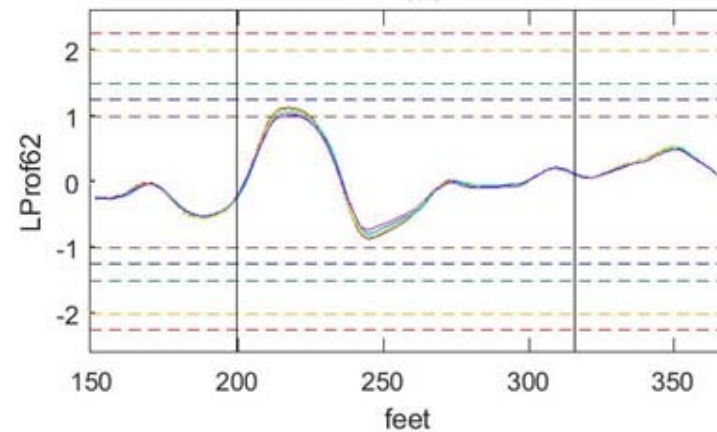


Project Goals and Deliverables

- Establish a process that will utilize ATIS data to facilitate preventative maintenance based on frequent inspections from revenue service vehicles;



Identification of Low Level Defects



Preventative Action Through Frequent Measurements

- Assessment of effectiveness of identifying/remediating defects through use of traditional and new approaches.



Schedule of Activities

- September 2017: Notice to Proceed
- June 2018: Design Completion
- September 2018: System Installed
- December 2018: Commissioning and Acceptance
- September 2019: Phase I Completed



MARTA Work Train

- ATIS to be installed on MARTA work train during Phase I



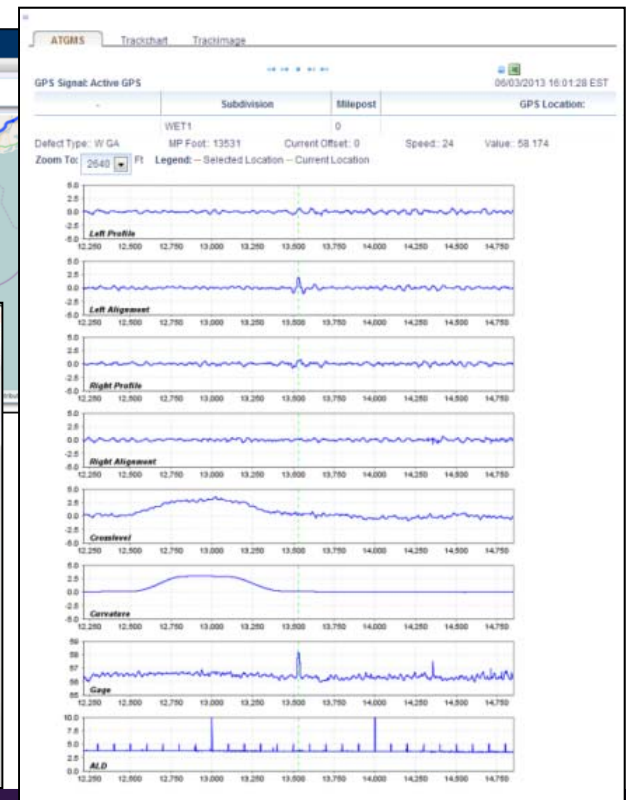
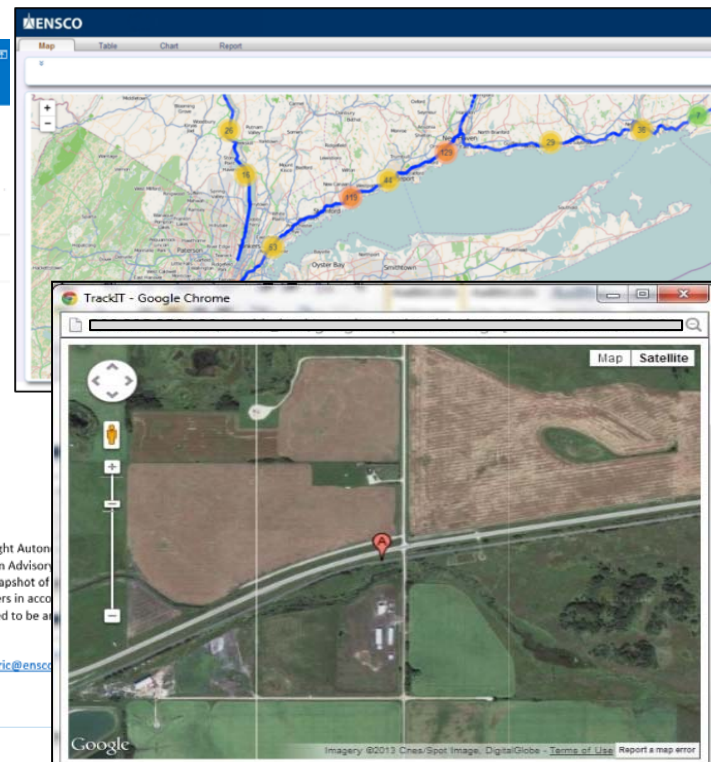
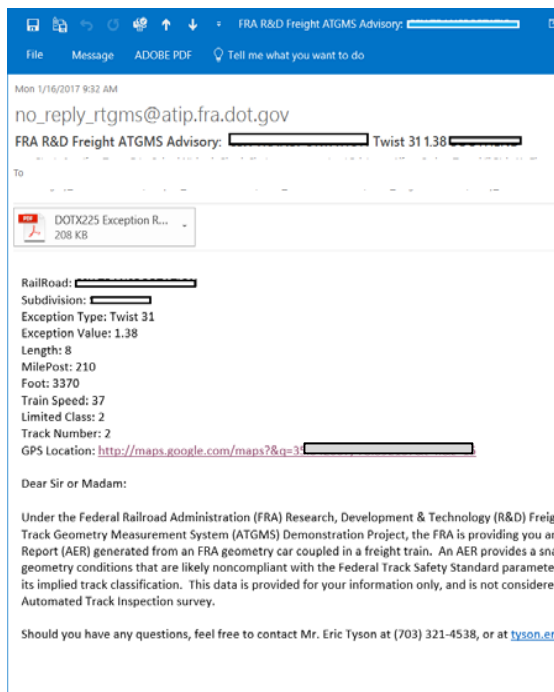
Technology Overview

