

AFMSS Inspection Handheld Pilot: Project Recap & Status Update

***James Gazewood, PE, WY-920
Pilot Project Manager
Phases I, II & III***

***Jim Gegen, WO-330D
Pilot Project Manager
Phases IV, V & VI***

***Paul Brown, WO-310D
AFMSS Program Manager***



Presentation Outline

- ❑ *Pilot Objectives*
- ❑ *User Requirements*
- ❑ *Initial Pilot Phases*
- ❑ *Software and Hardware Acquisition*
- ❑ *Pilot Evaluation Report for Nov. 2003 ITIB*
- ❑ *User Feedback & Lessons Learned ...*
- ❑ *Future Investment & Recommendations*
- ❑ *Demo on Toshiba Laptop/Tablet PC*

Pilot Objective

The AFMSS Inspection Handheld Pilot is intended to provide oil and gas field inspection personnel with:

- Field Inspection Tablet or Laptop PC technology,*
- Digital Image and Global Positioning System (GPS) capabilities designed to directly interconnect with AFMSS, and*
- BLM's ArcInfo GIS software suite.*

Presentation Outline

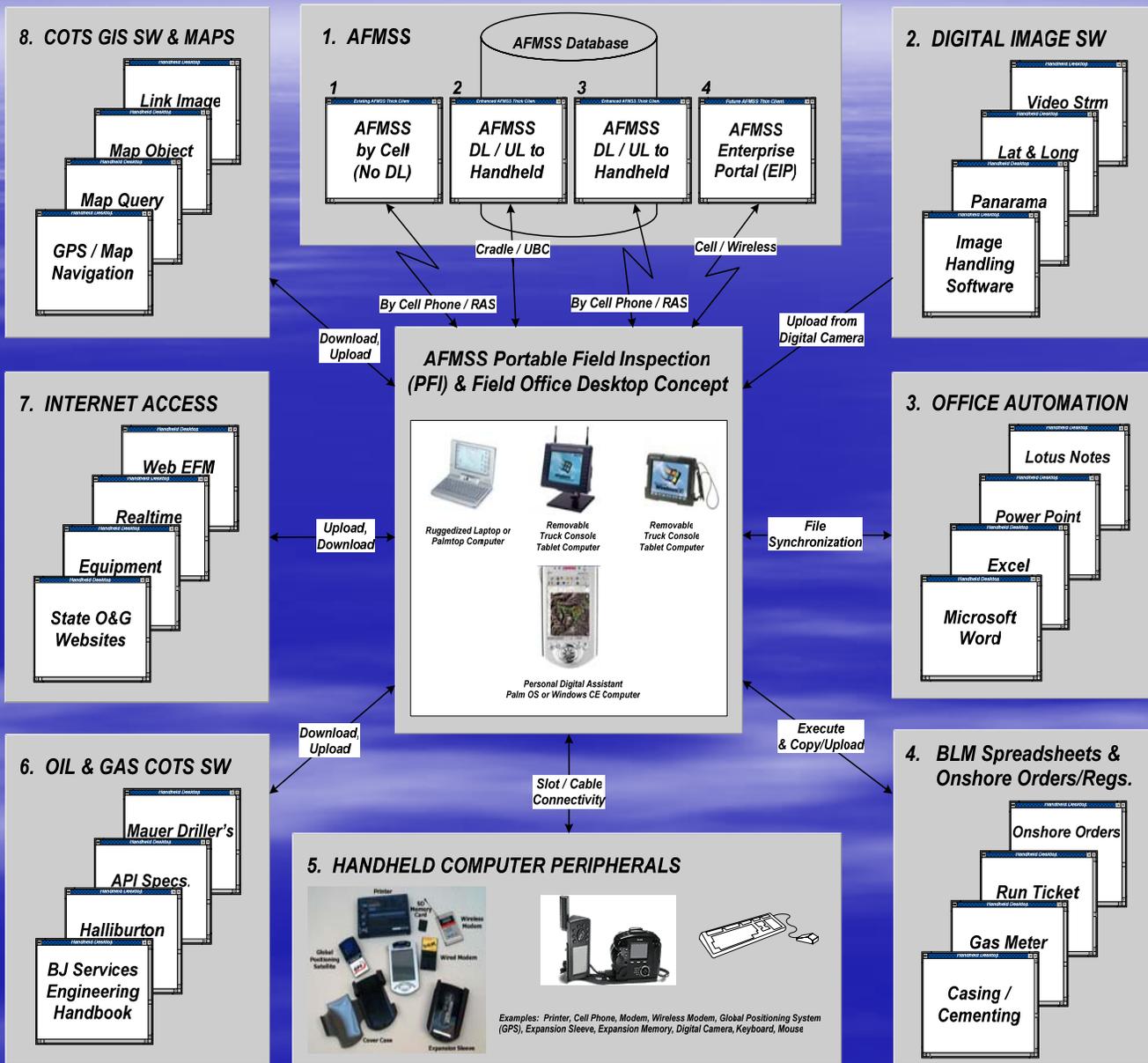
- ✓ *Pilot Objectives*
- ❑ *User Requirements*
- ❑ *Initial Pilot Phases*
- ❑ *Software and Hardware Acquisition*
- ❑ *Pilot Evaluation Report for Nov. 2003 ITIB*
- ❑ *User Feedback & Lessons Learned ...*
- ❑ *Future Investment & Recommendations*
- ❑ *Demo on Toshiba Laptop/Tablet PC*

