Hubbell Avenue Safety Improvements

Des Moines, Iowa

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Hubbell Avenue Safety Improvements

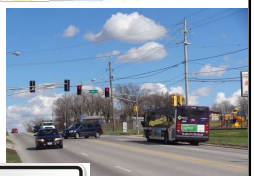
- History and Purpose
- Corridor Characteristics
- Alternatives
- Data Collection
- Design

Hubbell Avenue
History & Purpose

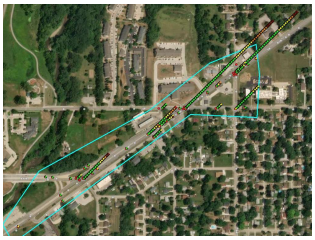
Hubbell Avenue
Corridor Characteristics

Hubbell Avenue
Corridor Characteristics

- Average Daily Traffic
  - 2015 – 19,000 to 24,000 vpd
  - 2045 – 22,000 to 28,000 vpd
  - Directional Movements in AM and PM Peaks
- Transit Access along Corridor
- Speed
  - 85th %-tile Indicates Compliance
  - East Extent Slightly Higher Speeds



Hubbell Avenue
Corridor Characteristics – Crashes*



- Manner of Crash
  - Broadside
  - Rear-end
  - Angle, On-Coming Left
- Severity
  - 2 Fatalities
  - 9 Major Injury
  - 17 Minor Injury

*2011-2015

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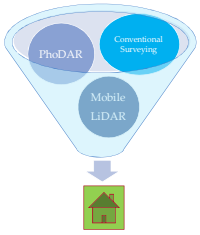
Alternatives Explored

- Incorporate Traffic, Safety, and Public Input
- Working with Iowa DOT
- Design Concepts
  - Roundabout Alternative
  - Two Way Left Turn Lane Alternative
  - Medians with Signals Alternative

Remoting Sensing Technology



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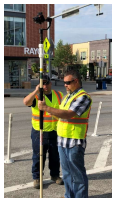
Data Collection Approach

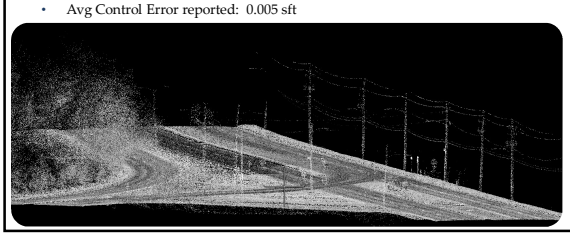
- Project Control
- Mobile LiDAR
- sUAS (fixed wing/multirotar)
- Vehicle mounted PhoDAR
- Traditional boots on the ground



Mobile LiDAR – Data Capture

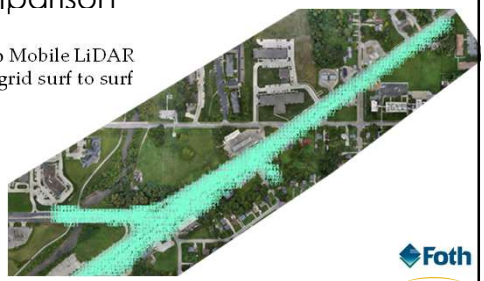
Results

- Total point cloud captured comprised of 456,766,157 pts.
- Avg Control Error reported: 0.005 sft
- NSSDA Vert Accuracy @ 95% Confidence: 0.019 sft



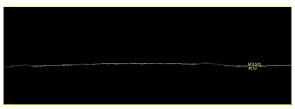
Data Comparison

- UAS surface to Mobile LiDAR control – 25 ft grid surf to surf comparison.

