



IDAHO PORT-OF-ENTRY RAMP MONITORING

National Rural ITS Conference

Coeur d'Alene, Idaho

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OVERVIEW OF PRESENTATION

- × Need
- × Locations
- × Alternatives / Solution
- × Project Process
- × Requirements
- × Technology
- × Construction
- × Testing & Commissioning



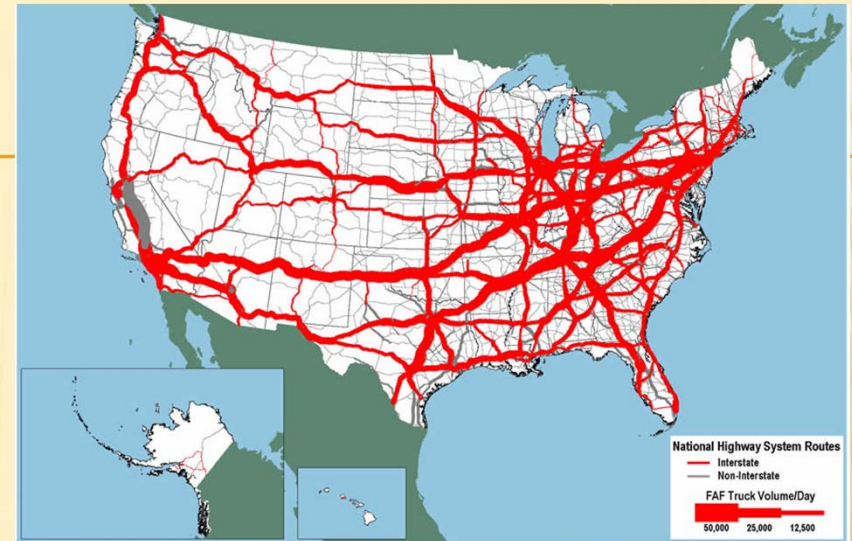
THE PROBLEM

- ✖ Provide a means to monitor and respond to truck traffic queuing on Port-of-Entry intake ramps and exceeding ramp capacity – truck queue backs onto freeway mainline.



