

1. Product Name: Smart GPR (Ground Penetrating Radar) System

2. Introduction of Smart GPR

- ◆ Smart Ground Penetrating Radar (GPR) uses echo waves to detect underground cavities, groundwater, sewers, and road ground conditions.
- ◆ Depth detection of 0.5m to 100m from the surface using a magnetic field with a strong short wave band.
- ◆ Underground detection is possible not only in flat areas such as general roads but also in non-flat areas such as mountain areas with high resolution.

GPR-R1

GPR-T1

3. Smart GPR Performance

- ◆ Detection depth: 0.5 m to 100 m
- ◆ Operating frequency: 8 MHz
- ◆ Detection space resolution: 0.25 m or higher.
- ◆ Detection depth steps: 0.5, 1.0, 1.5, 2.0 m
- ◆ Detection Results: 2D / 3D Mapping Analysis Graphs



GPR-T1



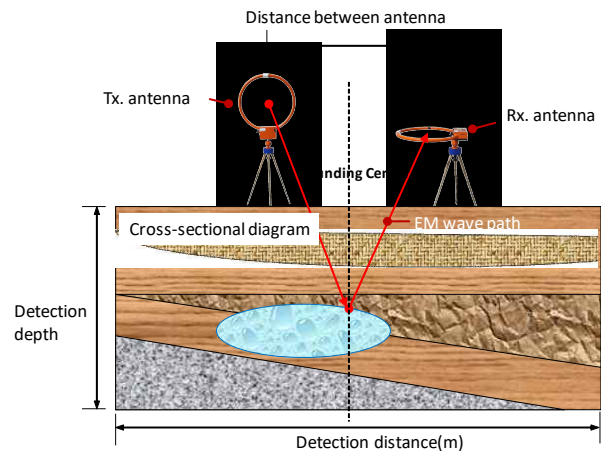
GPR-R1



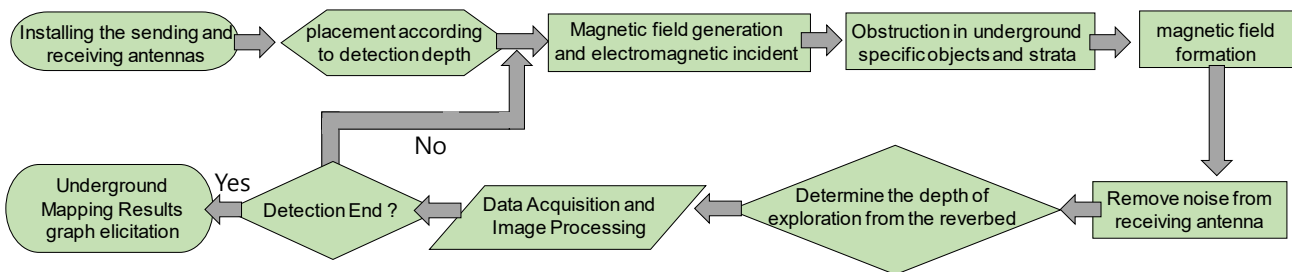
Control Unit.

4. Principle of Smart GPR

- Ⓐ Magnetic field with a strong short wave band on the transceiver antenna
- Ⓑ Electromagnetic Underground Entrance
- Ⓒ Obstruction in certain underground objects and strata
--> Magnetic field formation
- Ⓓ Remove noise from receiving antenna
- Ⓔ Determine the depth of exploration from echo waves
- Ⓕ Data acquisition and image processing (underground mapping)



