

WSDOT Construction

The Headlight Inspection Tool Pilot Project

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About WSDOT

- Total lane miles: 18,689 (state-owned)
- Bridges: 3,765
- Ferries: 22 vessels on 10 routes (carried 22.8 million passengers last year)
- Passenger rail: 11 Amtrak Cascades trains daily, approx. 780,000 riders
- New \$16B funding package



Delivering Projects

As a public agency delivering transportation projects, WSDOT has a business need **to properly inspect, observe and document** the activities on our construction project sites

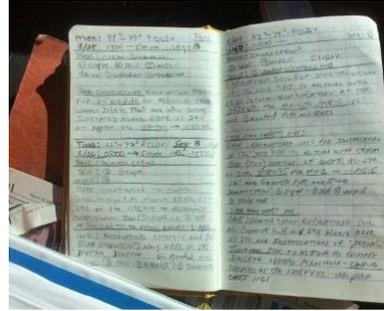


WSDOT Inspection Needs

- Verify quality
- Confirm proper location and installation
- Measure product for timely payment to contractors
- Fulfill other legal obligations, DBE, Apprenticeship, Environmental Permit compliance
- Document project incidents for legal purposes (traffic control, work zones, incidents, etc.)
- Preserve our permanent records for up to 75 years

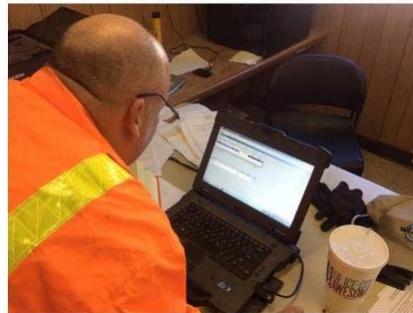
Old School Tool of Choice?

- Paper forms and documents
 - Inspectors Daily Reports
 - Field Note Records
 - Traffic Control Reports
 - Materials documentation
 - On and on.....



Challenges exist...

- Requires multiple entries of the same data in multiple locations
- Forms can't share data
- Opportunity for error
- Usually filled out at the end of shift = time away from the field (or overtime?)



Challenges exist...

- Only hand searchable
- Requires physical storage, security and archiving
- Requires the paper document to physically change locations as it moves through the process



Baby Steps...

- Cell phones, lap tops and smart phones are already in use and familiar
- Some offices already using electronic forms, but printing and storage still needed
- Digital photographs in use, but no way to link or tag them
- Electronic forms that can't share data or aren't searchable is not enough



Other WSDOT eConstruction

- BidX electronic bidding
- Web based reporting by contractors for contract apprenticeship and DBE participation
- ECM Portal electronic final records storage – meets 75 year records retention law – in pilot phase
- Electronic plans and specs available – but not mandated or exclusive
- Change order documents electronic storage – unofficial files
- Electronic database of bridge and structure as build plans
- 3D modeling for conflict management/resolution on recent large complex projects (pontoon construction, tunnel life safety retrofit)