THE PROBLEM

- ✖ Increasing Heavy Truck Traffic



- ✖ Larger Trailer Combinations



- ✖ Dated Infrastructure



TRUCKS QUEUING ON INTAKE RAMP



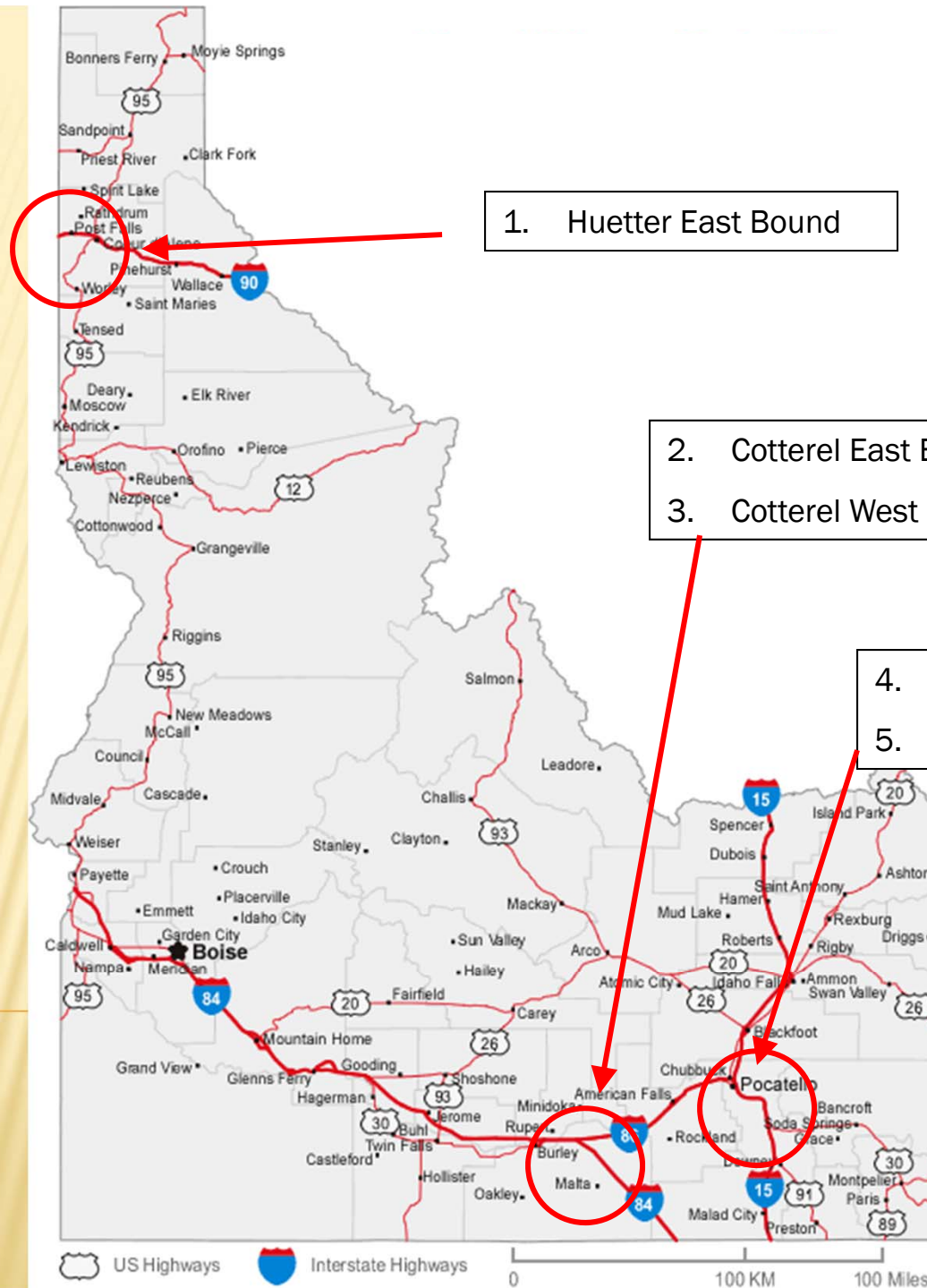
TRUCKS BLOCKING VIEW OF THE QUEUE



CRITICAL POE LOCATIONS

1. Huetter East Bound (I-90)
2. Cotterel East Bound (I-84)
3. Cotterel West Bound (I-84)
4. Inkom North Bound (I-15)
5. Inkom South Bound (I-15)





1. Huetter East Bound

2. Cotterel East Bound

3. Cotterel West Bound

4. Inkom North Bound

5. Inkom South Bound



SOLUTION TO MANAGE THE PROBLEM

- ✘ Provide inspectors with queuing information via speed detection and cameras.
- ✘ Provide a means to close the POE before queue backs onto the freeway.

Within the Context of POE Operations



PROJECT DEPLOYMENT PROCESS

- ✗ Project team
- ✗ Formalized concept of operations
- ✗ Develop requirements/specifications
- ✗ Conduct detailed design
- ✗ Fold specifications into procurement document
- ✗ Contract with selected vendor
- ✗ Complete pilot site and monitor construction
- ✗ Testing and acceptance

