WSDOT Construction

The Headlight Inspection Tool Pilot Project

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Lynn Peterson
Secretary of Transportation

**Washington State
Department of Transportation**

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

Washington State Department of Transportation

Our Mission

The Washington State Department of Transportation provides and supports safe, reliable and cost-effective transportation options to improve livable communities and economic vitality for people and businesses.

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


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Why do we inspect?

We do this to fulfill our own contract management purposes, as well to as to fulfill our obligations to our funding partners, other regulatory agencies and to the taxpayers

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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

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Old School Tool of Choice?

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

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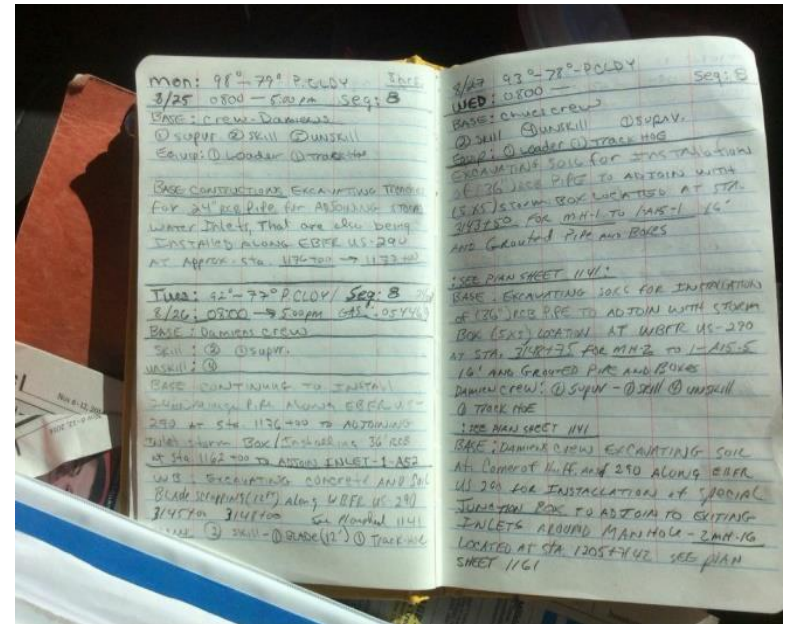
Challenges exist…

- 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?)

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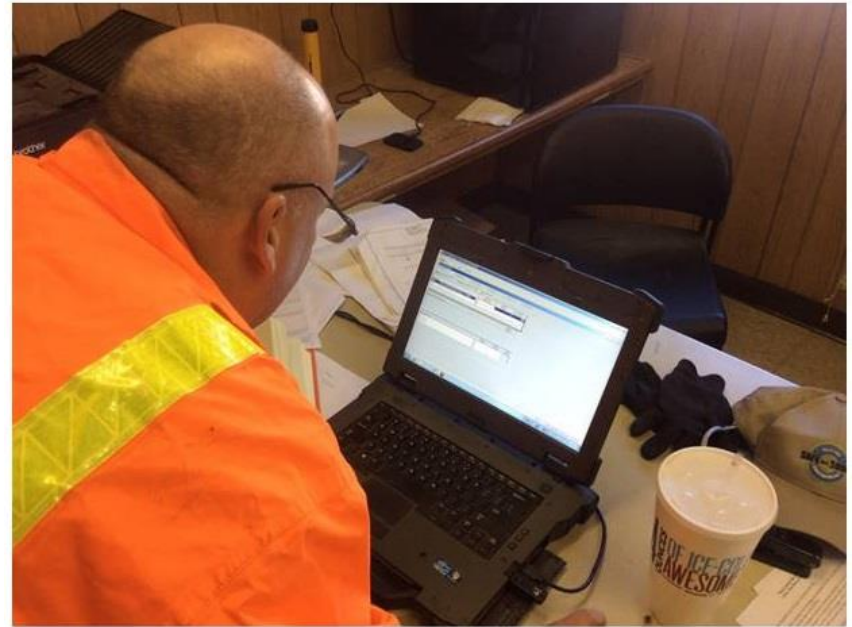
Challenges exist…

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

Other current practices…

- 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

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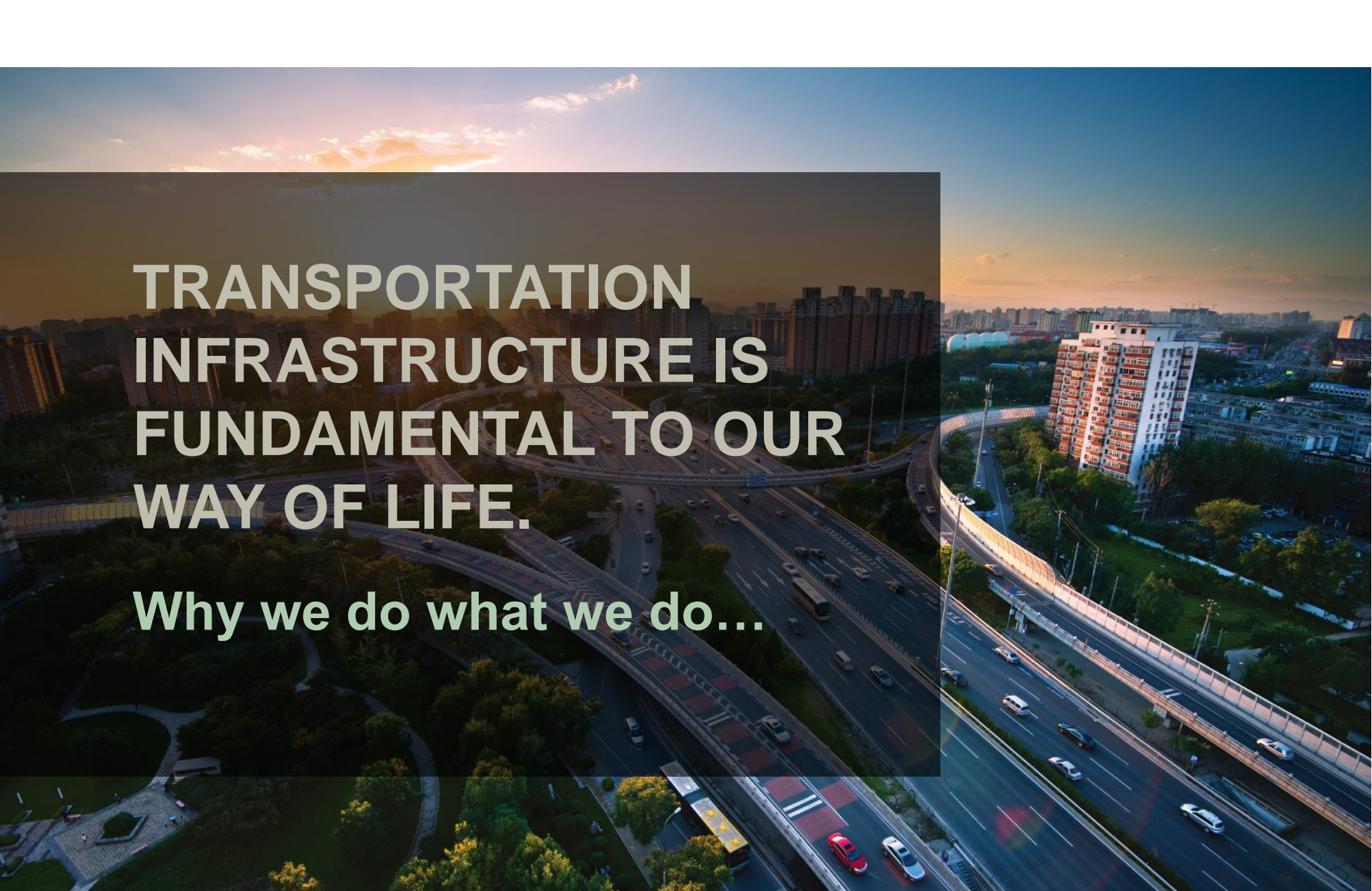
WSDOT Goals