Conceptual diagram of the GPR antenna

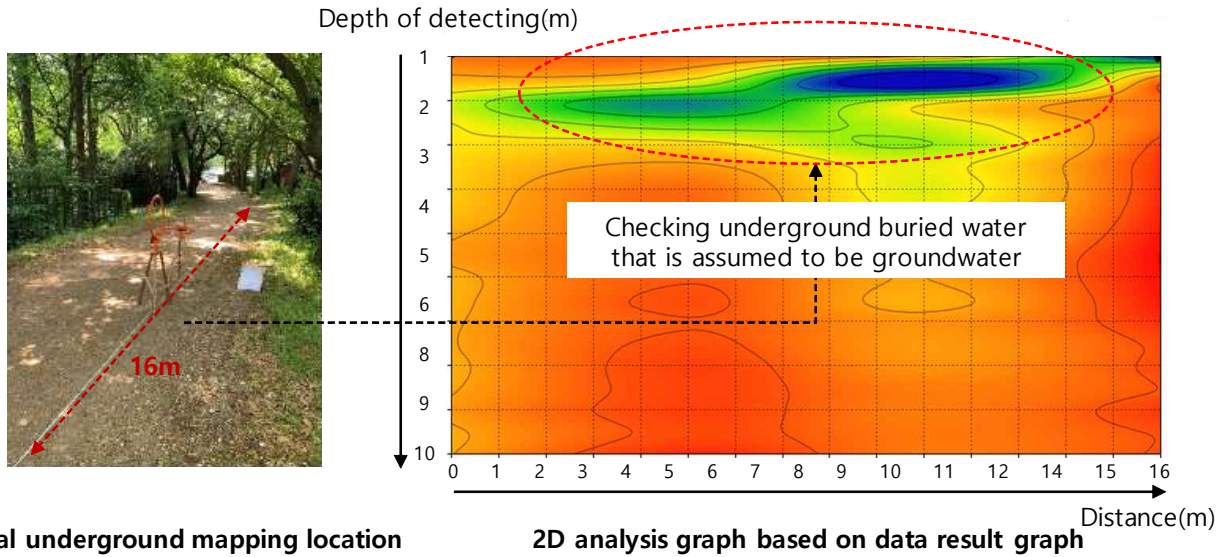


Operational flowchart of GPR antenna

5. Underground Detection Using Smart GPR Technology

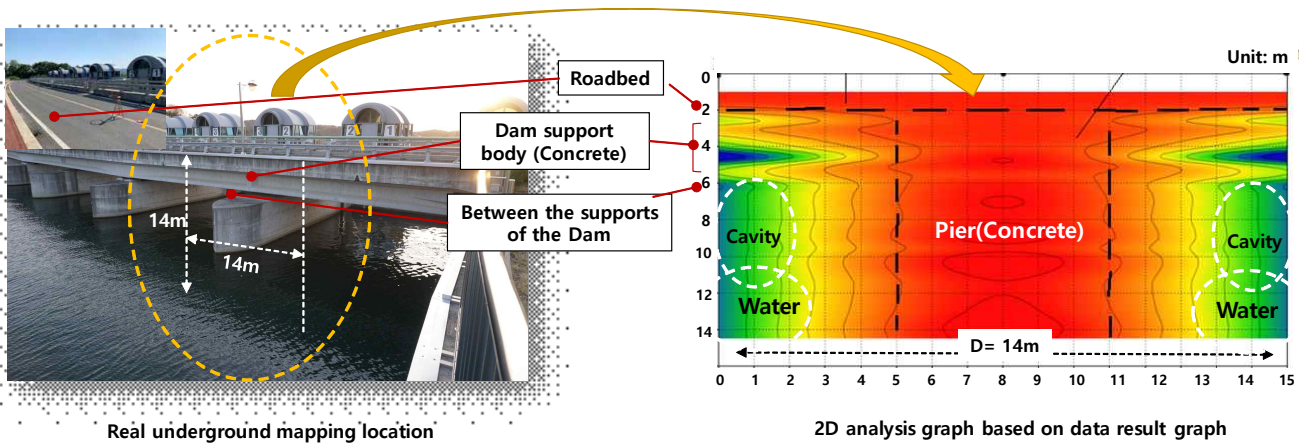
- ① Underground detection example 1: Mountain range

- Subject to test: Mountain areas (Banya-Mountain, Nonsan)
- Test purpose: Verification of detection performance in mountainous areas
- Measurement height: Up to 10m
- Result: Confirmation of underground buried matter estimated as groundwater at a depth of 1.5m