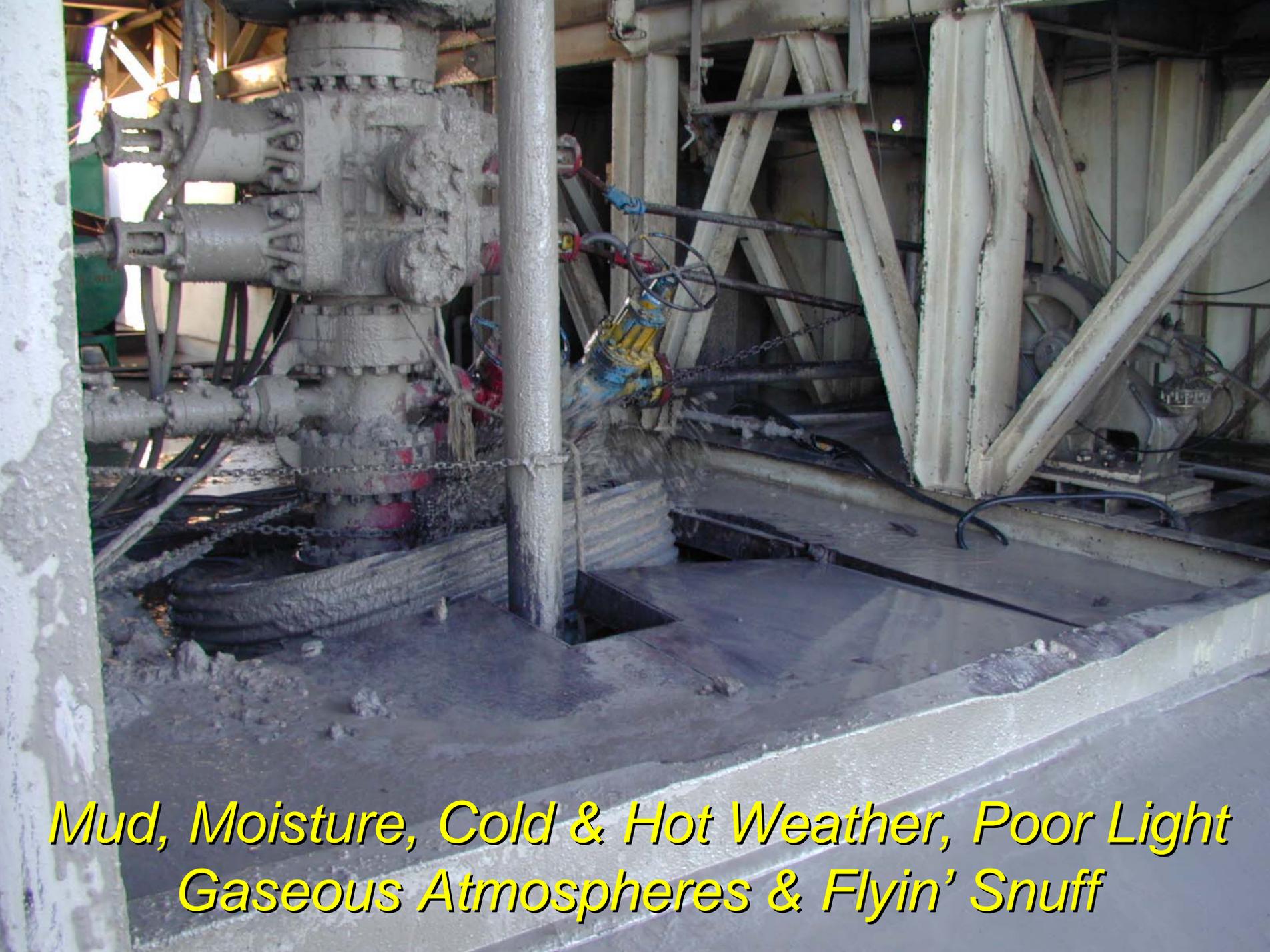
User Requirements



- *Inspection record download, field data capture and upload to AFMSS from the AFMSS Portable Field Inspector (PFI) software running on a tablet PC (or existing BLM laptops).*
- *Digital Image Software for capturing inspection photos and saving as part of the AFMSS database.*
- *Office Automation for ready use of Onshore Order and Regulation Adobe PDF files.*
- *Office Automation (e.g., Microsoft Excel) to Support use of BLM Inspection Calculation Spreadsheets.*
- *Testing of non-ruggedized Windows XP tablet computers with associated handheld computer peripherals (e.g., field capable inkjet printers).*
- *Utilization of oil & gas industry commercial-off-the-shelf software which supports the wellbore inspection process (e.g., BJ Services Engineering Handbook and Halliburton Red Book software).*
- *Internet access to State oil and gas commission and similar inspection reference websites.*

FLUID MINERAL FIELD INSPECTION HANDHELD COMPUTER PROJECT REFERENCE MODEL - "The Whole Enchilada"





*Mud, Moisture, Cold & Hot Weather, Poor Light
Gaseous Atmospheres & Flyin' Snuff*

Initial Pilot Scope: Use Case