WSDOT Goals

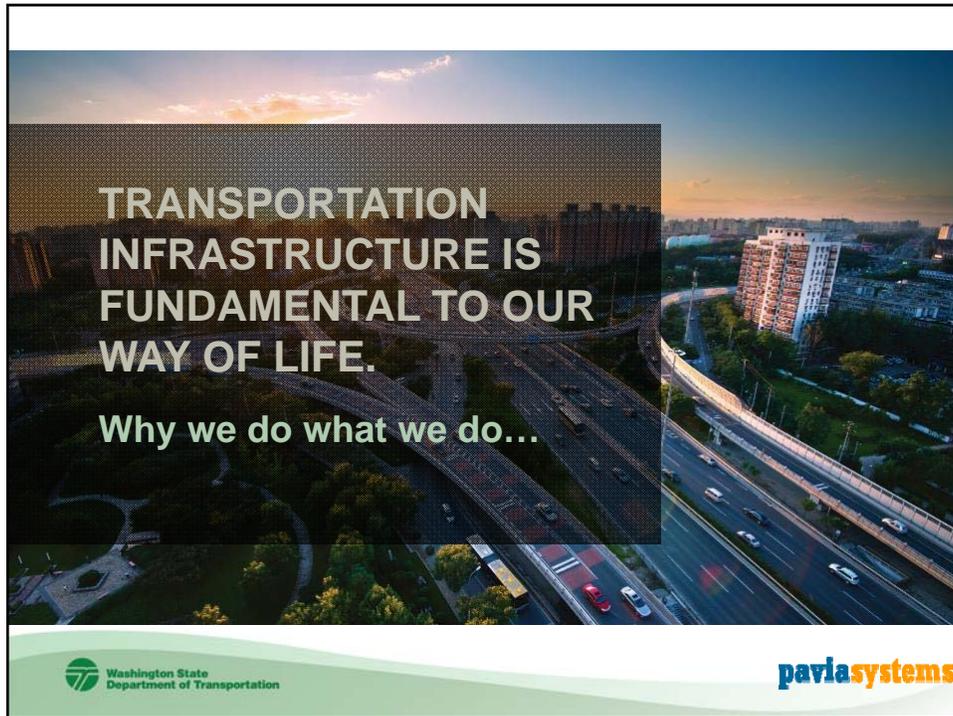
- Move to a paperless office – electronic forms instead of paper and carbons and boxes of records
- Data resides in a searchable location, where data is shared and tagged
- “Collect once, use many”
 - Reuse the data to populate many forms
- Electronic project delivery from conception to final records and archives

WSDOT Goals

- Data is easily collected by inspectors and easily used by office personnel
- Provide field access to project documents
- Use latest wireless and cellular technology to help our inspectors

Research

- The WSDOT Research Office began investigating opportunities for new inspection technologies
- WSDOT led a research project with two other state transportation agencies (Minnesota and Texas) to explore the use of wireless devices to increase productivity, data quality and data availability



**TRANSPORTATION
INFRASTRUCTURE IS
FUNDAMENTAL TO OUR
WAY OF LIFE.**

Why we do what we do...

 Washington State
Department of Transportation

 pavia systems



PAVIA'S MISSION

To **transform** the **capabilities** of organizations in the **transportation industry** through the practical use of remarkable technologies.

