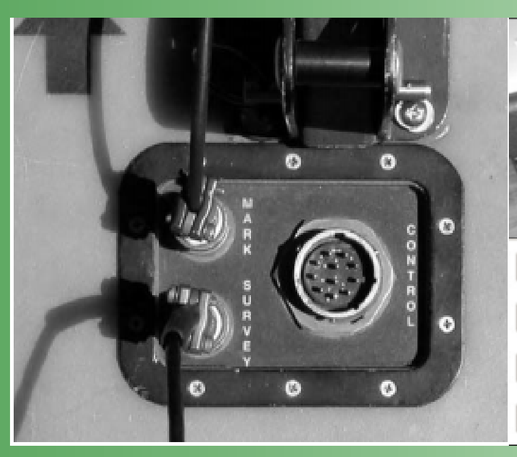
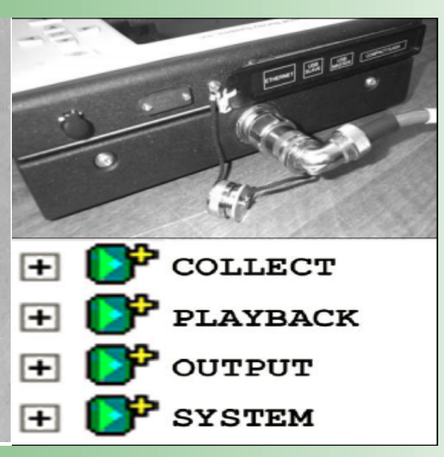
System and Process Assessment Research Laboratory
SPAR Lab
Missouri S&T

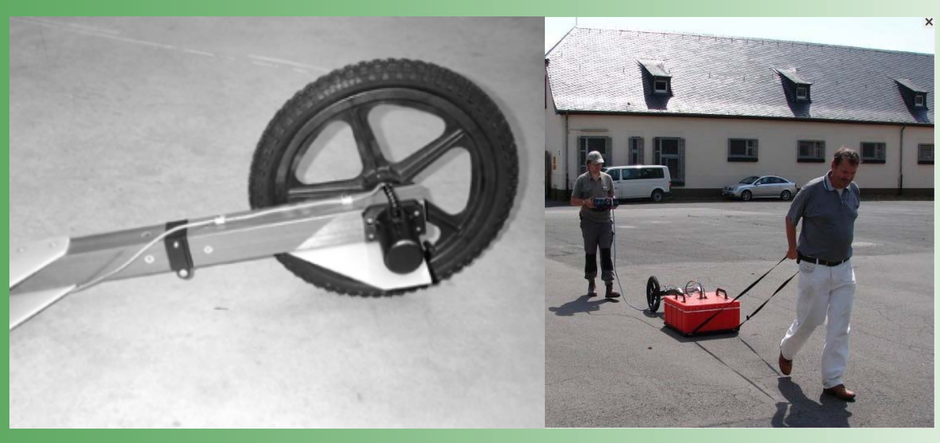
GROUND PENETRATING RADAR (GPR) SYSTEM

Description of System

- **Radar pulses are used to image the subsurface. The current system consists of two main parts: SIR-3000 and antenna (200MHz).**
- **Range of measurements**:
  - 30 ft penetration depth, 3.3~17 in. spatial resolution
  - 200 MHz center frequency
  - 512 samples (individual data points) per scan







Procedure of Operation

- **1. Connect the SIR 3000 with antenna**

  Use appropriate cables and connectors.