- Autonomous Track Geometry Measurement System
 - Fully digital non-contact geometry measurement system
 - Autonomous system measures and reports track geometry exceptions in real-time
 - Geometry exceptions are determined based on class of track



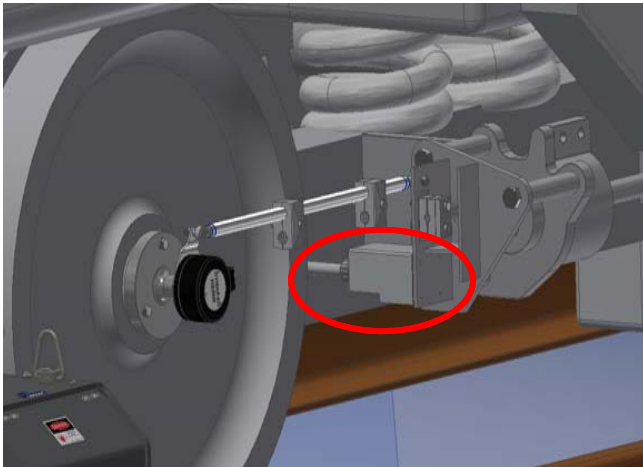
Technology Overview

- Autonomous Track Geometry Measurement System Data Products
 - Geometry exceptions are delivered via email with GPS coordinates to specified user list



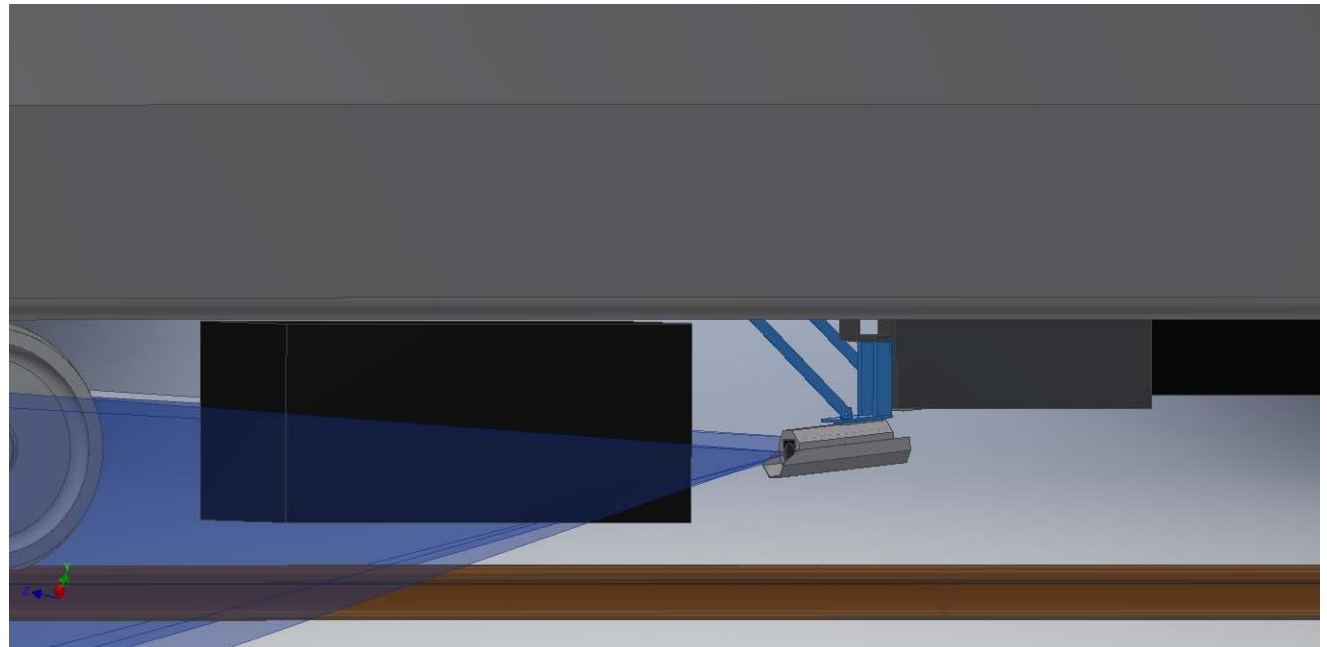
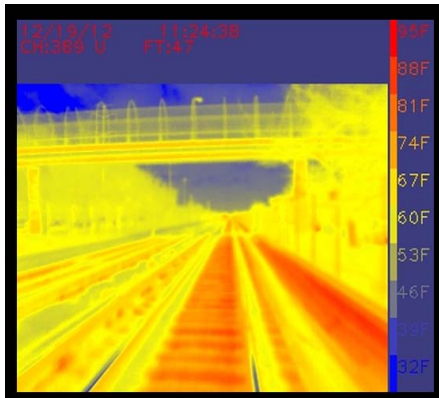
Technology Overview