- ✓ ***Notification of Well Spud with Creation and Download of Drilling Inspection.***
- ✓ ***Download Inspection Record and Associated Permit Approval Data.***
- ✓ ***Conduct Drilling Inspection in the Field.***
- ✓ ***Transfer Drilling Inspection from Handheld Computer to AFMSS.***
- ✓ ***Prepare to Conduct Follow-up Drilling Inspection.***

Presentation Outline

- ✓ *Pilot Objectives*
- ✓ *User Requirements*
- *Initial Pilot Phases*
- *Software and Hardware Acquisition*
- *Pilot Evaluation Report for Nov. 2003 ITIB*
- *User Feedback & Lessons Learned ...*
- *Future Investment & Recommendations*
- *Demo on Toshiba Laptop/Tablet PC*

Initial Pilot Phases

Phase I

- *Development of Investment Proposal, dated May 2001 and ITIB Approval to develop Business Case, dated June 4, 2001*
- *Received WO-310 Funding in Jan. 2002*

Phase II [April 2002 – August 2003]

- *Gathering of business/hardware requirements for Tablet PC's.*
- *Acquisition of non-ruggedized and ruggedized tablet hardware for pilot testing.*
- *Development of Portable Field Inspector (PFI) software for pilot testing.*
- *Deployment of non-ruggedized tablets to pilot inspectors in:*
 - *Meeker, Colorado*
 - *Vernal, Utah*
 - *Hobbs, New Mexico*

