

United States
Department of
Agriculture

Soil
Conservation
Service

Northeast NTC
160 East 7th Street
Chester, PA 19013

Subject: Trip Report of GPR Field Assistance; Date: September 21, 1988
Florida, 11-16 September 1988

To: James W. Mitchell
State Conservationist
USDA-Soil Conservation Service
Federal Building
401 S.E. 1st Avenue, Room 248
Gainesville, Florida 32601

File code: 430-13-7

Purpose:

To provide ground-penetrating radar training and field assistance to newly appointed radar specialists in Florida.

Principal Participants:

Eugene Bertine, Conservation Tech., SCS, Hasting, FL
Dr Mary Collins, Assoc. Prof., Soil Sci. Dept., U. of Florida,
Gainesville, FL
Edward Cummings, Soil Specialist (GPR), SCS, Lake City, FL
Jill Dobbs, Soil Conservationist, SCS, Gainesville, FL
James Doolittle, Soil Specialist (GPR), SCS, Chester, PA
William Harb, District Conservationist, SCS, Hasting, FL
Douglas Lewis, Soil Specialist (GPR), SCS, Sebring, FL
Bruce Piatek, Archaeologist, Preservation Board, St. Augustine, FL
Douglas Slabaugh, Party Leader, SCS, Bronson, FL

Activities:

Field sites in Alachua, St Johns, and Levy Counties provided a range of training experiences, soil and site conditions. On 12 September, system components, initial settings, and field calibrations were reviewed in Alachua County. On the afternoon of September 12, the radar unit assigned to Lake City was inventoried and inspected. On September 13, an archaeological investigation in the historic district of St Augustine provided an opportunity to review field procedures necessary to conduct site investigations. GPR field procedures and interpretations were reviewed in Levy County on September 14 and 15, 1988.

Observations and Comments:

I was most pleased by the motivation and enthusiasm of both Eddy Cummings and Doug Lewis. Both are progressing well towards mastering the art of GPR interpretations.

Enclosed are the inventory lists for the GPR units assigned to Eddy Cummings (Enclosure A) and Doug Lewis (Enclosure B). Eddy Cummings equipment was inventoried. Though in generally good condition, this unit has, over the years, been taken to the field and has been "well used." The following items are in need of maintenance or repair:

1. The model 4800 control unit periodically fails to maintain a signal and appears to be heat sensitive. The operation of this unit should be closely monitored by the radar specialist.
2. Model 10 remote marker is missing and should be replaced.
3. The short cable connecting the transmitter and receiver on the model 3105A antenna (300 MHz) is frayed and must be replaced prior to use in the field.
4. The tow bar for the model 3112 antenna (80 MHz) is broken.
5. The power cable for the tape recorder is missing and must be replaced if the tape recorder is to be used in the field.
6. The marking button on the extension bar for the model 3102 antenna (500 MHz) is inoperable.

The radar specialists were encouraged to keep their supervisors informed of equipment and supply needs. Both specialists have been sent technical articles on the uses of GPR for soil and site investigations. They were encouraged to contact me concerning any interpretative or technical problems with the radar.

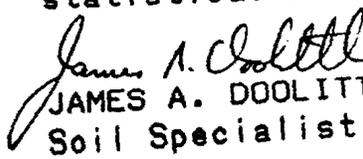
The enclosed article from the NEWS-JOURNAL provides favorable comments concerning our site investigations in the historic district of St. Augustine.

Recommendation:

It is recommended that James Doolittle make periodic training visits to Florida. During these field visits, field techniques and interpretations will be observed and evaluated. Field visits will afford the radar specialists an opportunity to exchange ideas and experiences.

Both radar specialist are encouraged to inventory their "inherited" equipment and to prepare a list for their supervisors documenting the status of their equipment. The equipment observed was in generally good to excellent field condition. Both operators were encouraged to remove all unnecessary equipment and materials from their vehicles.

The radar specialist are encouraged to become more versed in basic statistical methods needed to summarize GPR transect data.


