

BRIDGING THE GAP

Distribution Statement A: Approved for public release; distribution unlimited

2004

Counter Underground Facilities

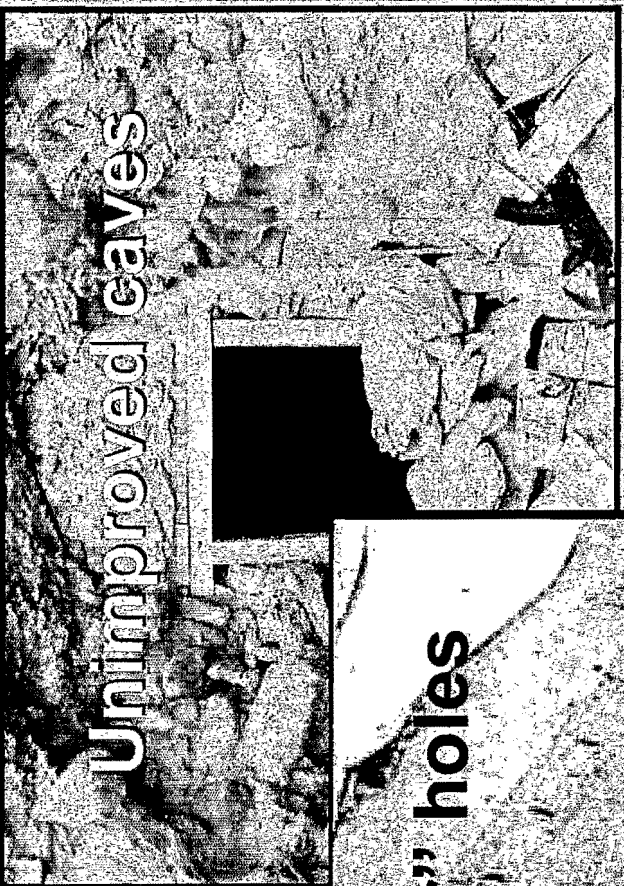
Greg Duckworth



Deep facilities



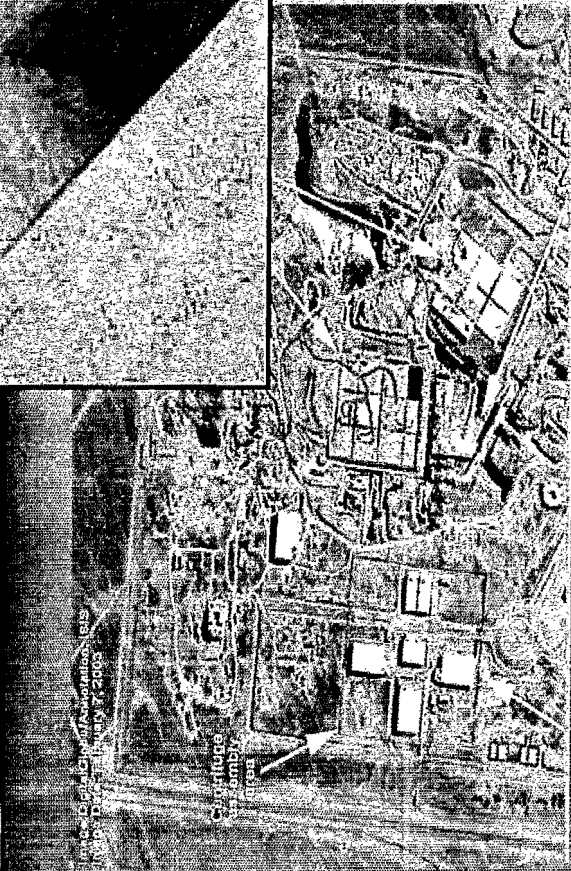