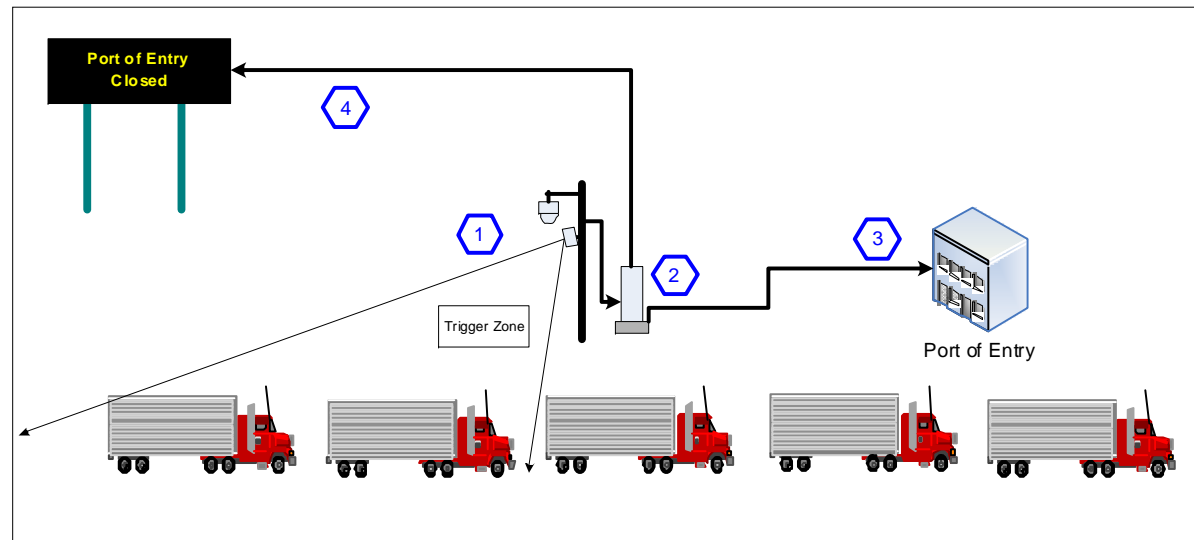


PROJECT TEAM

- ✕ Port-of-Entry Supervisors
- ✕ Commercial Vehicle HQ Management
- ✕ ITS Engineering
- ✕ Enterprise Architect
- ✕ Procurement Specialist