JAMES A. DOOLITTLE
Soil Specialist (GPR)

cc: Rodney F. Harner, Nat'l. Leader, NSSQAS, SCS, MWNTC, Lincoln, NE
Wade Hurt, State Soil Scientist, SCS, Gainesville, FL

AREA NEWS

Archaeologists use new device to look for relics in street

By DENISE O'TOOLE

ST. AUGUSTINE — Archaeologists got a chance to look beneath a busy downtown street for artifacts on Tuesday without getting their hands dirty or causing major traffic disruptions.

Ground-penetrating radar devices were used to scan portions of Cordova Street and the adjacent Government House lawn, an area which Historic St. Augustine Preservation Board archaeologists believe harbors remnants of an important defense point in the walls which once surrounded the nation's oldest city.

"It's like being able to pick up the carpet and see what's underneath it," said archaeologist Bruce Piatek, who asked soil specialists from the U.S. Department of Agriculture Soil Conservation Service to test potential archaeological applications of the high-tech equipment. It could help scientists determine where to dig for buried historical treasures — and where not to bother, Piatek said.

The sensor unit which Doug Lewis, of the service's Lake City office, pushed along the surface of the grass and pavement resembled an upright vacuum cleaner. It was connected by thick wires to a

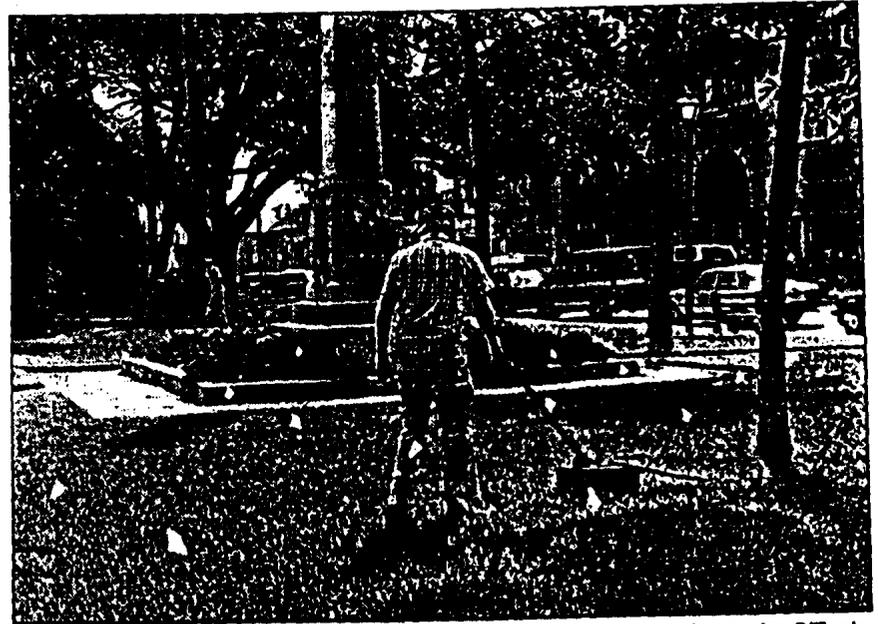
printer, which spat out graphs showing denser parts of the ground as dark areas. The graphs were immediately interpreted by James A. Doolittle, a government expert on the equipment who was called in from Pennsylvania for the tests.

"The interpretation is ready on the spot. We don't have to go back and do any fabrication," Doolittle said. His readings showed some undetermined object or group of objects hidden under the lawn and the street.

Earlier this year, Piatek and his staff gleaned bits of information about the defense point, the Rosario Redoubt, by excavating a portion of the west sidewalk of Cordova Street. The deposits found then led the team to believe most of what remains of the redoubt is located beneath the street. The radar readings strengthened, but did not confirm their suspicions.

"Our interest in this technology ... is to try and locate archaeological deposits prior to doing the excavation," Piatek said. "Obviously, you don't want to just dig a hole in the middle of the street on a 50-50 chance."

The Rosario Redoubt site was chosen because his staff could



News-Journal photo by Denise O'Toole

Doug Lewis, of the U.S. Department of Agriculture Soil Conservation Service, pushes the sensor unit along the surface of the grass and pavement within the area marked by small flags.

draw some conclusions about the accuracy of the equipment's findings based on what they already knew about the area. A second test site, a garden which is believed to be the former site of a colonial Spanish home, was chosen because an excavation project is scheduled to begin there in January.