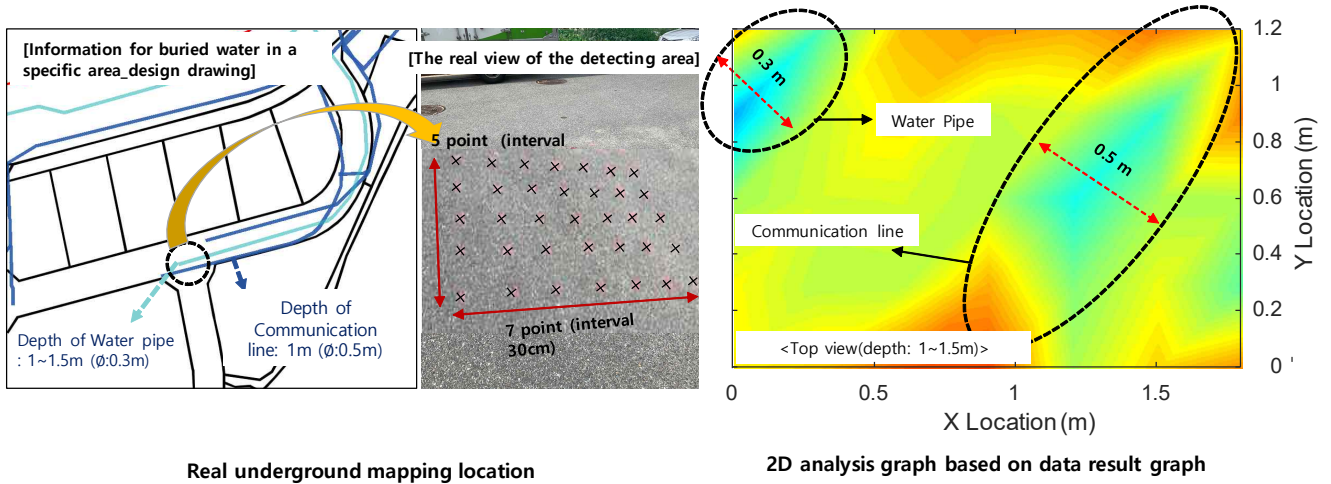
② Underground detection example 2: Bridge

- Subject to test: Bridge around Topjeongho Lake in Nonsan City
- Test purpose: Verification of detection performance on bridges
- Measurement height: Up to 14m
- Result: Roadbed, dam support, pier, water (joint) detection check completed.



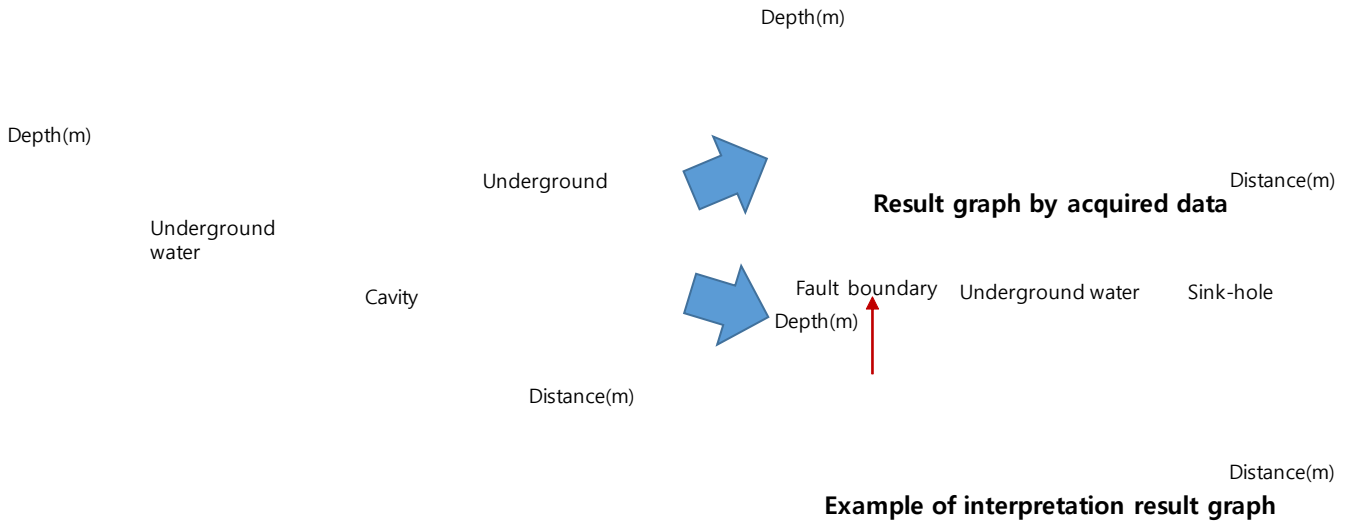
③ Underground detection example 3: a general road