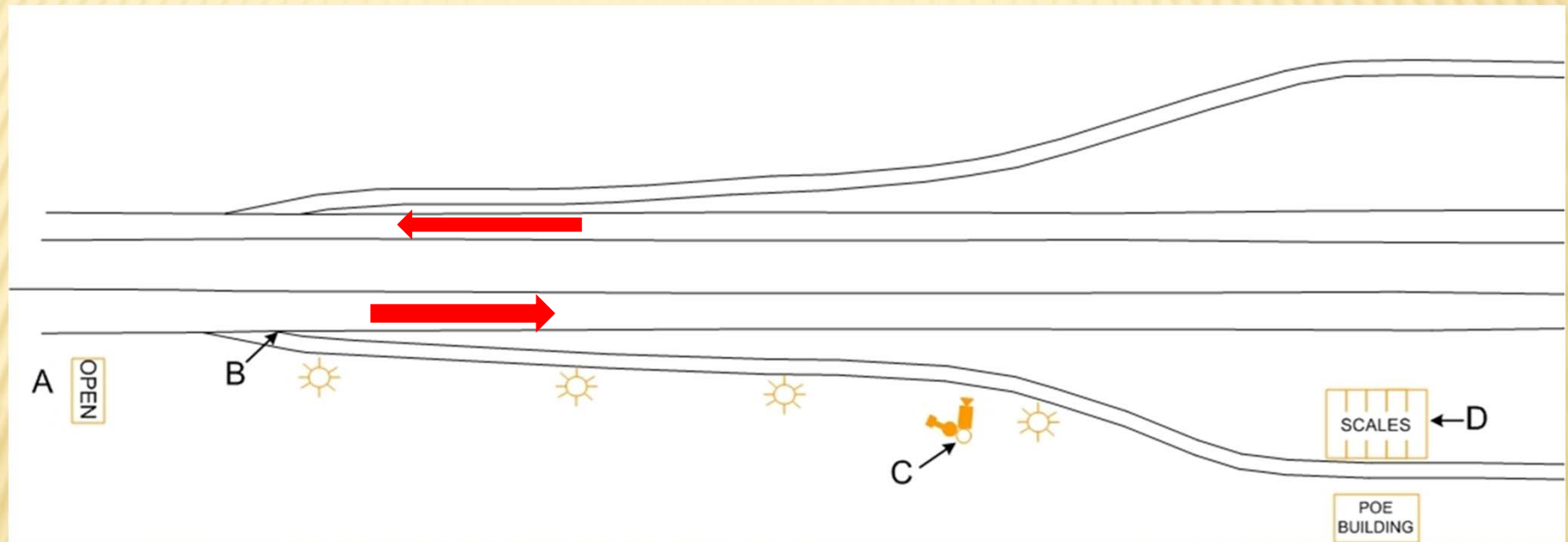


CONCEPT OF OPERATIONS



1	Detection unit set to monitor ramp backup trigger zone detects slow moving trucks.	
2	System logic determines when slow speed threshold is met, sends message to system computer in POE.	
3	Manual	Automated
	a) System computer sounds alarm in POE, inspectors verify ramp back-up and initiate a "Closed" message on sign.	a) System computer sounds alarm in POE and automatically initiates "Closed" message on sign.
	b) POE officers monitor ramp condition, verify clearance and initiate an "Open" message on sign.	
4	POE sign is changed to a) "Closed" preventing further intake ramp backup. b) "Open" and normal operations resume.	

CONCEPT OF OPERATIONS DIAGRAM



- A – Port status sign – open/closed
- B – Gore point
- C – Sensors – radar based speed detection and CCTV camera
- D – Scales



SYSTEM REQUIREMENTS

✖ 66 requirements in 9 categories

1. General
2. Radar Detection Subsystem
3. Verification Camera
4. Computer/Software Subsystem
5. Digital Video Recorder
6. “Open/Closed” Sign Controller
7. Communication/Integration Infrastructure
8. Equipment Cabinet
9. Mounting Subsystems Requirements

POE Ramp Monitoring

System Requirements

2.0 System Functional Requirements

This section defines the requirements for the POE Ramp Monitoring system. These system requirements will be used as the basis for development of functional and technical specifications and will provide the criteria against which the deployed systems will be tested.

2.1 General Requirements

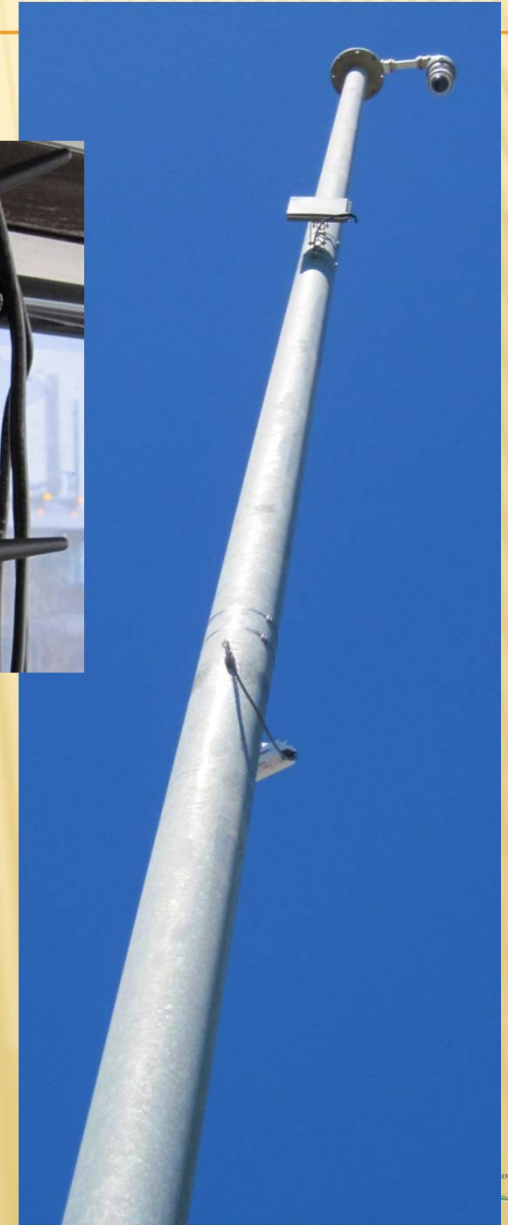
Req. #	Requirement Description
2.1.1	The POE Ramp Monitoring System shall be installed by the contractor at the following five Idaho port-of-entry locations: <ul style="list-style-type: none">• Cotterel East Bound• Cotterel West Bound• Inkom North Bound• Inkom South Bound• Huettner East Bound
2.1.2	The Cotterel East Bound site shall be installed first as a prototype. This site shall be installed, operational, and accepted by ITD before work begins at any of the remaining sites.
2.1.3	The POE Ramp Monitoring System configuration shall focus on effectively addressing ramp back ups during heavy truck traffic to prevent queue encroachment onto interstate highway main line.
2.1.4	The POE Ramp Monitoring System shall use real-time ramp condition information to generate alerts in the POE building when ramp conditions meet predefined values.
2.1.5	The existing “Open/Closed” sign at each POE shall be controlled at the Ramp Monitoring System computer in the port building.
2.1.6	Software shall be provided by the contractor to perform the following functions: <ul style="list-style-type: none">• Control the “Open/Closed” sign and display status• Collect/archive sign status• Generate the ramp back up alert• Generate sign status reports and recorded video excerpts on disk The system shall have a user selectable automatic mode wherein it will change the POE “Open/Closed” sign from “Open” to “Closed” without user input.
2.1.7	Ramp condition data shall be collected through radar based vehicle detection equipment located on a mounting pole along the ramp, a computer in the POE building and specified communications equipment.
2.1.8	At each location, video-based queue back up verification shall be provided by a camera subsystem – with the camera located on a mounting pole along the ramp connected to a computer subsystem in the POE building.
2.1.9	The radar detection unit and the camera shall be mounted on a single pole.