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Opportunities to evolve



Real Time Strategic Project Inspection

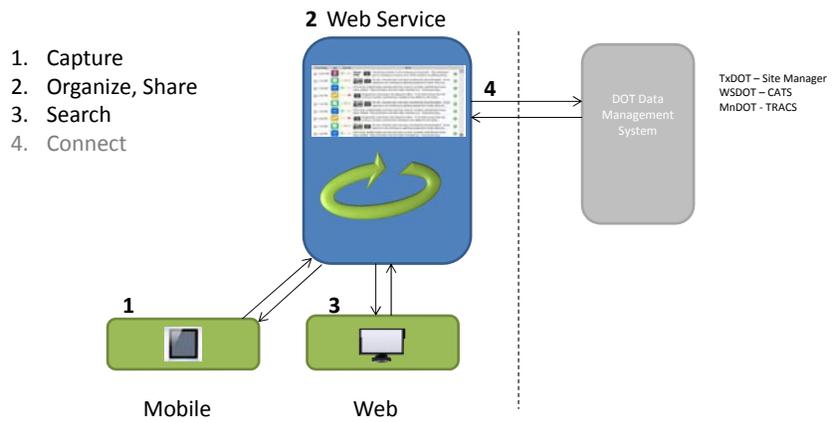


PILOT SYSTEM - HEADLIGHT



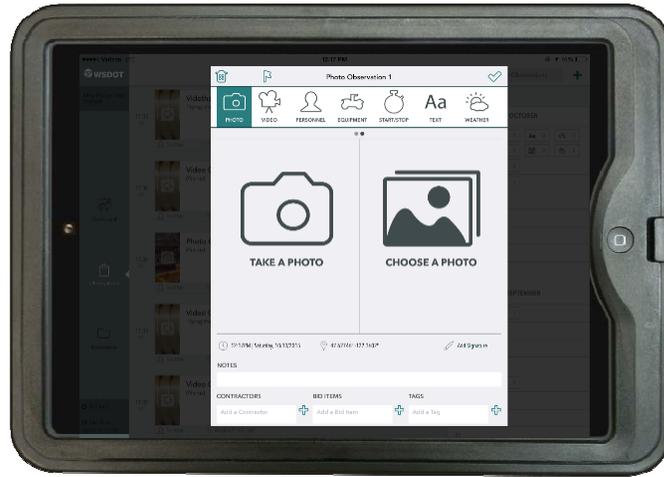
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HIGH LEVEL SYSTEM DIAGRAM



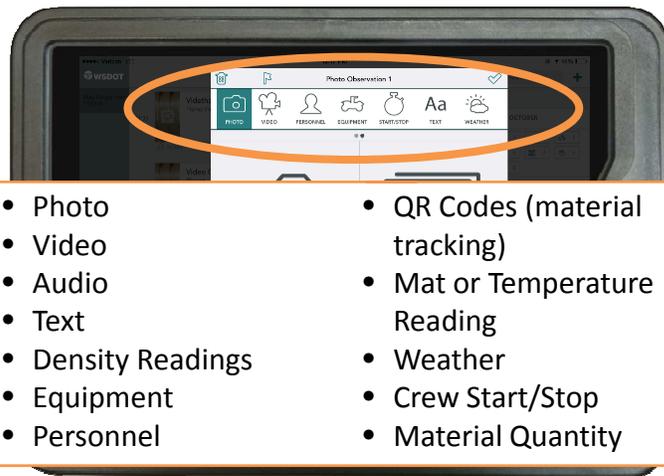
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PILOT SYSTEM – FIELD NOTEBOOK



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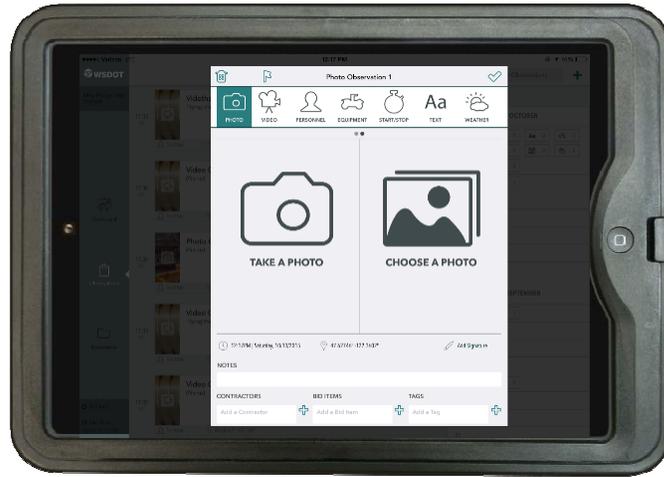
PILOT SYSTEM – FIELD NOTEBOOK



- Photo
- Video
- Audio
- Text
- Density Readings
- Equipment
- Personnel
- QR Codes (material tracking)
- Mat or Temperature Reading
- Weather
- Crew Start/Stop
- Material Quantity

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PILOT SYSTEM – FIELD NOTEBOOK



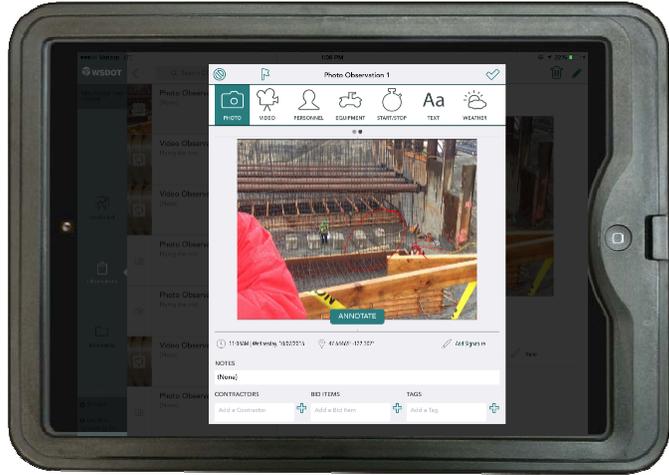
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PILOT SYSTEM – FIELD NOTEBOOK