  Fully charge battery.
- **2. Set up input and output parameters**

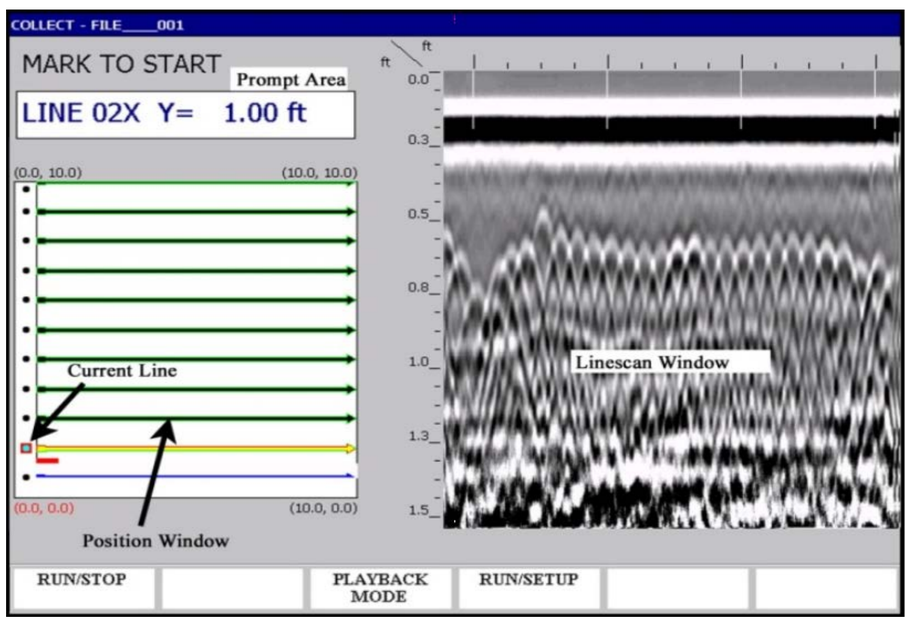
  The SIR-3000 has four dropdown menus: Collect, Playback, Output, and System. Each menu has multiple parameters to set following self-explanatory instructions.
- **3. Calibrate the survey wheel**

  A long measured straight line is drown on the survey surface to make the calibration more accurate.
- **4. Start the survey or detection**

  One person pulls the antenna and the other person in the back collects data.

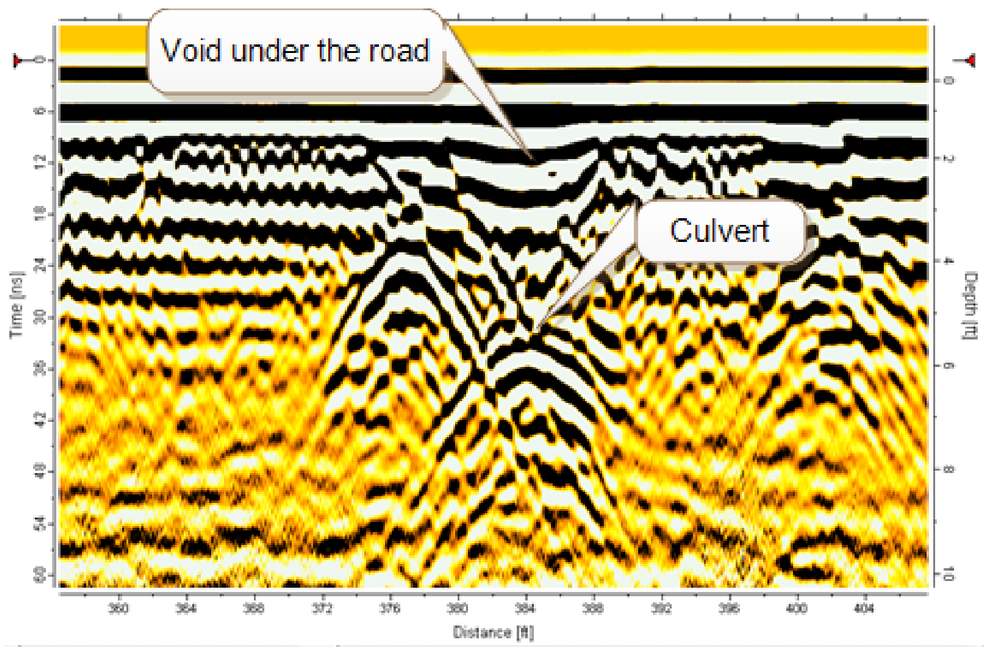
Main Benefits of GPR Survey

- Nondestructive to structures.
- Widely applied for detection of subsurface objects, changes in material property, and voids and cracks.
- Easier to collect data and save files automatically when done from one line to another (see figure to the right).
- Convenient to transfer data from SIR-3000 to a PC for processing and interpretation.



Main Applications of GPR Survey

- Riverbed profiling for bridge scour monitoring.
- Nondestructive tests of structures and pavements (figure to the right) to locate buried structures and utility lines, and identify soils and rock stratification.
- Construction of 2D and 3D tomographic images by a systematic collection of multiple lines of data over an area of interest.



Contact: *Genda Chen, Ph.D., P.E., SPAR Lab Director,* **Phone: (573) 341-4462, Email: gchen@mst.edu**