3



TECHNOLOGY

- ✗ Queue sensing
 - + Loop Detection
 - + Optical
 - + Radar
- ✗ Queue verification
 - + CCTV
- ✗ Communication
 - + Wired
 - + Wireless
- ✗ Automated closure decision software



HARDWARE SPECIFICATIONS


- ✖ PTZ Camera*
- ✖ Mounting Pole*
- ✖ Cam Lowering Mechanism*
- ✖ Equipment Cabinet*
- ✖ Foundations*

*ITD Specifications



PROCUREMENT

- ✖ Developing the procurement document turned the 66 requirements into 88 specifications with many multi-part specifications
- ✖ Three responses to the Invitation to Bid
- ✖ Selection based in part on perceived software development capabilities



IDAHO TRANSPORTATION DEPARTMENT
INVITATION TO BID (ITB)

RAMP MONITORING SYSTEMS FOR THE ITD PORTS-OF-ENTRY
REQUISITION # V-856910

August 11, 2009

Physical Address
Idaho Transportation Department
Business and Support Management – Purchasing Unit
3311 West State Street
Boise, Idaho 83703

All sealed bids must be received by 5:00 pm on September 22, 2009. Sealed bids will be opened at 10:30 am on September 23, 2009, at Business and Support Management, Purchasing Unit, Purchasing Office, at 3311 West State Street in Boise. The scope of work on this project consists of supplying and installing equipment for five Ports-of-Entry (POE) ramp monitoring systems, as per the specifications contained in the above requisition. This is a federally funded project.

PUBLIC WORKS LICENSE IS REQUIRED

Contact Evey McAdams, Grants Contract Program Specialist, for clarification of bid requirements at (208) 334-8084. All questions relating to bid specifications must be faxed to: (208) 332-4109 or e-mailed to evvey.mcadams@itd.idaho.gov

FOR BID: UPDATES, ADDENDUMS, RESULTS, OR PLAN HOLDERS LIST go to: <http://itd.idaho.gov>
"Doing Business with ITD"

RETURN BID IN A SEALED ENVELOPE CLEARLY MARKED AS SHOWN:

Business Name: _____
Requisition #: V-856910
Bid Close Date: September 22, 2009 5:00 PM
Bid Open Date: September 23, 2009 10:30 AM
Item Bidding: Ramp Monitoring Systems for the ITD Ports-of-Entry

Mailing Address
Idaho Transportation Department
Business and Support Management - Purchasing Unit
Attention: Evey McAdams
P.O. Box 7129 Boise, Idaho 83707-1129



