

United States  
Department of  
Agriculture

Soil  
Conservation  
Service

160 East 7th Street  
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**Subject:** Trip Report - Government Users      **Date:** April 6 1992  
Workshop on Ground Penetrating Radar  
Applications and Equipment; US Army  
Corps of Engineers Waterways Experiment Station,  
Vicksburg, Mississippi; 26-27 March 1992

**To:** Carolyn Olson  
National Soil Survey Investigation Staff  
National Soil Survey Center  
USDA - Soil Conservation Service  
100 Centennial Mall North  
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**Purpose:**

To provide a forum for government users of ground-penetrating radar (GPR) to discuss current applications, areas of critical research, and emerging technology.

**Participants:**

See enclosure 1.

**Activities:**

See enclosure 2.

**Discussion:**

This conference afforded the first opportunity for all SCS radar specialists (5) to gather and discuss areas of application and problems encountered in the field. The level of USDA involvement (10) in this conference reflects the growing significance of GPR applications within the department. Including ARS (4), USDA accounted for 18% of the conference participants.

The two major manufacturers of GPR equipment (Geophysical Survey Systems Inc. and Sensors & Software Inc.) displayed and demonstrated their newest equipment (SIR System-10 and pulseEKKO IV). Radar equipment is becoming increasingly sophisticated and dependent upon computer processing, data manipulation and analysis. During my presentation, I cautioned vendors to continue to support simple, practical, and affordable equipment. Other than for research needs, USDA programs do not justify nor support reliance upon expensive GPR systems which are more formidable to operate and require extensive computer processing or data analysis procedures.

Through panel and informal conversations with participants (1) government standards for GPR practices, and (2) potential conflicts

of interest between GPR contractors and government users were discussed.

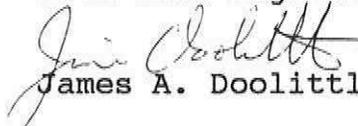
A proposed ASTM standard has been drafted by committee D-18.21.01. This standard will provide broad standards and recommend the minimum requirements for GPR field surveys. Most participants appeared to endorse the establishment of a formal standard. I am presently reviewing the draft of this standard.

The USDA-SCS is sensitive to situations having the appearance of "conflicts of interest". However, no one attending this conference was aware of any instance where GPR contractors were claiming a conflict with government agencies. Bruce Bevan of Geosight felt that SCS involvement in archaeological investigations is non-conflicting, fosters a greater public awareness to the potentials of using GPR techniques, and has indirectly increased requests for his services. Lynn Yuhr of Technos felt that there is no conflict of interest but regrets the government bidding policy. She felt that the government "waste her companies time" by needlessly requesting bids on a project only to accept a low bid from federal agency having a radar unit. Tom Fenner of GSSI was unaware of any GPR contractor making derogatory comments or "conflict-of-interest" statements about SCS's radar activities. Furthermore, Fenner considers that SCS's work with GPR in soils essential and pioneering.

In the late 1970's, the US Army Corps of Engineers, Waterways Experiment Station (CEWES) was recognized as a leader in the use of GPR for cavity detection and assessing the trafficability of roads. I was most surprised to learn that this leadership has been lost at CEWES. Present researchers appear to be attempting to rediscover the uses and limitations of radar systems. I am troubled by the thought that this turn of events could happen within SCS.

The conference was extremely informative and plans are being made for EPA to host a similar conference in the near future..

With kind regards.

  
James A. Doolittle

cc:

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U.S. ARMY ENGINEER WATERWAYS EXPERIMENT STATION  
GOVERNMENT USERS WORKSHOP  
GROUND PENETRATING RADAR APPLICATIONS AND EQUIPMENT  
26-27 MARCH 1992

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**Government Users Workshop**  
on  
**Ground Penetrating Radar**  
**Applications and Equipment**

**Agenda**

**Thursday, March 26**

**Introduction**

- 0800 Registration
- 0830 Welcome — *William F. Marcuson, Chief, Geotechnical Laboratory, US Army Engineer Waterways Experiment Station*
- 0840 Organizational Details and Arrangements — *Michael K. Sharp, US Army Engineer Waterways Experiment Station*
- 0850 Elementary GPR Overview and Workshop Scope — *Dwain K. Butler, US Army Engineer Waterways Experiment Station*
- 0920 Overview of Key Geologic Factors Effecting GPR Performance — *Richard D. Lewis, US Army Engineer Waterways Experiment Station*
- 0945 BREAK