- 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

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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

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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

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TRANSPORTATION INFRASTRUCTURE IS FUNDAMENTAL TO OUR WAY OF LIFE.

Why we do what we do…

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PAVIA'S MISSION

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

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TECHNOLOGY IS MAKING US MORE EFFICIENT!

Imagine if someone took away your navigation systems and left you with only a paper map…

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Opportunities to evolve
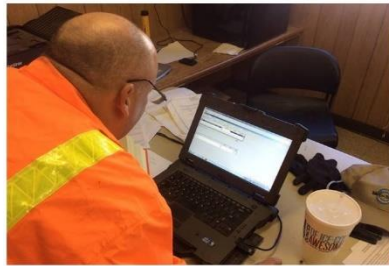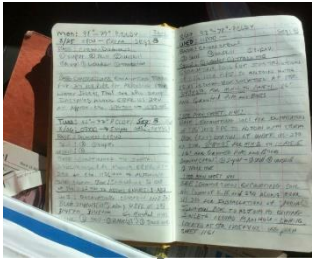
Headlight System Overview

2 Web Service

1. iOS Client
2. Web Service
3. Web Client
4. Interface

4

WSDOT Data Management System

1

3

Mobile

Web

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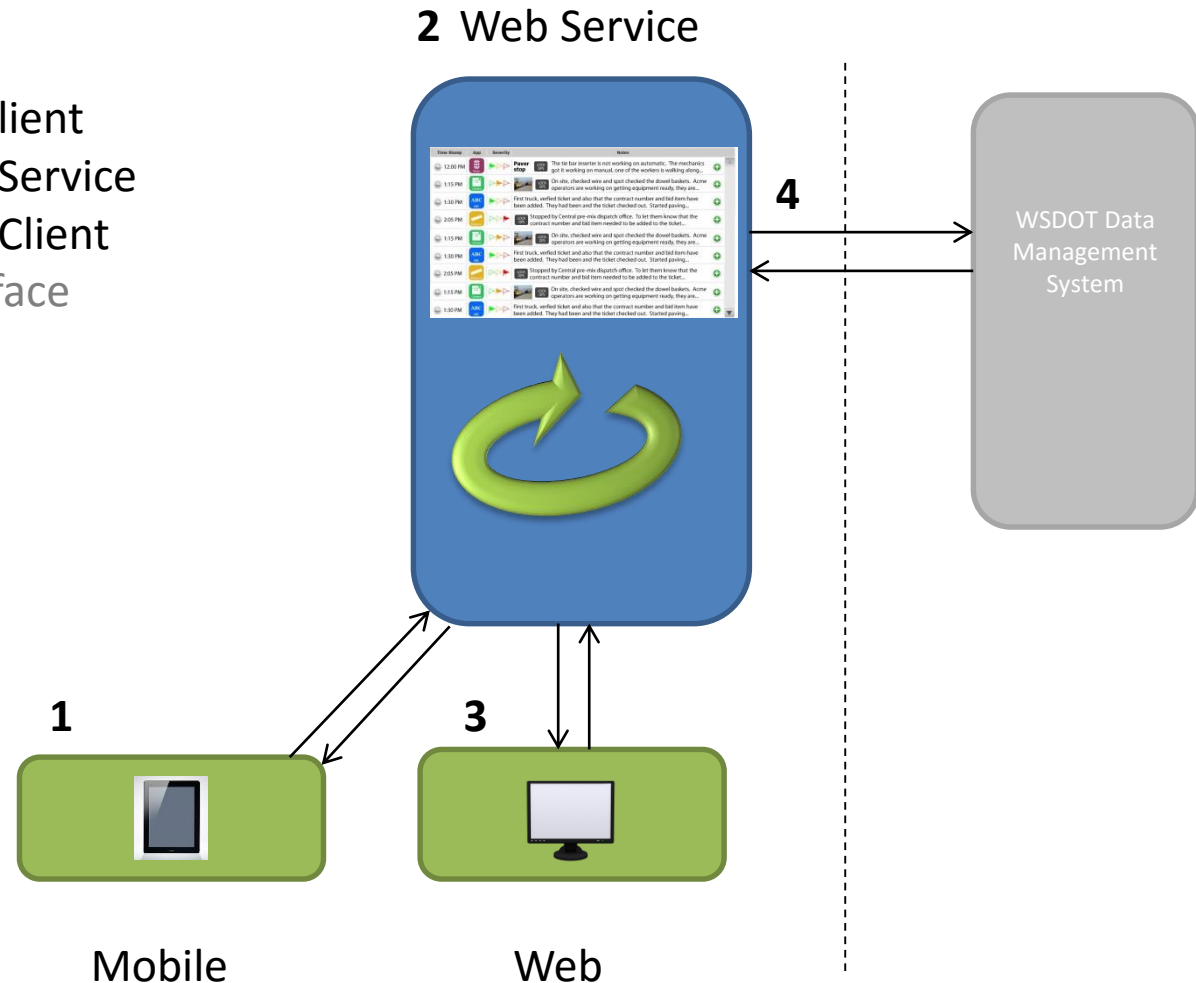
Headlight Inspection Units
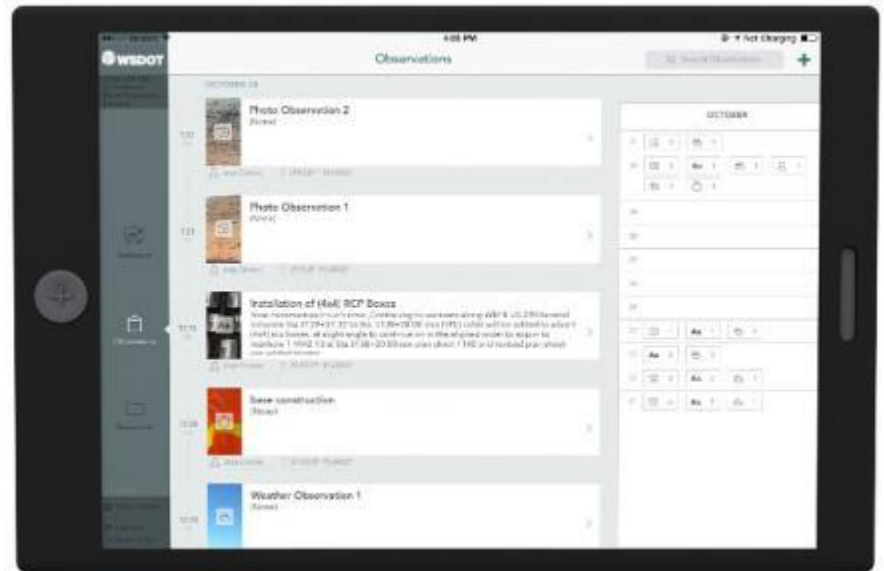
PILOT SYSTEM - HEADLIGHT