- Test target: General road (Sejong-si)
- Test Purpose: Detection of location information of underground installations
- Measurement height: Up to 3m
- Result: Detected the water supply line and communication line according to the installation information

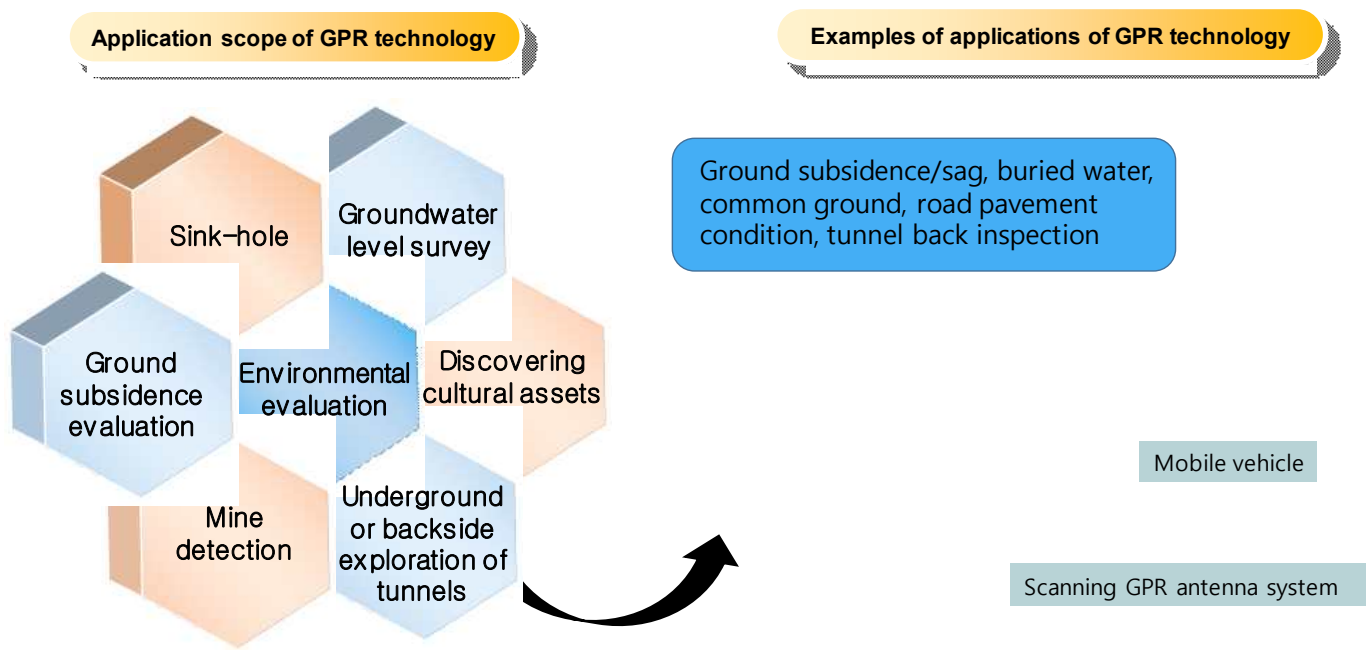


6. The Application and Expected Effect of Smart GPR

[Example of Utilization] : Vehicle Mounted Smart GPR System



[Scope of Smart GPR]



[Expected Effect of Smart GPR]

- Securing Smart GPR technology
- Development of technologies specialized in various terrain
- Development of a real-time integrated GPR system
- Securing a safety net for infrastructure