- Vehicle/Track Interaction Monitor
 - Provide near real-time detection of unsafe track conditions caused by track geometry deviations
 - Wheel/rail impacts caused by battered and broken joints
 - Short chord track surface conditions caused by mud spots and pumping joints



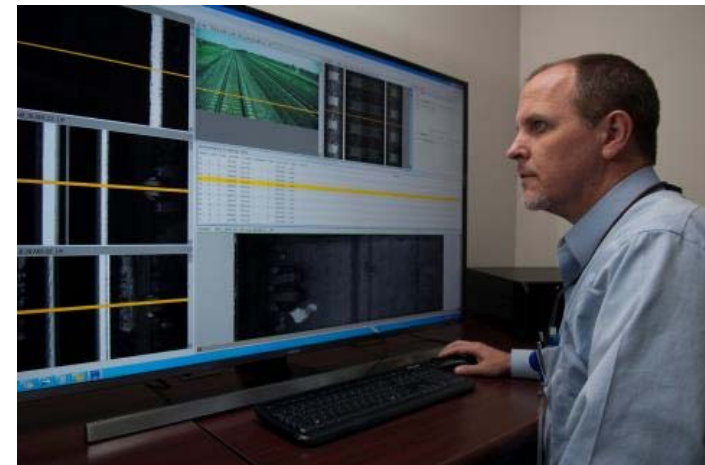
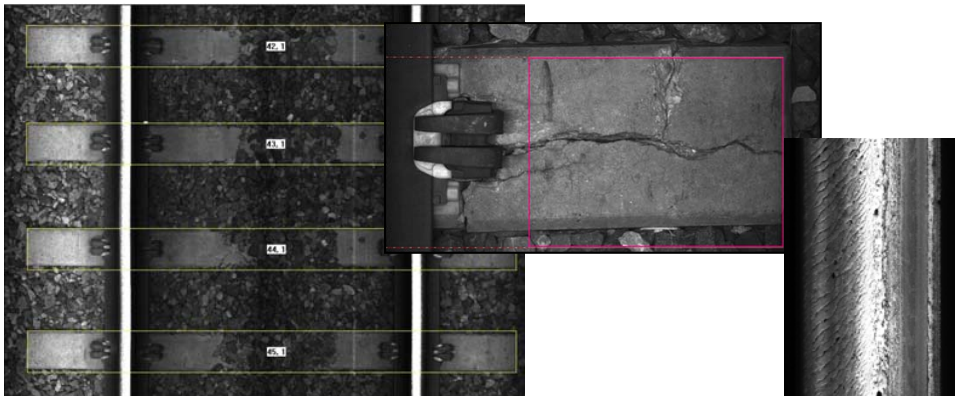
Technology Overview

- Thermal Imaging System
 - New inspection configuration directed at third rail
 - System will identify areas of concern including “hot spots” in traction power system



Future Activities and Benefits

- Phase II - Expand capabilities to add Autonomous Rail Profile Measurement and Line Scan Imaging Systems to ATIS
- Phase III - Establish automated procedure for review of integrated track measurements and images from safety of an office environment



Future Activities and Benefits

- FTA's evaluation of rapidly emerging inspection technologies for use in transit applications:
 - Autonomous inspection technology
 - Component image assessment
 - Office-based evaluation (a “Virtual Track Walk”)
- Demonstration of role of autonomous inspection products for:
 - Asset inventory and condition assessment
 - Performance measures/indicators
 - Input into Asset Management Plans
 - Improved State of Good Repair