PILOT SYSTEM – FIELD NOTEBOOK
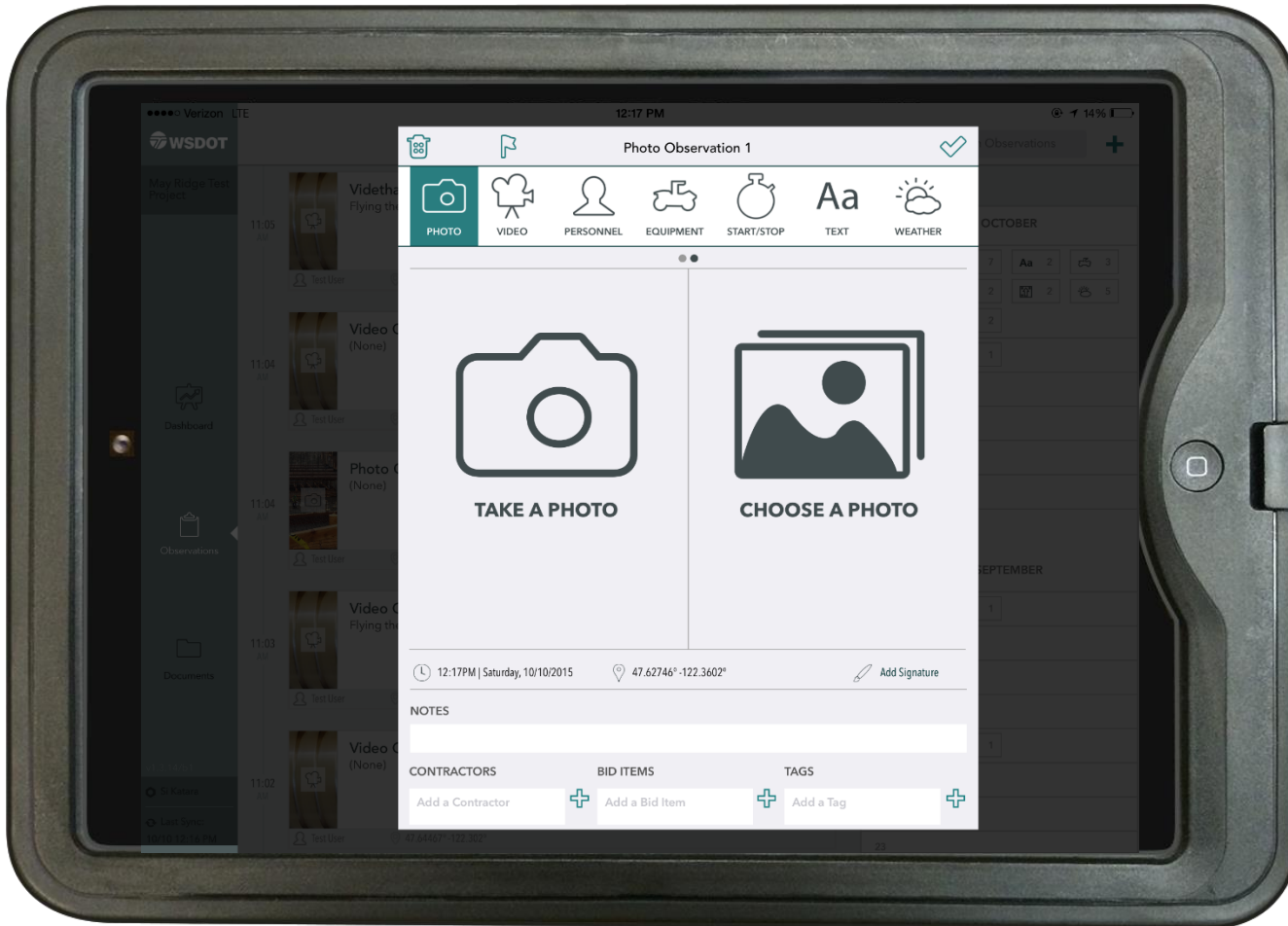
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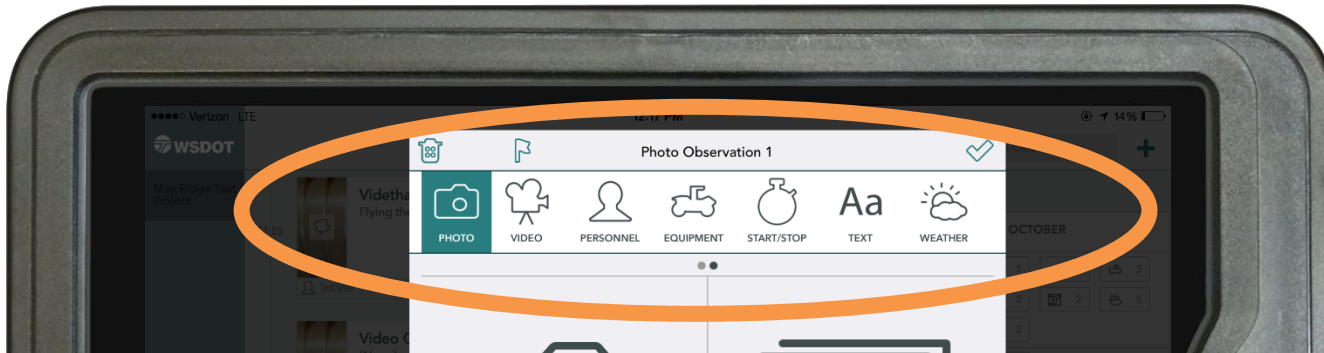
- Photo
- Video
- Audio
- Text
- Density Readings
- Equipment
- Personnel

- QR Codes (material tracking)
- Mat or Temperature Reading
- Weather
- Crew Start/Stop
- Material Quantity