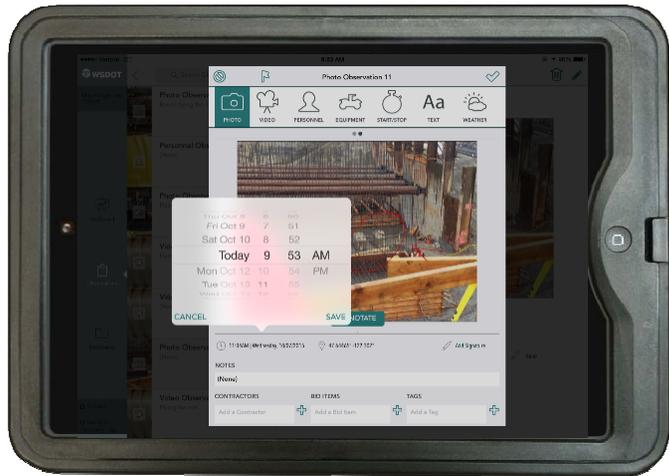
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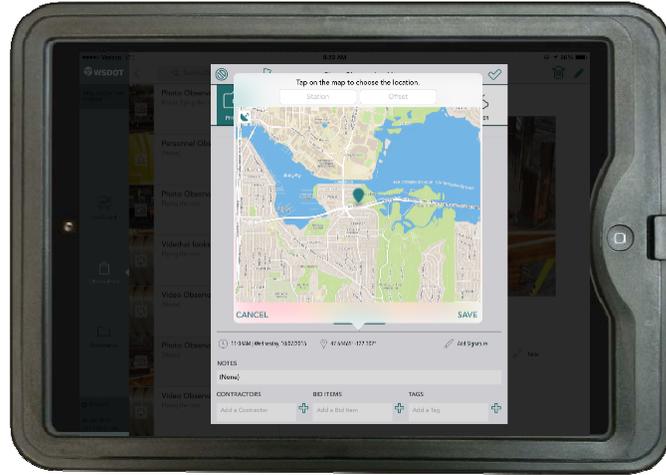
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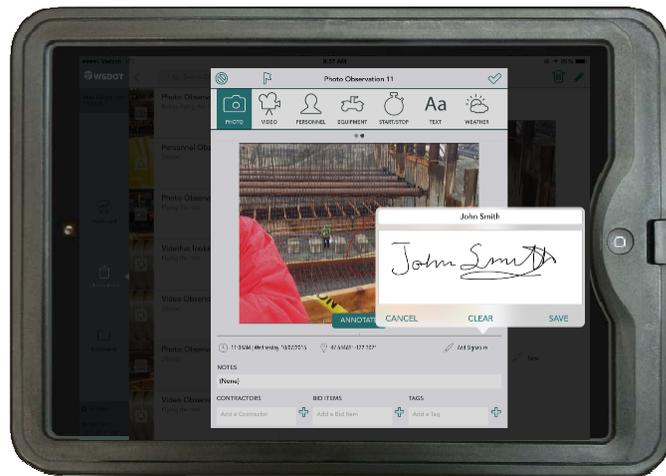
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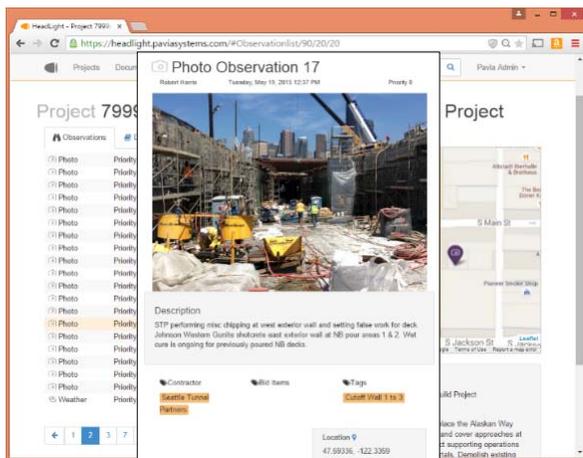
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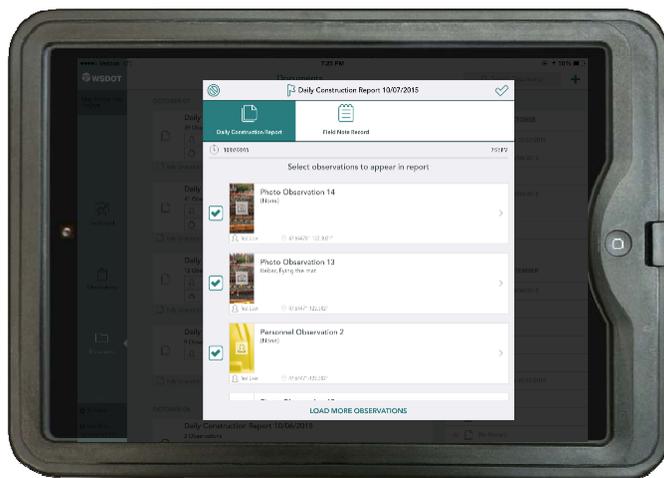
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PILOT SYSTEM – OFFICE VIEW