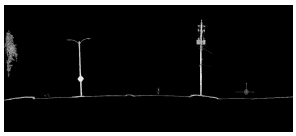


Data Comparison Cont....

sUAS



Mobile Scan



Data Comparison Results

Results

- Expected Ht accuracy based on processing engine used 1-2 pixels (0.075 x 2) = 0.15 ft
- ACTUAL:
  - Combination of Hard Surf and Soft areas: 0.10 ft Avg (871 pts)
  - Hard Surface areas: 0.07 ft Avg (713 pts)
- Improving UAS Accuracies:
  - Increase accuracy through lower flight
  - Employ higher resolution camera capability and lens (36 Mp with 35mm lens), 300ft AGL
  - 0.04 ft GSD x 2 = 0.08 ft

Conclusion

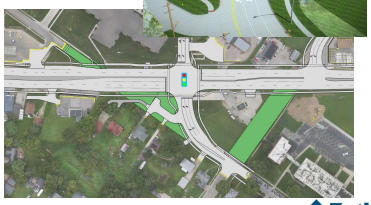
Project Conclusion

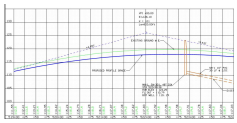
- Mobile LiDAR
  - Higher overall absolute accuracy and precision for demanding urban corridor mapping
  - Limited site capture due to vehicle access
  - Economics of site size
  - Understructure data capture (bridges)
- UAS
  - Rapid deployment, good positional accuracy
  - Top-down site coverage
  - Additional Control/Lower Flight Height/Sensor - can yield higher accuracy
- Project hybrid approach offers expanded deliverables and able to capture the ENTIRE site, provide current high-res ortho imagery for design and communication.

Safety Improvements

Improved Sight Distance

- Realigned Skewed Intersections
- Address Crest Vertical Curve Issues

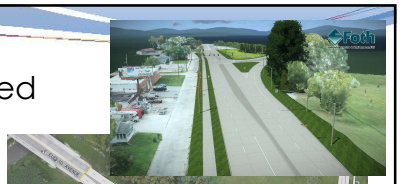




Safety Improvements

Influencing Speed

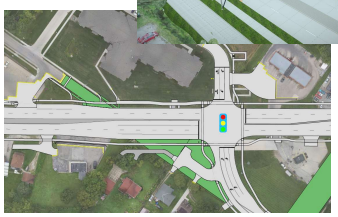
- Removed All-Way Stop
- Installed Traffic Signal
- Redesign of Free Right
- Relocated Traffic Signal



Safety Improvements

Managing Access

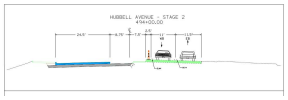
- Raised Median
- Combine/Limit Access
- Iowa DOT and City Access Rights
- Improved Pedestrian Facilities
- Pedestrian Crossings



Design tools

OpenRoads Advantages

- Dynamic changes
- Quick, Detailed Cross-Sections
- Feature Definitions
- Machine Control Grading Files
- Base Object for a Virtual Reality Model with high level accuracy



Design Tools

SUDA

- Subsurface Utility Engineering
- Full Storm Sewer Modeling
- Existing and Proposed Utilities
- Conflict Detection

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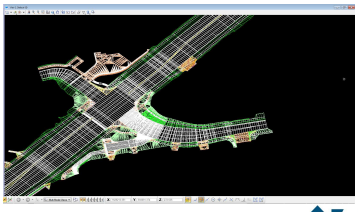
Opportunities Presented

- Aerial Imagery
- Encompassing Existing Surface
- OpenRoads/SUDA
- Increased Utility Management
- Evolving toward Electronic Deliverables
- Virtual Reality
- Internal Investment in Technology



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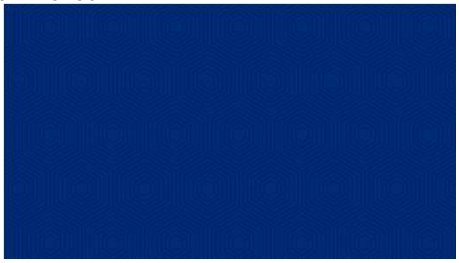

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