**Case Histories/Applications**

- 1000 Testing for Unmarked Graves — *Bruce Bevan, Geosight*
- 1020 Fracture and Cavity Detection and Mapping with GPR: An Overview with Examples — *R. C. Benson and Lynn Yuhr, Technos, Inc.*
- 1040 Application of GPR for Location of Old Mine Workings — *J. E. Scaife, P. Giamou and A. P. Annan, Systems and Software, Inc.*
- 1100 The Detection and Location of Abandoned Gas Wells in Coal Seams by GPR — *Robert C. Kemerait, ENSCO, Inc.*
- 1120 Applications of GPR in the Georgia Coastal Plains — *C. C. Truman and D. D. Bosch, Department of Agriculture, Agricultural Research Service*
- 1140 Role of GPR in an Integrated Geophysics Assessment of an Existing Dam — *D. K. Butler, US Army Engineer Waterways Experiment Station*
- 1200 LUNCH
- 1330 Role of GPR in an Integrated Geophysics Investigation at a Defense Depot — *M. K. Sharp, US Army Engineer Waterways Experiment Station*

- 1350 Application of GPR to Contaminated Ground Water Mapping — *A. P. Annan, J. D. Redman and S. W. Conway, Systems and Software, Inc.*
- 1410 Advances in GPR for Pavement Research — *Stan Smith, Geophysical Survey Systems, Inc.*
- 1430 Use of GPR Within the USDA-Soil Conservation Service — *James Doolittle, Department of Agriculture, Soil Conservation Service*
- 1450 BREAK
- 1510 A FM-CW Radar Used for Probing of Brick Structures — *Oren Tranbarger and Bob Duff, Southwest Research Institute*

**New Initiatives**

- 1530 Application of Maximum Entropy to GPR — *Louis Roemer, David Cowling and Leo Zou, Louisiana Tech University*
- 1550 The Use of GPR in Trenchless Excavation — *David Cowling, Louis Roemer and Leo Zou, Louisiana Tech University*
- 1610 Problems Encountered and Role for GPR in Concrete Technology and Corps Structures Assessment — *A. Michel Alexander, US Army Engineer Waterways Experiment Station*
- 1630 Initiation of a NDT/GPR Research and Development Effort — *Falih Ahmad, US Army Engineer Waterways Experiment Station*

**Friday, March 27**

**Equipment: Status, New Developments, Considerations**

- 0800 Recent Advances in Subsurface Interface Radar Technology — *Thomas J. Fenner, Geophysical Survey Systems, Inc.*
- 0830 An Overview of the pulseEKKO™ GPR Technology — *A. P. Annan and S. W. Conway, Systems & Software, Inc.*
- 0900 Airborne, Borehole and Surface GPR: Measurement, Processing and Modelling — *Gary R. Olhoeft, US Geological Survey*
- 0945 BREAK
- 1000 FIELD DEMONSTRATIONS
- 1200 LUNCH
- Wrapup**
- 1300 Panel Discussion — *Butler, Bevan, Benson, Annan, Stove, Fenner, Olhoeft, Alexander, Doolittle*
- 1430 Open Discussion; Synopsis

**GOVERNMENT USERS WORKSHOP**  
on  
**GROUND PENETRATING RADAR  
EQUIPMENT AND APPLICATIONS**

US ARMY ENGINEER WATERWAYS EXPERIMENT STATION  
VICKSBURG, MISSISSIPPI

26-27 MARCH 1991

**OBJECTIVE:** Provide a forum for government users of ground penetrating radar (GPR) to (1) be introduced to state-of-the-art and emerging technology in GPR equipment, (2) discuss current applications of GPR, and (3) discuss limitations and areas of required research.

**FORMAT:**

Presentations by Private Industry, Government Agencies,  
and Academia on State-of-the-Art and Developmental  
GPR Equipment (Status Summary Required, 1-3 pages)

Displays and Demonstrations of GPR Equipment

Brief Case History Presentations (15 minute-length)  
Abstract Required (1-3 pages)

Guided Panel Discussion of Application Areas  
Archaeology  
Hazardous and Toxic Waste Site Characterization  
Mine and Unexploded Ordnance Detection  
Hydrogeology  
Ground Water Exploration  
Subsurface Contaminant Mapping and Characterization  
Cavity and Tunnel Detection  
Geotechnical Studies (Pavements, Dams, Levees, Buildings)  
Miscellaneous and Novel Applications

Synopsis and Identification of Problem Areas and Research  
and Development Requirements

**IMPORTANT DATES:** 31 January 1992\*--Title, Name of Presenter, and  
Preliminary Abstract or Summary Due;  
Notification of Intent to Display and/or  
Demonstrate GPR Equipment Due  
21 February 1992\*--Notification of Acceptance of  
Case History Presentation and GPR Equipment  
Presentation and Preliminary Program  
2 March 1992--Notification of Intent to Attend  
Workshop Due  
16 March 1992\*--Final Abstracts and Summaries Due

**\*Presenter Deadlines**

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