PILOT SYSTEM – FIELD NOTEBOOK
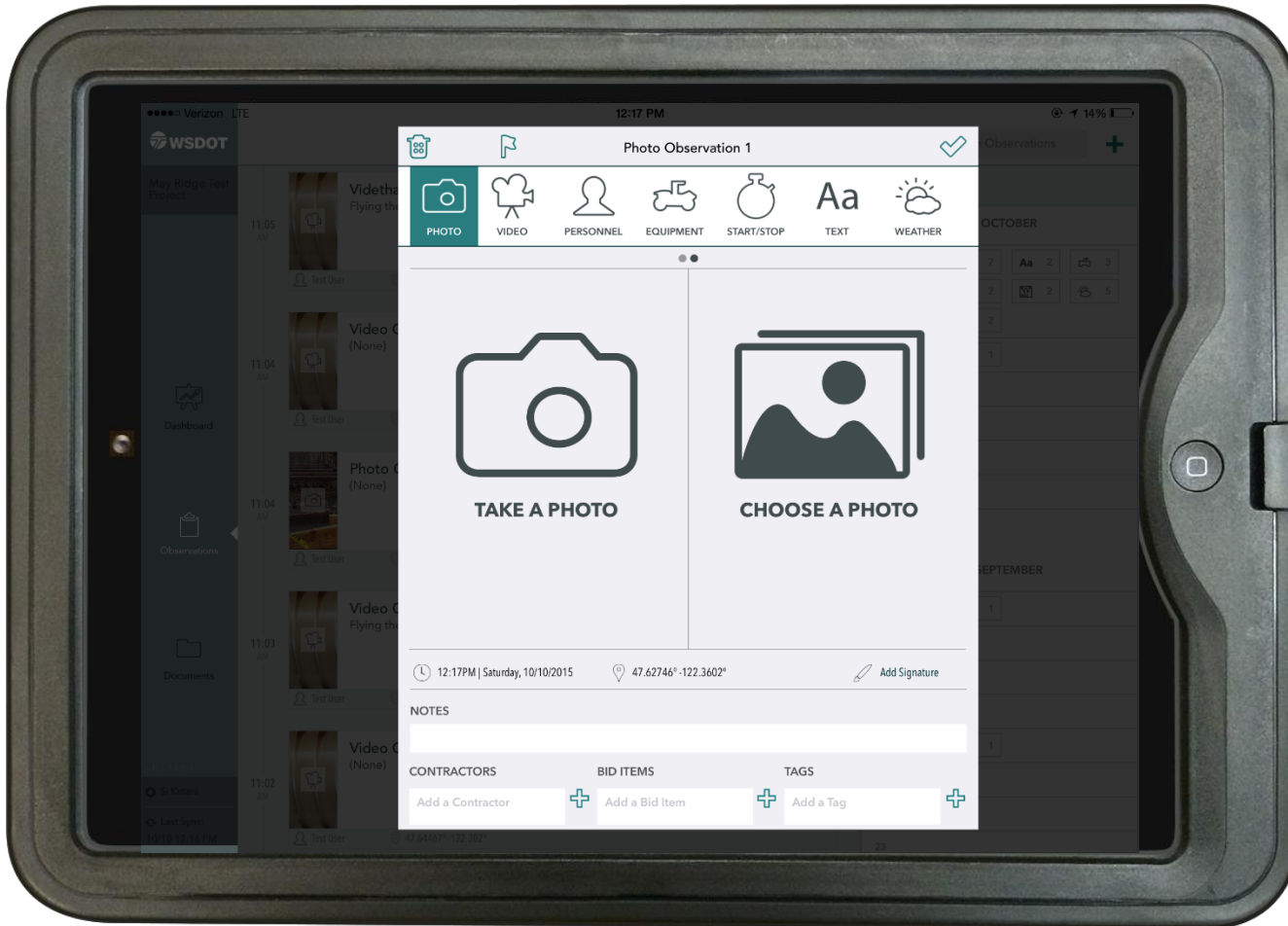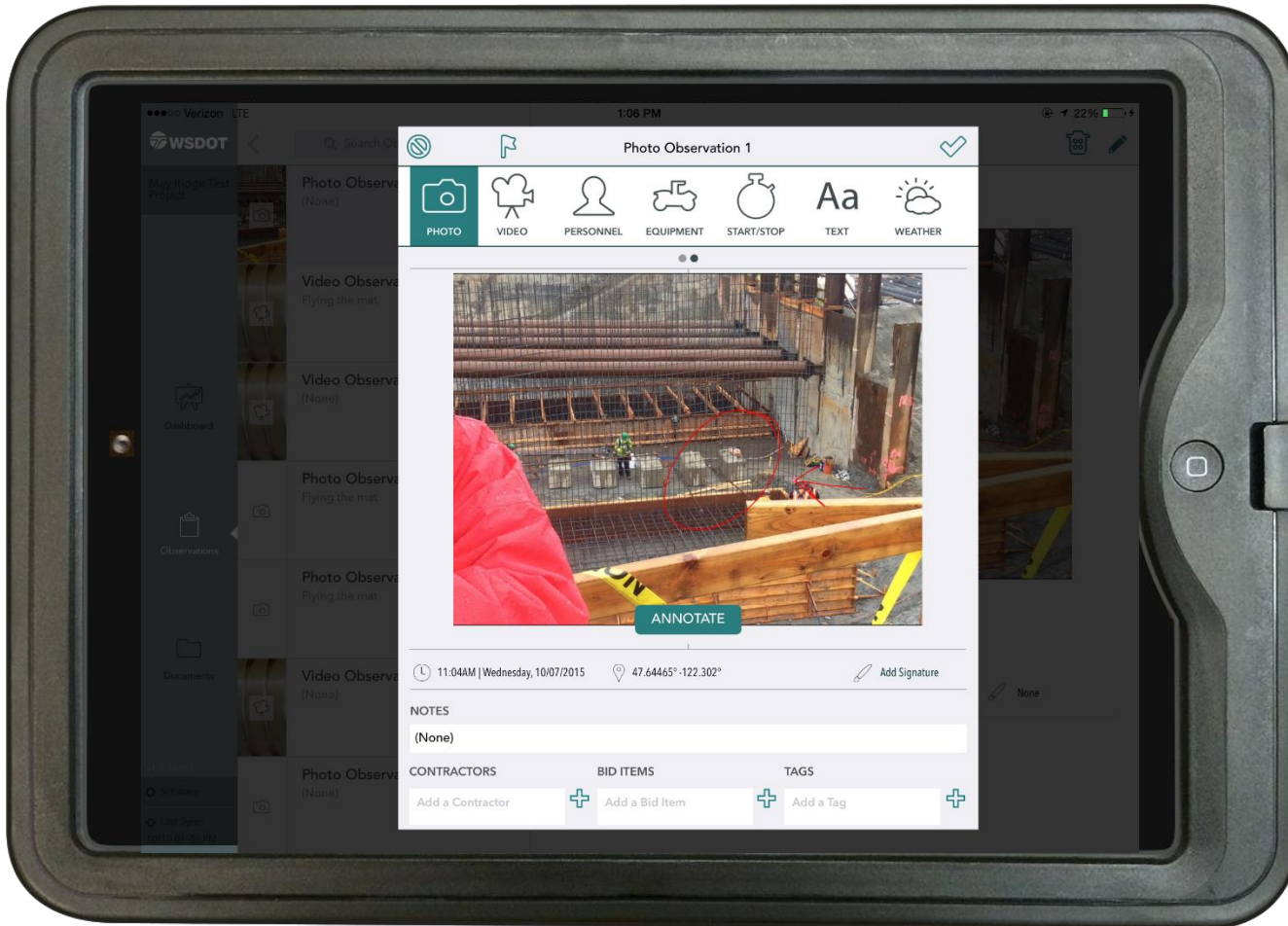
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