Railroad Crossing Inventory

A Modern Approach

Mid-Continent Transportation Research Symposium, Ames, Iowa

Session 2: Technology – Asset Management

Wednesday, 16 August 2017, 1:00pm – 3:00pm

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Authors:
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Background

- Paper-based inventory
  - Entire state
  - Workflow
    - Record on paper
    - Input into spreadsheet
    - Email spreadsheet
    - Input into database

Time consuming, Inaccurate, Expensive

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Implications

- An accurate, comprehensive inventory of highway-rail crossings is critical in order to:
  - Advise highway authorities of the relative risk associated with crossings
  - Calculate a benefit/cost to prioritize applications for approximately $4-5 million in annual federal funding for crossing improvements
  - Allows department personnel to better understand the interaction of vehicles and trains at crossings and the operations of the rail system in Iowa

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Planning

- **Coordination**
  - The Iowa DOT worked extensively with each railroad to allow access to their right-of-way (ROW). This was accomplished through approval of the office's thorough and extensive safety and rail industry specific training the interns received.
- **Safety**
  - Equipment includes amber lights, reflective vests, head gear, ear/eye protection, boots.
  - A mandatory safety briefing was conducted each day prior to beginning work in the ROW.
- **Training**
  - Manuals on inventory criteria
  - Railroad knowledge training
  - Fulcrum App training
  - Used a testing group in the spring to validate

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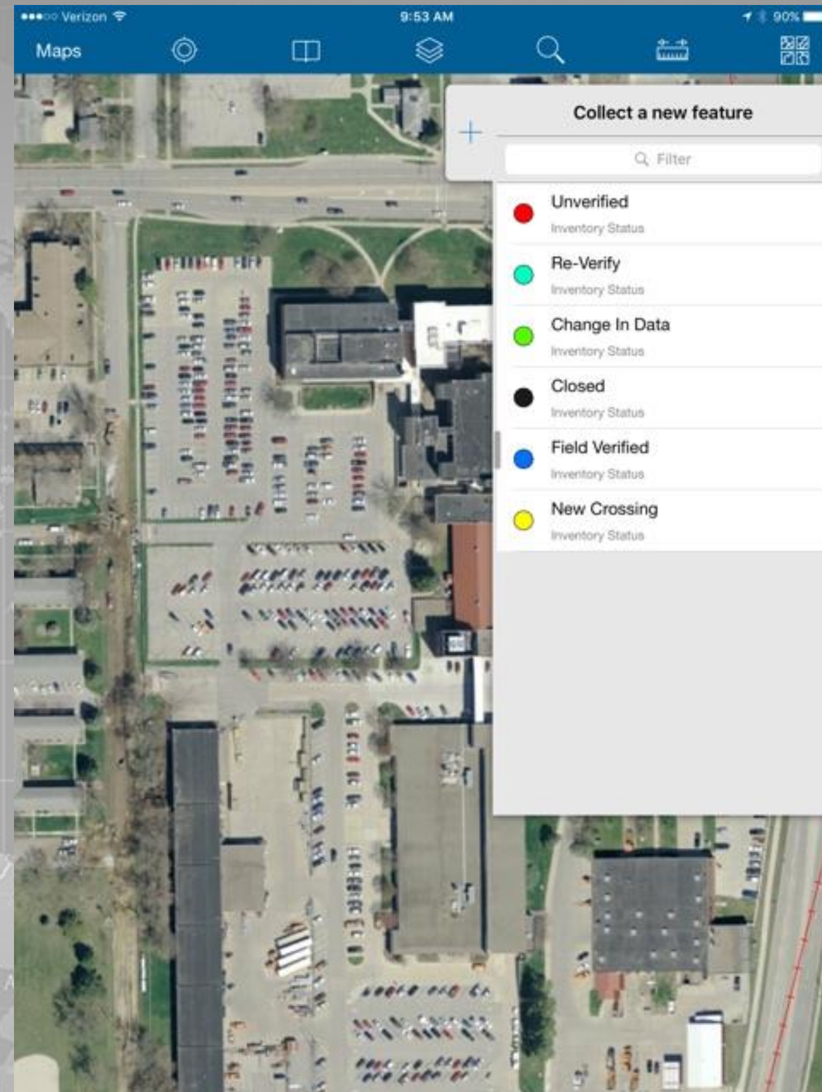
2016