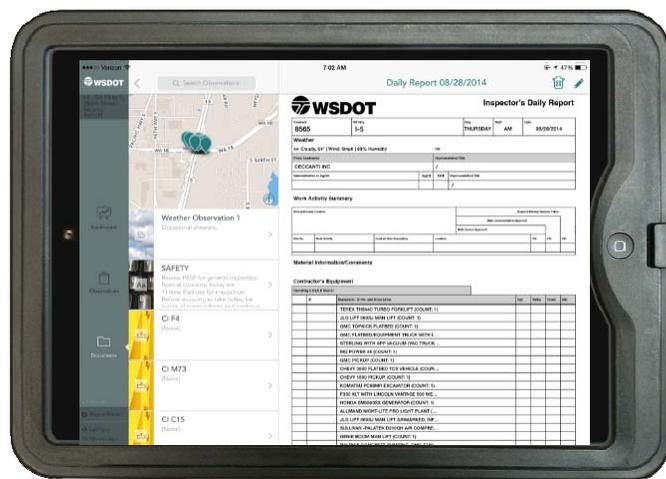
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PILOT SYSTEM – DOCUMENTATION



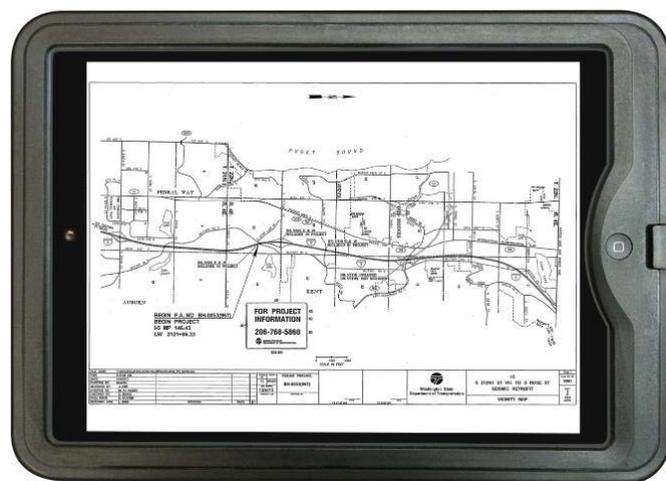
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PILOT SYSTEM – DOCUMENTATION