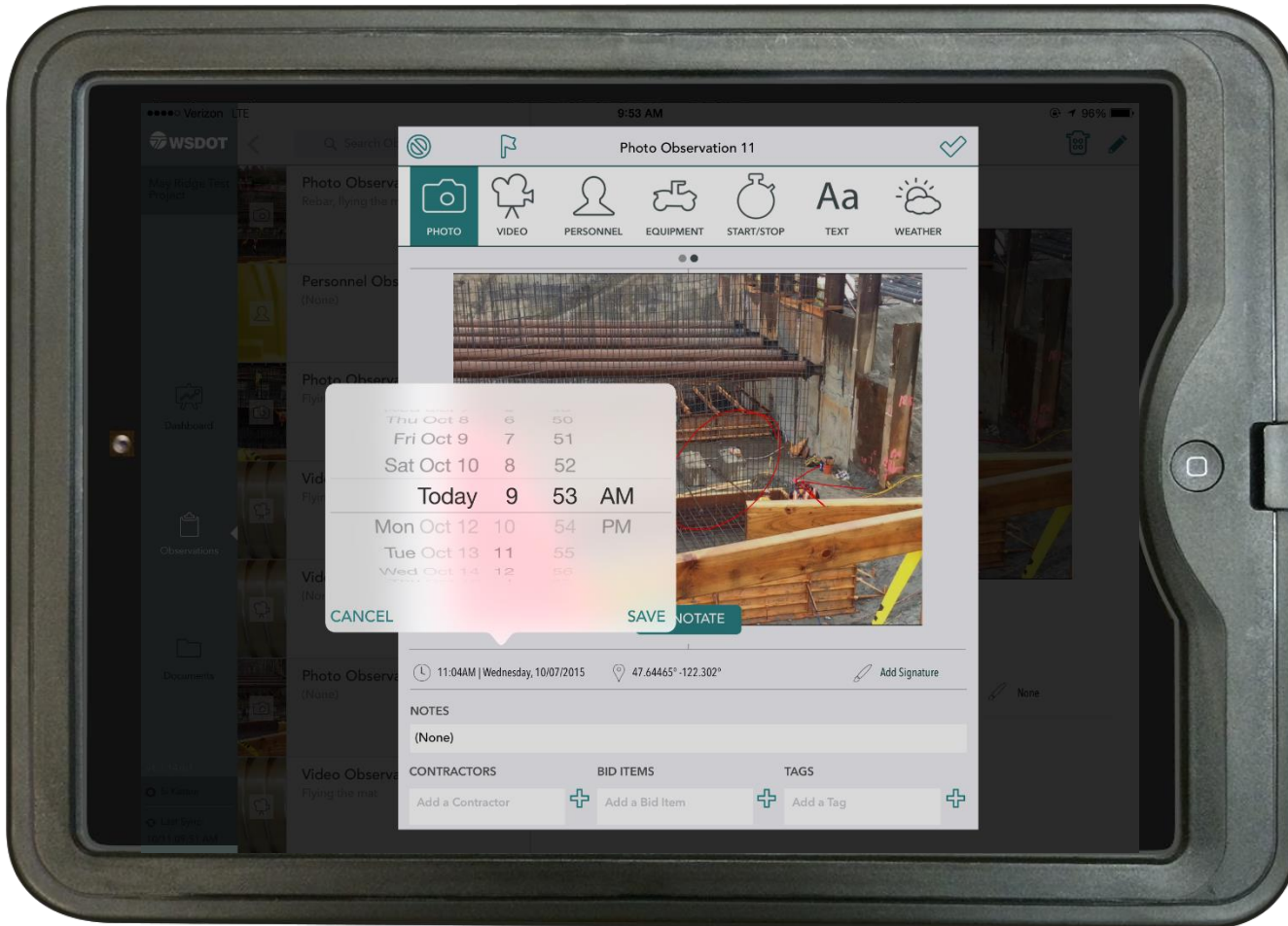
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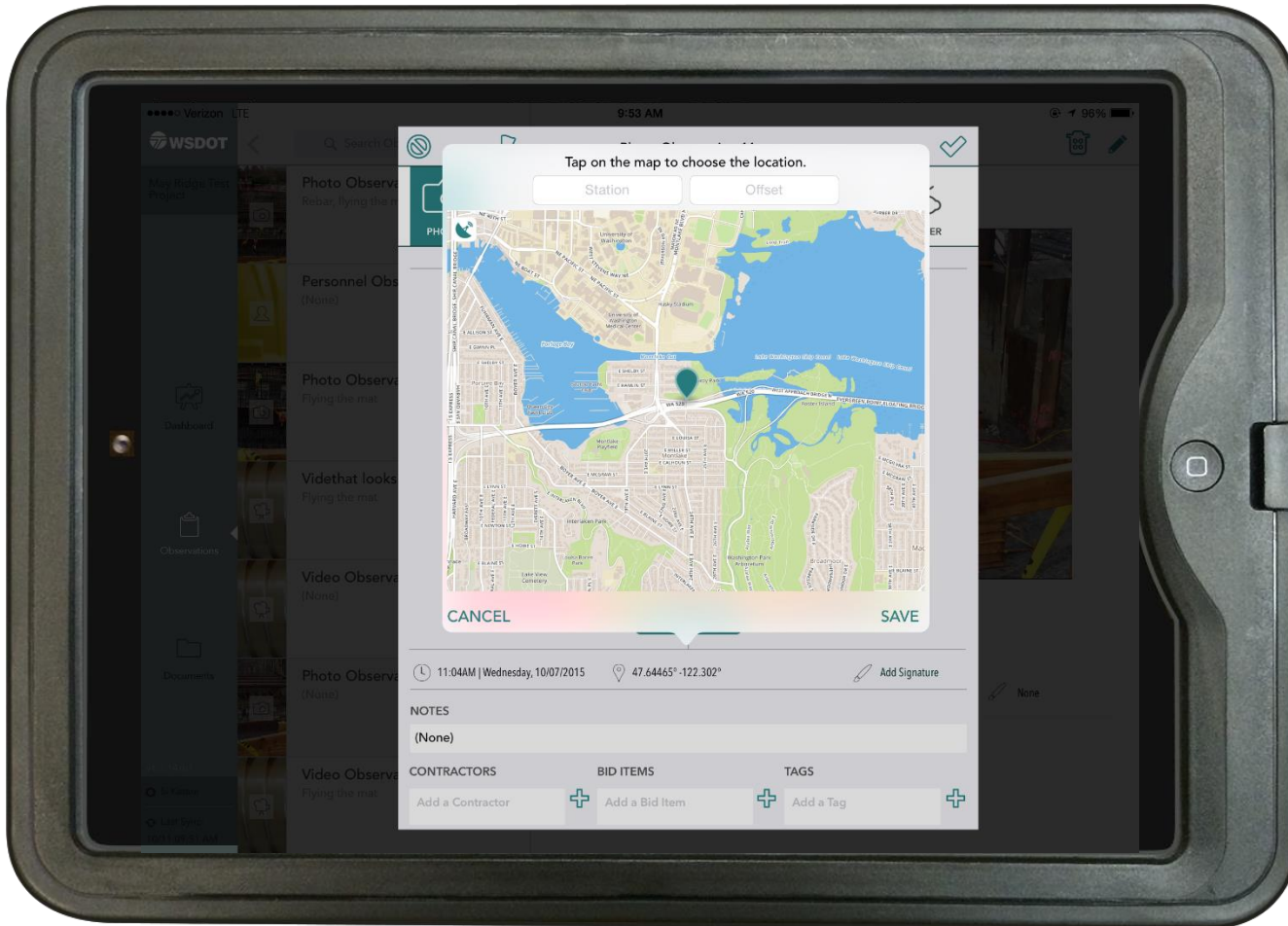