Phase III [July 2003 – Oct. 2003] Suspended Due to Cobell Shut-down

- *Deployment of ruggedized tablets to pilot inspectors in:*
 - *Meeker, Colorado*
 - *Buffalo, Wyoming*

Presentation Outline

- ✓ *Pilot Objectives*
- ✓ *User Requirements*
- ✓ *Initial Pilot Phases*
- *Software and Hardware Acquisition*
- *Pilot Evaluation Report for Nov. 2003 ITIB*
- *User Feedback & Lessons Learned ...*
- *Future Investment & Recommendations*
- *Demo on Toshiba Laptop/Tablet PC*

Hardware/Software Acquisition

- *Performed extensive market research on PDAs, tablet PCs, convertible tablet PCs, palmtops, ruggedized laptops and field-capable printers.*
- *Developed weighted evaluation matrices which utilized real field user (PET) input, to weight the relative importance of pilot hardware requirements during the market research on mobile computers and accessories.*
- *The pilot also identified recommended spatial software for implementation with mobile field inspection systems.*

Presentation Outline

- ✓ *Pilot Objectives*
- ✓ *User Requirements*
- ✓ *Initial Pilot Phases*
- ✓ *Software and Hardware Acquisition*
- *Pilot Evaluation Report for Nov. 2003 ITIB*
- *User Feedback & Lessons Learned ...*
- *Future Investment & Recommendations*
- *Demo on Toshiba Laptop/Tablet PC*

Nov. '03 ITIB Pilot Eval. Report

- ❑ *Executive Overview*
- ❑ *Pilot Project Overview*
- ❑ *Requirements*
- ❑ *Pilot Testing and Beta Training*
- ❑ *Field Evaluation*
- ❑ *Value (Cost/Benefits)*
- ❑ *Lessons Learned*
- ❑ *Deliverability*
- ❑ *Issues and Recommendations*
- ❑ *Future IT Investment*
- ❑ *Recommendations*

Appendices:

- A. Investment Proposal*
- B. Requirements Facilitation Session Report*
- C. Integrated System Specification*
- D. Market Research Tablet Scores*

ITIB Pilot Eval. Report (Cont'd)

□ *Appendices (Cont'd)*

E. Market Research Printer Scores

F. Handheld Computing Scoring Criteria

G. Portable Printer

H. Ruggedized Tablet PC Specification

I. Non-Ruggedized Tablet PC Specification

J. Spatial Software

K. User Evaluation Summary

L. System Engineering Lessons Learned

M. Meeker Pilot Test Phase One Report

N. Handheld Pilot Software Configuration

O. Tablet PC Configuration Comparison

P. California Oil & Gas PDA Project Report

Q. Portable Field Inspection Tablet Productivity Metrics

Pilot Report - User Survey

The AFMSS Field Inspection Handheld Pilot Project evaluation form was designed to obtain information for the following categories:

- 1. BLM field inspection experience and current computer skills.***
- 2. Ease-of-use of the AFMSS download capability to the AFMSS Portable Field Inspection software.***
- 3. Ease-of-use of the AFMSS Portable Field Inspection software during the actual field inspection.***
- 4. Ease-of-use of the AFMSS upload capability from the AFMSS Portable Field Inspection software.***
- 5. Ease-of-use of the PET's Field Office Desktop Concept software.***
- 6. Evaluation of the field performance of the tablet computer.***
- 7. Workload comparison: manual inspection form process versus use of AFMSS PFI/Tablet computer.***
- 8. Overall evaluation of the pilot project.***
- 9. Summary of likes and dislikes of the pilot project.***

ITIB Pilot Eval. Report (Cont'd)

The Initial Pilot results have resulted in updates for the:

- ***AFMSS OMB Exhibit 300 Capital Asset Plan- May 2003***
- ***AFMSS Return of Investment Metrics (ROI) - July 2003***
- ***ITIB Pilot Project Plan - July 2003***
- ***ITIB Pilot Project Evaluation Report - October 2003***