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PILOT SYSTEM - REFERENCES



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REAL WORLD PROJECTS

Used on 31 projects
totaling approximately
\$800,000,000

AGENCY	PROJECT COUNT	PROJECT BUDGETS
 WSDOT	7	\$24,676,814
	17	\$273,899,096
	7	\$501,055,413



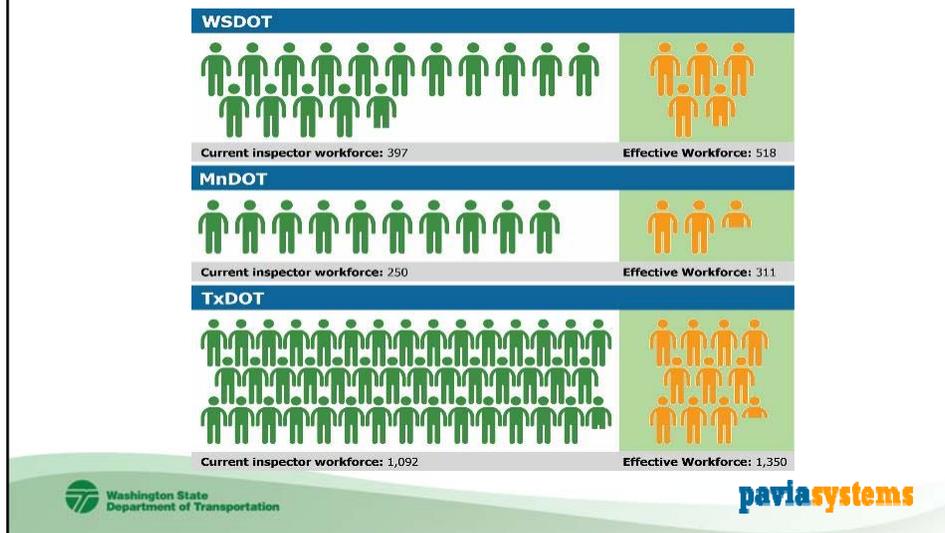
Pilot Results

Pilot showed that mobile devices with corresponding software makes inspectors more efficient and their jobs easier

- Average **time savings** of 1.78 hours
- Inspectors **collected 275 % more data**
- On time document submission **increased by 51%**



A more effective workforce



Current deployment...

- Approximately 100 different Headlight units deployed in 18 different project offices across the state for one year
- A variety of different project types, sizes and locations
- A second phase of research is funding further development of broader functions (more inspection forms)

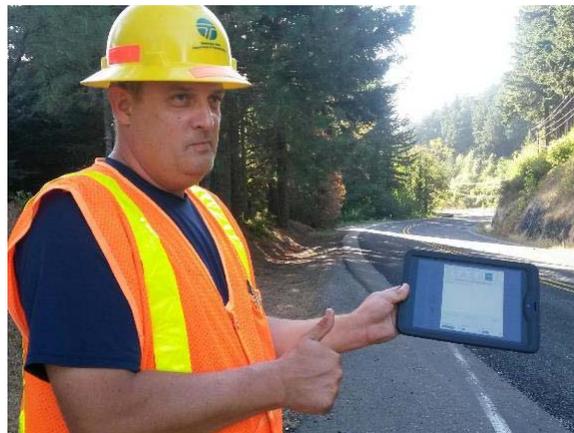
Obstacles we are tackling...

- Change management – easier for some
- Don't want to just add another device
- Need to duplicate the flow of documents through our system as much as possible
 - Same review process
 - Opportunity to correct, comment & approve
- Maintain data security (WSDOT firewall)
- Providing full access throughout our system to the inspection device

Obstacles we are tackling...

- Tagging and metadata to enable best possible searching
- Adapting to field inspectors preferences
- Creating use and application guides for how the device is used in each office and statewide
- Determining what type of connectivity is needed

To achieve the mission



Questions?

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