- **Esri's Collector App**
  - Hosted in ArcGIS Online
  - Part of license agreement
  - Easy to add layers
- **Feedback from the field**
  - Lacked control of the forms
  - Limited validation
  - Offline work with caveats



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2017

fulcrum

- **Fulcrum App**
  - Hosted in the cloud
  - Per user pricing
  - Couldn’t easily add layers
- **Applied lessons learned**
  - Better control of the forms
  - Customizable validation
  - Work offline at any time

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Equipment

Hardware

- iPad Tablet
  - Cell Plan
  - Otterbox
  - Accessory kit
- Garmin
- Power inverter
- External battery

Other Equipment

- Laser range finder
- Digital measuring wheel

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Numbers

2016 – Collector App

- 1,770 verified
- 63 closed
- 22 new crossing
- 13 construction

1,868 total crossings

2017 – Fulcrum App

- 2,061 verified
- 58 closed
- 30 new crossing
- 27 construction

2,176 total crossings

5,324 total records
1,309 left that are unverified

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Costs

Costs per year *(based on 2017)*

- $24,000 payroll
  - Includes $8,000 expenses
- $1,200 vehicle expenses
- $640 app expenses

$25,840

$11.76 / crossing
Includes travel time

Total Costs *(estimate over 3 years)*

- $62,000 payroll
  - $20,000 expenses
- $3,100 vehicle expenses
- $1,920 app expenses

$67,020

Does not include staff time (QA/QC)

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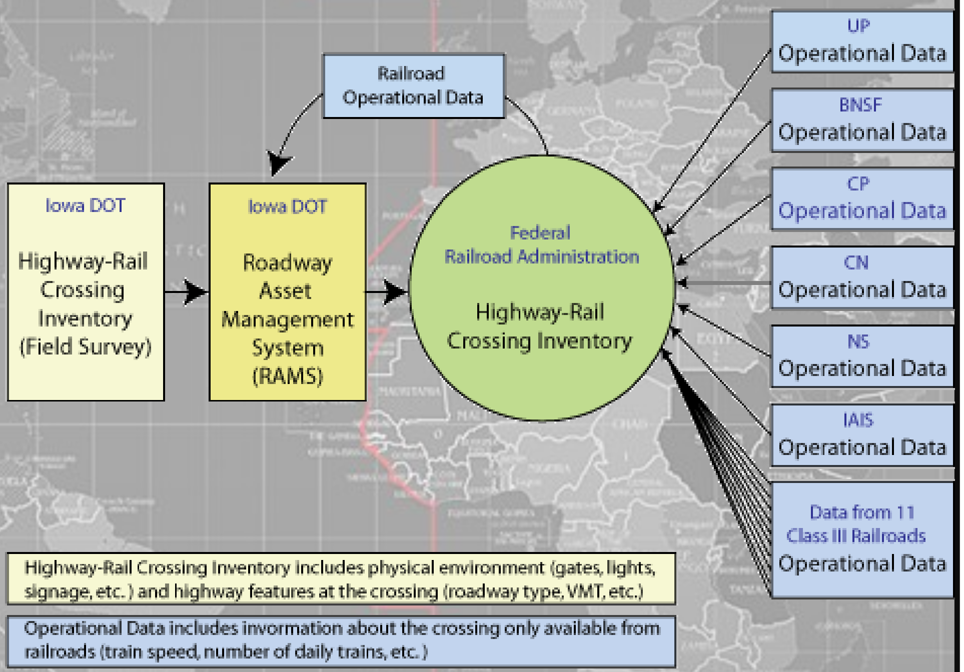
Data Management

- **Federal Railroad Administration (FRA) database**
  - Railroads & DOTs update
- **Rail data from FRA**
  - Iowa DOT's RAMS database
  - Roadway Asset Management System
- **Office quality checks**
  - Comparing multiple databases
  - 10 minutes per crossing
- **Future**
  - Photos will be connected to RAMS
  - More automation between field collection and RAMS
  - Collecting data that cannot be obtained from a physical inventory



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App Demo

https://web.fulcrumapp.com/

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THANK YOU

FOR YOUR ATTENTION

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