Depending on how useful the data gathered during the tests proves to be and on the availability of funding, the preservation board may consider investing \$17,000 to \$18,000 in its own radar unit, Piatek said.

If purchased, the unit could be used to quickly scan private construction sites before ground is

broken to prevent damage to artifacts which might be buried there, Piatek said. Archaeological examination of construction sites already is required by city ordinance and the new technology could speed the process, he added.

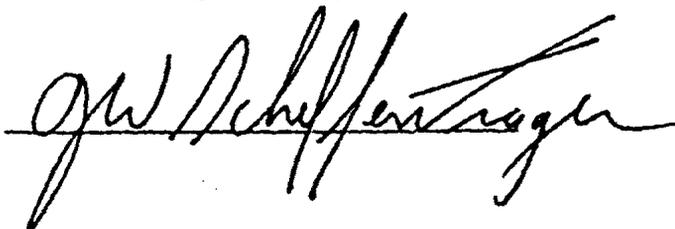
Piatek said similar radar equipment has been used at archaeological sites in Santa Elena, S.C., and San Luis, Fla., which is near Tallahassee. The equipment is capable of finding disturbances in natural soil patterns up to about five feet below the surface.

"The disturbances are all going to be from the hands of man, and that's what we're looking for," Piatek said.

1 SIR System-8 consisting of the following items:

- 1 - Model 4800 control unit
- 1 - Model 30 program control unit
- 1 - Model 20P remote control marker
- 1 - Model 10 remote marker
- 1 - Model 06 power supply, S/N 10
- 1 - Model 3105AP terrestrial transducer (300 MHz), S/N 064
- 1 - Model 3112 antenna (80 MHz), S/N 034; with tow bar and 705 transducer
- 1 - transducer control cable (30m)
- 3 - transducer control cable (25ft)
- 1 - CU/graphic cable
- 1 - CU/tape cable
- 1 - CU/power cable
- 1 - graphic/power cable
- 1 - tape/graphic cable
- 1 - tape/power cable
- 1 - manual set
- 1 - graphic recorder, ADTEK SR-8004H, S/N 069
- 1 - Model 3110 antenna (120 MHz), S/N 035; with 705 transducer
- 1 - Model 3101C antenna (500 MHz), S/N 25; with extension
- 1 - Model 705DA transceiver, S/N 052
- 1 - 500 watt generator (Honda Model EM-500; engine number 130446)
- 1 - utility bag
- ~~1 - utility cart in State Office~~
- 2 - boxes containing magnetic recording tapes
- 3 - Model TC-1 transit case
- 1 - Model ADTEK DT-6000 tape recorder, S/N 011
- 1 - horse trailer
- 1 - handyman jack
- 1 - Nikon 35mm camera, SCS #707417; with case

I acknowledge receipt and custody of the above listed equipment.



2/25/85

1 SIR SYSTEM-8 consisting of the following items:

- (1) Model 4800 Control Unit, S/N 1187
- (1) Model 30 Program Control Unit
- (1) Model 20P Remote Control Marker
- (1) Model 10 Remote Marker
- (1) Model 05 Power Supply
- (1) Model 3105AP Terrestrial Transducer (300 MHz), S/N 045
- (1) Transducer Control Cable (30M)
- (1) Transducer Control Cable (25ft)
- (1) CU/Graphic Cable
- (1) CU/Tape Cable
- (2) CU/Power Cable (2 AC; 1 DC)
- (1) Graphic Recorder, EPC 2208S, S/N 151
- (1) Model 3110 Antenna (120 MHz), S/N 025
- (1) Model 705DA Transceiver, S/N 052
- (1) 500 Watt Generator (Honda Model EM-500; engine number 1182442)
- (1) Utility Bag
- (1) Utility Cart
- (1) Multitester, Micronta 22-027U
- (1) 500 MHz Antenna w/extension
- (1) HP 3964A Tape Recorder, S/N 2105A01580
- (1) Box containing Ampex magnetic recording tapes
- (1) Carrying case for graphic recorder
- (1) handyman jack

I acknowledge receipt and custody of the above listed equipment:

Susan T. Hoag

2/25/85