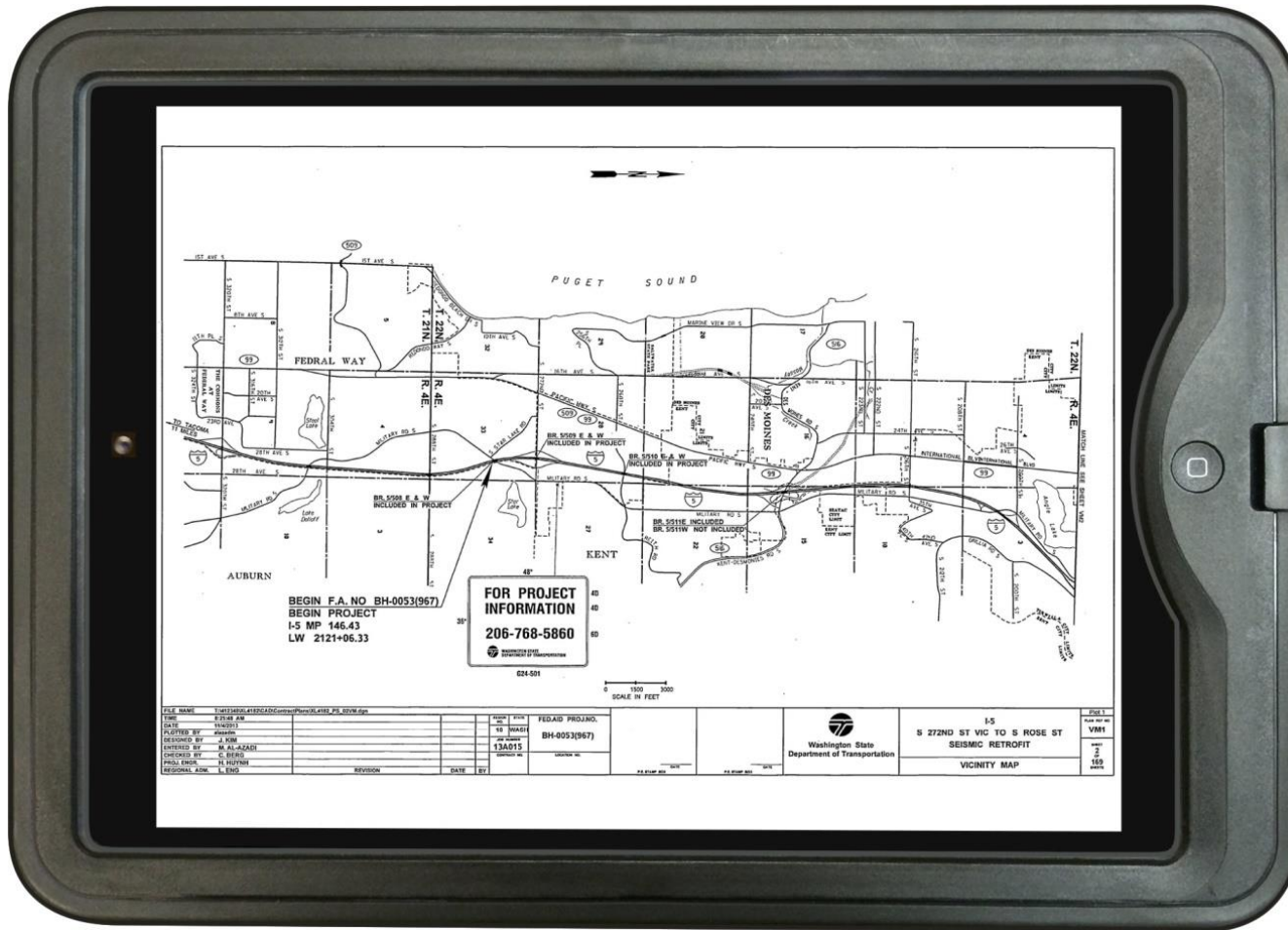
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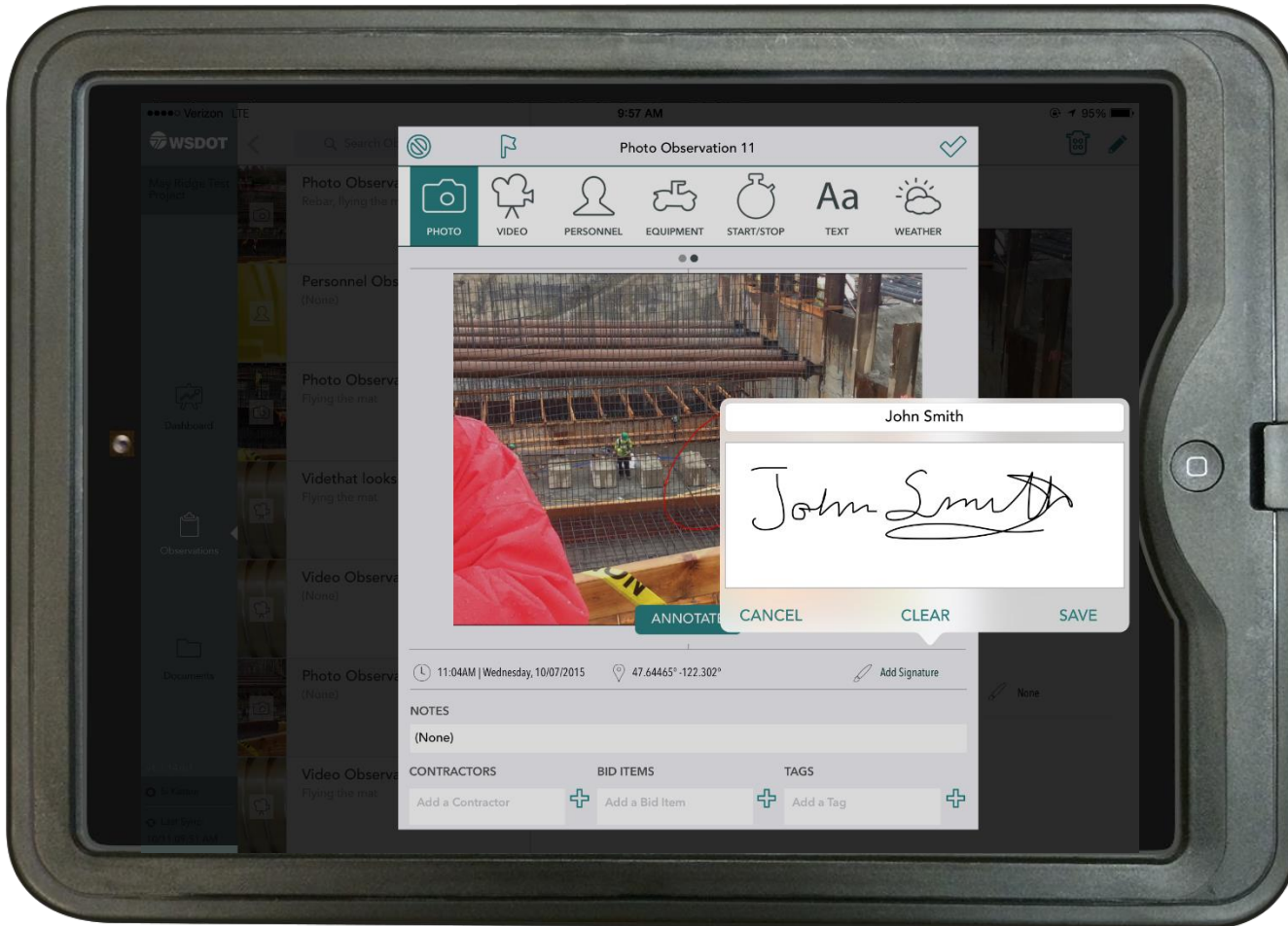
PILOT SYSTEM – OFFICE VIEW