CONSTRUCTION

- ✕ Approximately 8 Months Construction Period

- + Pilot

- + Phasing

- ✕ Construction

- ✕ Electrical

- ✕ Communication

- ✕ System Integration

- ✕ Sign Controller

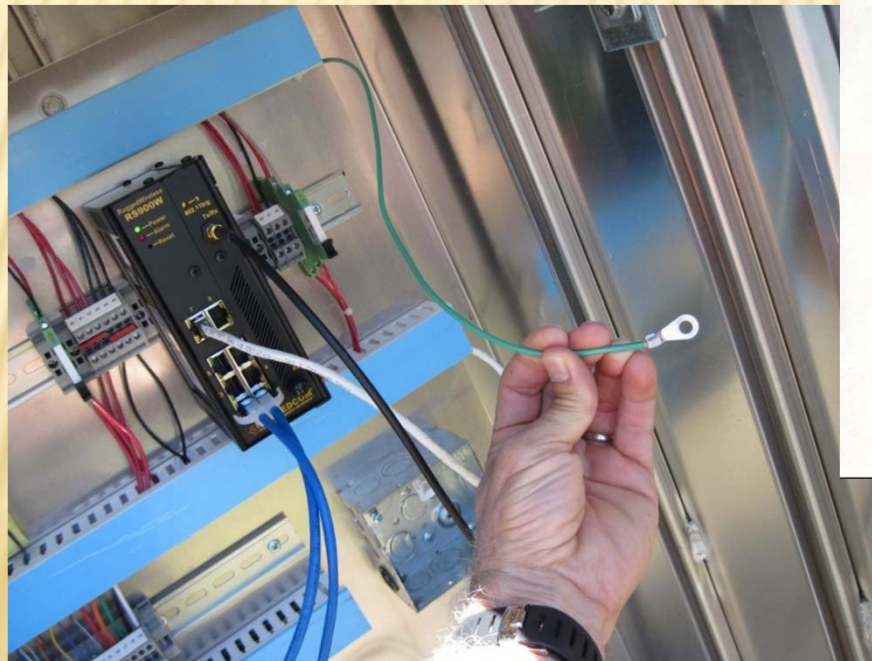
- ✕ Camera

- ✕ DVR



TESTING AND ACCEPTANCE

- ✖ Physical Installation
- ✖ Network Functionality
- ✖ System Functionality
- ✖ Detection, Alarm & Sign Control



Idaho Port-of-Entry Ramp Monitoring Final Acceptance Test Plan



3.0 System Functionality

This set of test criteria is to be conducted via interfaces on the installed computer system. This set of test criteria is intended to verify compliance with technical and functional specifications as they relate to basic software and sensor functionality. This set of tests is designed to establish general viability of the system prior to testing the system's ability to accurately monitor speeds, initiate alarms, etc.

No.	Test	Spec	Pass	Fail
17	Verify that system computer accesses and operates camera control application <input checked="" type="checkbox"/> Via Windows IE <input checked="" type="checkbox"/> Via Bosch Configuration Manager (optional)	A.3.5	✓	
18	Verify user control and security of administrative functions at appropriate user levels	Built into camera		
19	Verify capability for administrative access to configure camera settings	Built into camera		
20	Verify that video is correctly time-stamped	A.3.8	* ✓	
21	Verify adequacy of default position and zoom level, verify that camera returns to default after configured inactive interval (view configuration screens if necessary)	A.3.6 A.3.7	✓	
22	Verify that system computer loads and operates radar detection software	A.4.2	✓	
23	Verify that the system computer loads and operates ramp monitoring alert and sign control software	A.4.7	✓	
24	Verify administrative access to alarm settings	A.4.9f	✓	
25	Verify alarm sound file selection and play abilities	A.4.9h	✓	

↳ I had to connect power to speakers in monitor.

* I set time & configured camera to time stamp the image.
Also set return to default.

LESSONS LEARNED

- ✖ Site Communications
- ✖ Site-Specific Constraints
- ✖ Sign Verification
- ✖ Value of Pilot Installation



CLOSING

Idaho Port-of-Entry Ramp Monitoring Project



“Integration of technology to solve a unique problem....within the context POE operations.”



QUESTIONS - DISCUSSION

Thank-You!

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