Presentation Outline

- ✓ *Pilot Objectives*
- ✓ *User Requirements*
- ✓ *Initial Pilot Phases*
- ✓ *Software and Hardware Acquisition*
- ✓ *Pilot Evaluation Report for Nov. 2003 ITIB*
- *User Feedback & Lessons Learned ...*
- *Future Investment & Recommendations*
- *Demo on Toshiba Laptop/Tablet PC*

User Feedback

- *“I liked the ease of use of the instructions that were written so a person with little computer experience could follow them easily. I was able to spend more time in the field and less time in the office. Everything I needed to do my inspection was in my hands and I could complete my entire inspection before leaving the drilling site. Downloading the inspection into AFMSS was a simple process that took only about 30 minutes, which could have been faster if AFMSS wasn’t so slow. I figured I was able to better utilize my time and saved at least half the time it would have taken me by doing it manually. The time savings will only get better when all of the equipment is functional on the tablet, like the INC. form and with the addition of printers, CD drive, GPS and so on”. [Bill Kraft, Meeker FO.](#)*
- *“I liked the entire concept, the speed of development and successful implementation of the project. I don’t think I can pick just one part of the project. I was very impressed with all the people on staff and their sustained commitment to realizing this aspect of AFMSS”. [Carol Kubley Scott, Vernal FO.](#)*
- *“We in the Hobbs office like the way the project was put together and the communication that went on to make this project a success”. [Larry Denny, Hobbs FO.](#)*

Lessons Learned

- ✓ *Since most of the data is input in the truck or on the drilling rig floor, ruggedization may not be as important.*
- ✓ *Inspectors will have to write legibly or accept the handwriting recognition software.*
- ✓ *The WI-FI networks in the tablets must be turned off while in the field.*
- ✓ *Truck mounting hardware may be more import if the data is being input in the truck.*
- ✓ *Keyboard input by the inspector is an important requirement.*
- ✓ *The use of convertible tablet computers where the laptop configuration can be used as an input console in a truck or used as mobile inspection tablet that is hand or shoulder carried around the inspection site.*
- ✓ *There are explosion proofing safety considerations which must be assessed and addressed when using electronic devices such as tablet PCs within oil and gas operations where potential explosive atmospheres may and do exist.*
- ✓ *Ruggedized technology must be well constructed and designed to avoid problem prone use.*



- ✓ *Establishment of a consistent RISC image to address XP tablet computer operating system, group policy objects (GPO) for systems administration and security as an operating system layer, as well as an AFMSS PFI/Field Inspection Desktop application layer and associated application data layer is needed. National CM, National Test Lab and Security C&A Certification is considered critical.*
- ✓ *GIS spatial requirements derived from this prototype encompassed field navigation needs and feature level mapping and attributing capabilities. For the purpose of this pilot, these capabilities were beyond the project's scope, but were defined by the California PDA Project Report.*

Findings & Benefits

Using handheld data capture technology in the field; BLM field inspectors will accrue considerable improvements in efficiency and data accuracy while achieving the following inspection and enforcement objectives:

- ✓ Eliminate handwritten/data transcription duplicate entry of AFMSS field inspection record data***
- ✓ Increase the inspector's time in the field to increase inspection and enforcement (I&E) effectiveness***
- ✓ Enable more inspections to be conducted with existing and or in some cases, smaller staffs***
- ✓ Enable more efficient compliance with mandatory inspection documentation requirements***
- ✓ Enable easy acceptance by the maximum number of targeted users***

Efficiencies Gained

- ***Manual:** The average time to perform a manual drilling inspection was approximately 12 hours and 55 minutes.*
- ***PFI/Tablet:** The average time using the PFI/Tablet computer process was approximately 6 hours and 22 minutes. This is a 51 percent time savings.*



Presentation Outline

- ✓ *Pilot Objectives*
- ✓ *User Requirements*
- ✓ *Initial Pilot Phases*
- ✓ *Software and Hardware Acquisition*
- ✓ *Pilot Evaluation Report for Nov. 2003 ITIB*
- ✓ *User Feedback & Lessons Learned ...*
- *Future Investment & Recommendations*
- *Demo on Toshiba Laptop/Tablet PC*