PILOT SYSTEM – DOCUMENTATION

PILOT SYSTEM – DOCUMENTATION

PILOT SYSTEM - REFERENCES

REAL WORLD PROJECTS

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

AGENCY	PROJECT COUNT	PROJECT BUDGETS
WSDOT	7	$24,676,814
Minnesota Department of Transportation	17	$273,899,096
Texas Department of Transportation	7	$501,055,413

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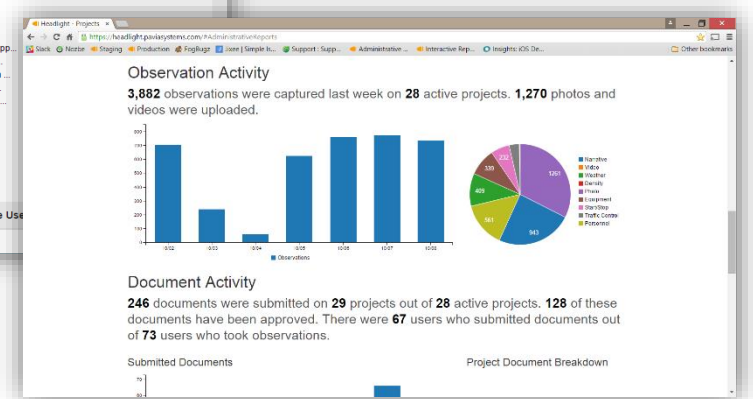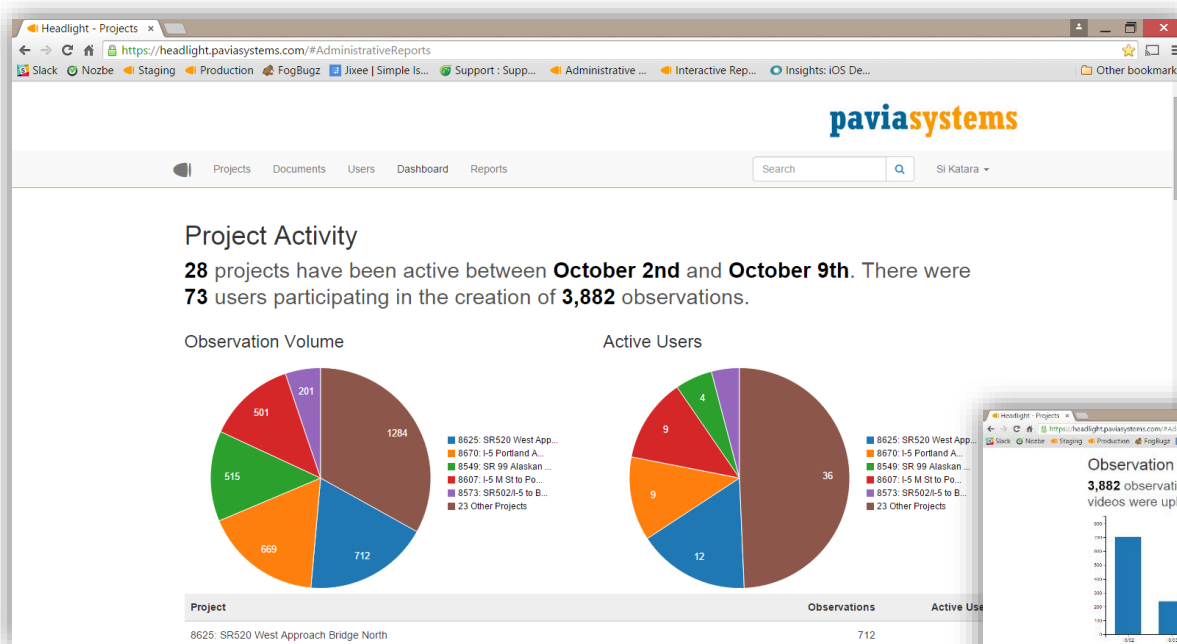
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Pilot Results

