SERDP and ESTCP Technologies for Cultural Resources Detection

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Purpose

• Strategic Environmental Research and Development Program (SERDP)
  – Basic and applied research and development
  – Funding through DDR&E

• Environmental Security Technology Certification Program (ESTCP)
  – Technology demonstration and validation
  – Funding through I&E
Environmental Drivers

Sustainability of Ranges and Range Operations

- Maritime Sustainability
- Threatened and Endangered Species
- Toxic Air Emissions and Dust
- Unexploded Ordnance
- Urban Growth
- Noise
- NOX and PM & Encroachment
Environmental Drivers

Reduction of Current and Future Liability

Contamination from Past Practices

- Chlorinated Solvents Remain Intractable
- Large Potential UXO Liability
- New Contaminants Emerging (Perchlorate)

Pollution Prevention to Control Life Cycle Costs

- Elimination of Hazardous Materials Reduces Cost of Operation, Repair & Demil
- Goal is to achieve Compliance Through Pollution Prevention
Sustainable Infrastructure

- **Natural Resource Management**
  - Ecosystem Management
  - Watershed Protection
  - Maritime Sustainability
  - Land Management

- **Facilities Management**
  - Noise
  - Energy
  - Solid Waste

- **Cultural Resources**
  - Archaeology
  - Built Infrastructure
Completed SERDP Projects

- SI-753: Phased Array Acoustic Detection of Artifacts
- SI-1130: Dynamic Modeling of Military Training Impacts and Archaeological Site Distributions in Evolving Landscapes
- SI-1142: Direct Detection of Archeological Sites Using Remote Sensing
SERDP SI-1130 Accomplishment

3D simulation

2D simulation
Detection and Identification of Archaeological Sites and Features Using Radar Data
Developing an Efficient and Cost Effective Ground-Penetrating Radar Field Methodology for Subsurface Exploration and Mapping of Cultural Resources on Public Lands

GSSI 900 MHz
**SERDP SI-1261, cont’d**

- **GPR reflections**: white is high amplitude, black is low.
- **Buried features**: white is present, black is absent.

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**900 MHz, Ground Wet**

- 52%  
- 85%  
- 80%  
- 68%  
- 24%  
- 47%

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**900 MHz, Ground Dry**

- 95%  
- 93%  
- 88%  
- 45%  
- 53%  
- 12%
New Approaches to the Use and Integration of Multi-Sensor Remote Sensing for Historic Resources Identification and Evaluation
Data Analysis and Fusion
• Army City, Fort Riley KS, geophysical data analysis / anomaly identification

- Electrical resistance
- Magnetic susceptibility
- GPR 0.5-0.75 m below surface
- Magnetic gradiometry
- EM conductivity
- Aerial thermal infrared
- Quickbird PAN-sharpened multispectral composite
Streamlined Archaeo-Geophysical Data Processing and Integration for DoD Field Use
For More Information

• www.serdp.org
• www.estcp.org
• John Hall, Sustainable Infrastructure Program Manager
• Katharine Kerr, Cultural Resource Management Specialist
• SI@serdp.org or SI@estcp.org
DoD Cultural Resources Workshop

• July 11-13, 2006
• Marriott Sea-Tac Airport Hotel  
  – Seattle, WA
• Legacy Resource Management Program
Sponsored by SERDP and ESTCP

Partners in Environmental Technology
Technical Symposium and Workshop

November 28 – 30, 2006
Marriott Wardman Park Hotel
Washington, D.C.