Future Investments

Phase IV – Limited Release: Continuing the iterative process, would build on the previous investment phases, refining the Portable Field Inspection (PFI) drilling inspection software to accommodate updated security requirements and adding additional inspection functionality for well plugging/abandonment, production, environmental/surface, undesirable events, and records (volume) verification categories. This phase would entail the leveraging of Laptop PC's currently deployed to inspection personnel and acquisition of up to 10 additional Laptop and/or Tablet PC's (to be configured with a Remote Installation Service (RIS) image for ease of field IT support) as the initial Limited Release to inspectors in four BLM Field Offices.

- ***Buffalo, Wyoming***
- ***Farmington, New Mexico***
- ***Hobbs, New Mexico***
- ***Meeker, Colorado***
- ***Vernal, Utah***

Future Investments (Cont'd)

Phase IV

Tasks would encompass:

- Refinement of Hardware/Software Requirements and Specifications***
 - BLM' Mobile Office concept***
 - Geospatial***
- IT support***
 - RIS Image***
 - Tablet PC Maintenance***
 - Spare/Depot Units***

Phases V & VI

Involve Production Releases I and II during FY 2005 and FY 2006 respectively. Each release would continue to build on the findings of the previous project phases, improving the product delivered to the customer.



Recommendations

- ***Based on the success of the pilot, the Handheld Data Capture Capability investment should proceed with Phase IV, the Limited release.***
- ***Prior to finalizing specifications for purchasing the Tablet PC's required for Phase IV, field testing of the Ruggedized Tablet PC must be completed.***
- ***The Limited Release specifications must also address the Mobile Office, Geospatial and Information Technology support requirements (i.e., extended warranty, depot replacement, life cycle.)***

Presentation Outline

- ✓ *Pilot Objectives*
- ✓ *User Requirements*
- ✓ *Initial Pilot Phases*
- ✓ *Software and Hardware Acquisition*
- ✓ *Pilot Evaluation Report for Nov. 2003 ITIB*
- ✓ *User Feedback & Lessons Learned ...*
- ✓ *Future Investment & Recommendations*
- *Demo on Toshiba Laptop/Tablet PC*

Field Modes

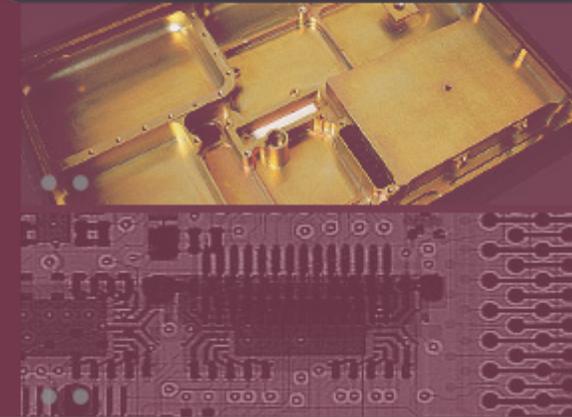
✓ *On Location*

✓ *In the Truck*

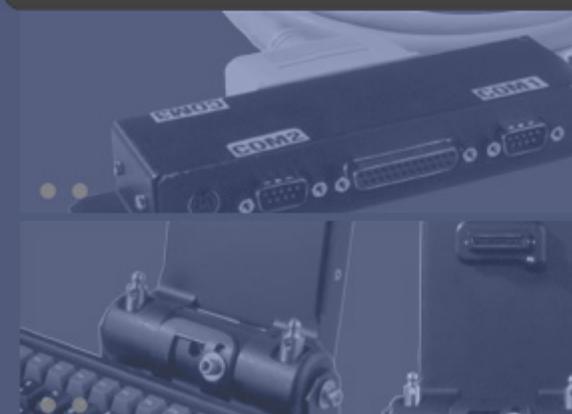
✓ *In the Office*



HAMMERHEAD - XRT



VEHICLE DOCKING



OFFICE DOCKING