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
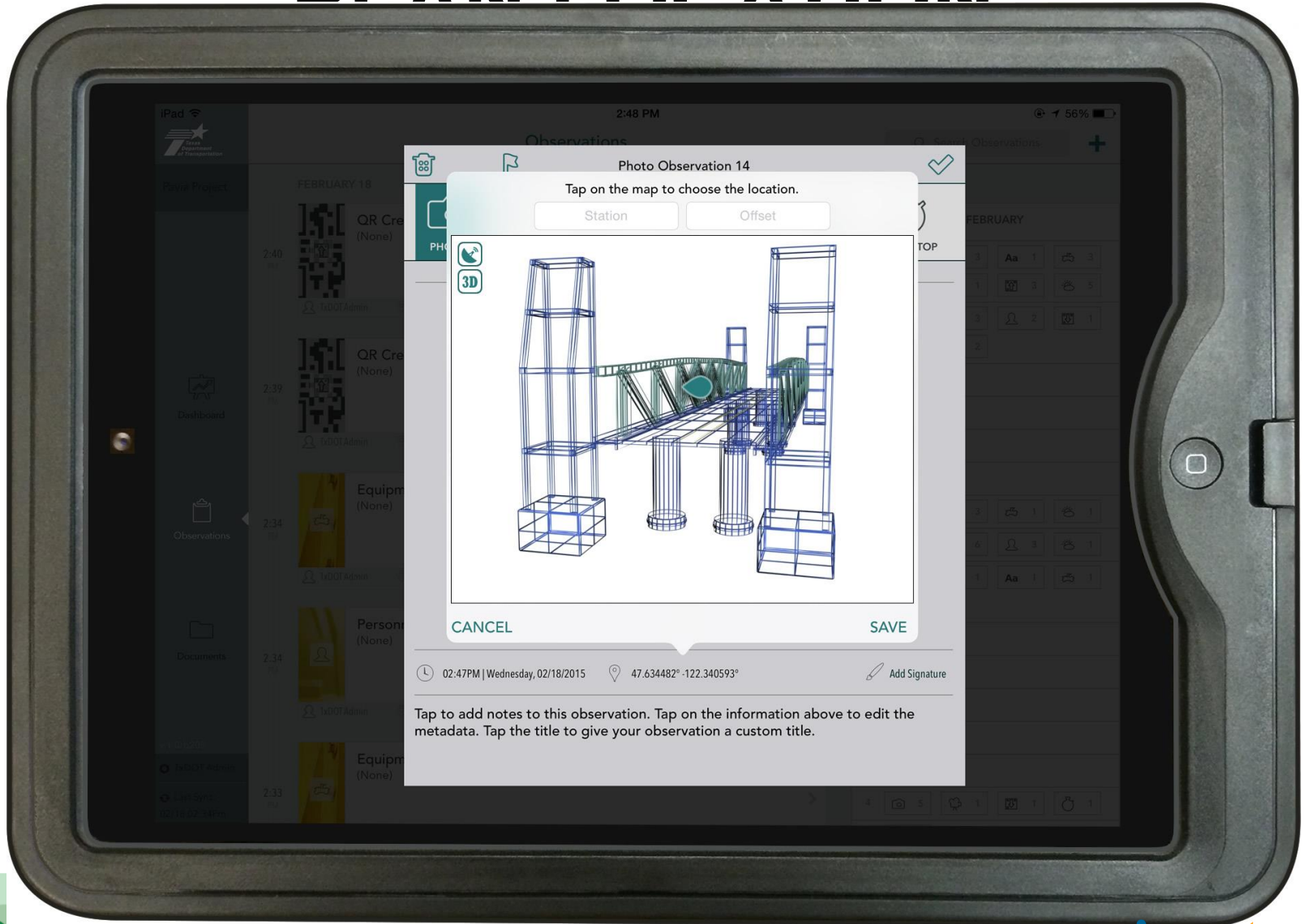
- On time document submission **increased by 51%**
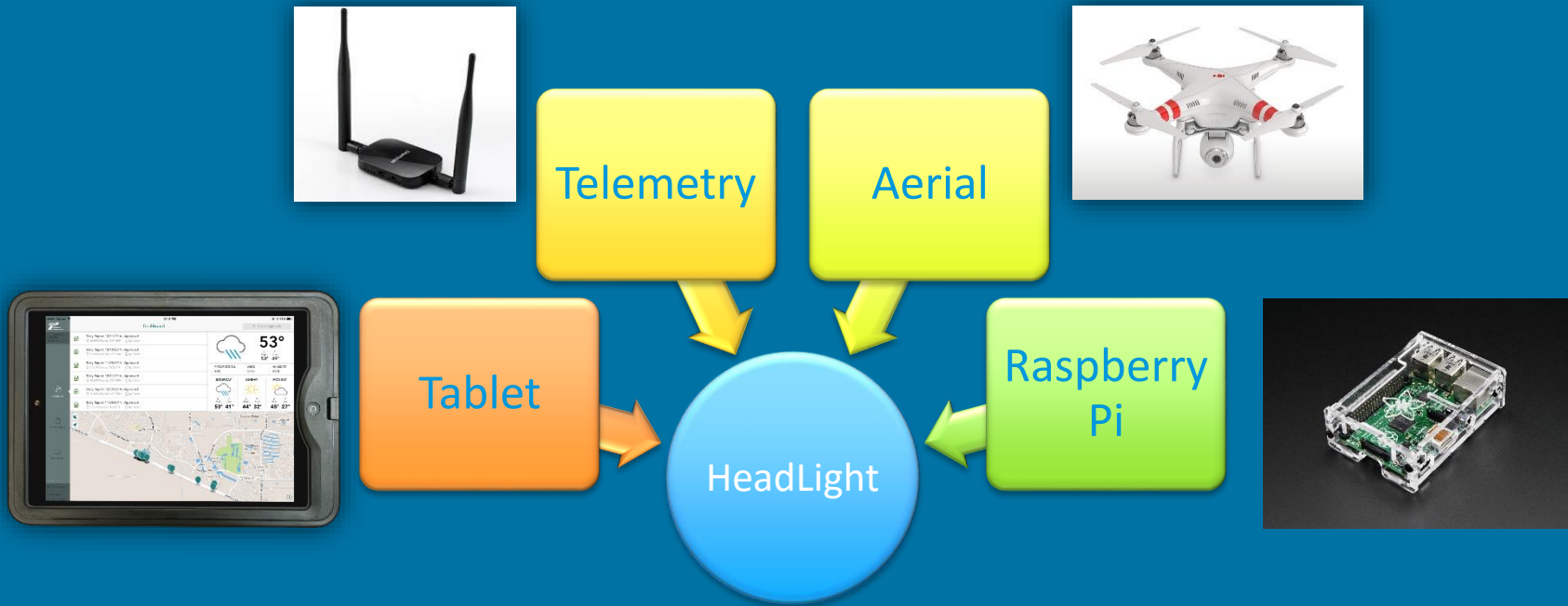
A more effective workforce

ANALYTICS

PLAN LOCATION

Platform approach

Telemetry

Aerial

Tablet

HeadLight

Raspberry Pi

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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)

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Obstacles we are tackling…

- Change – it comes easier for some
- Familiarity with the old ways
- Attempting 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)

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

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To achieve the mission
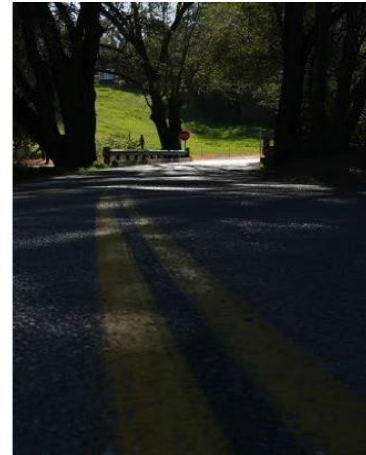
Questions?

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