Unimproved caves



"Spider" holes



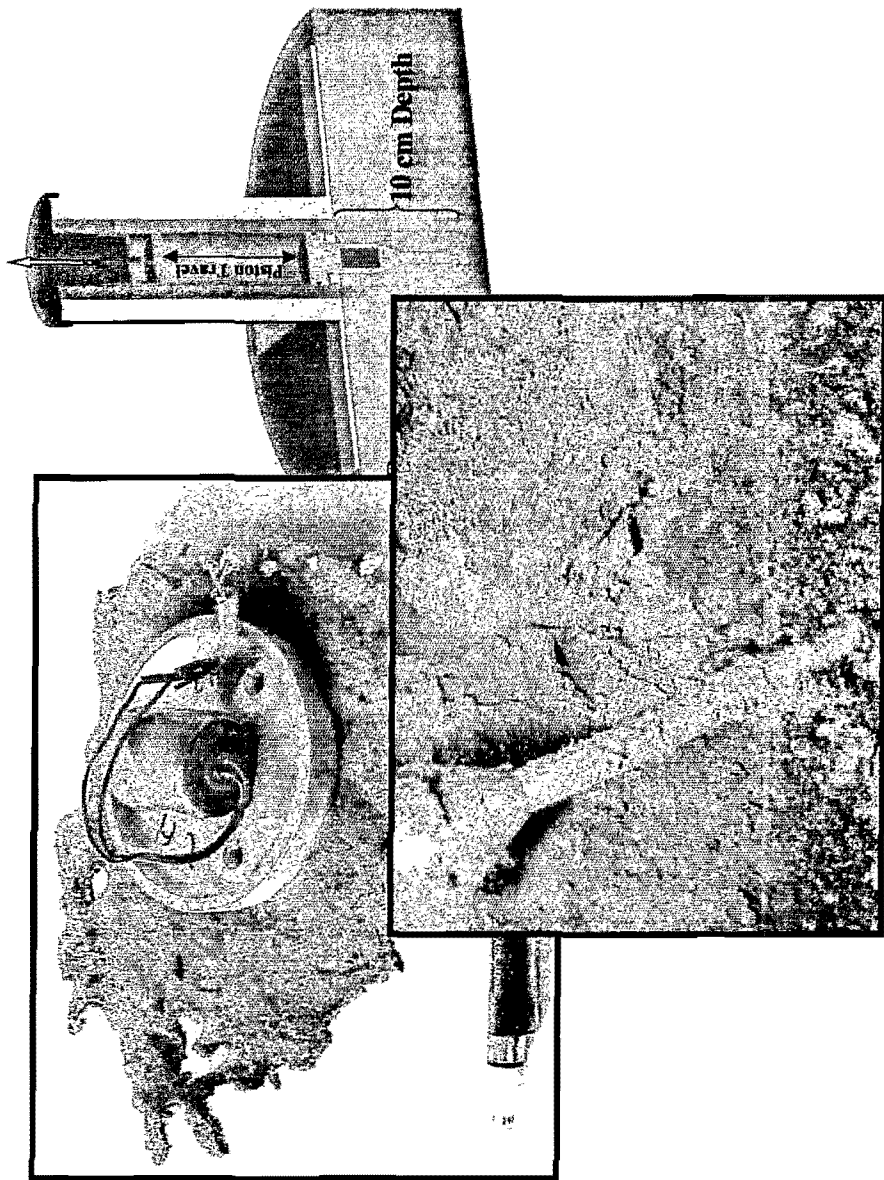
Urban facilities and interconnects



Cut and cover facilities



Robust Geophone Coupling



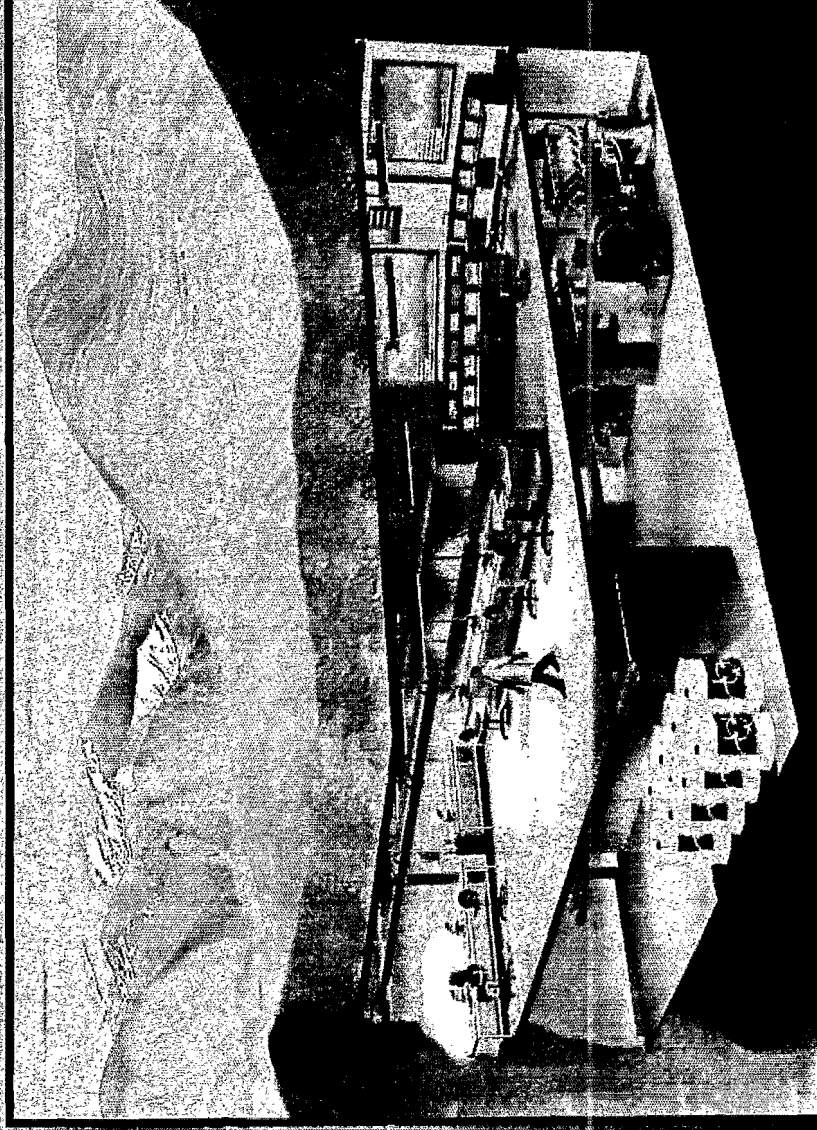
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PASEM:

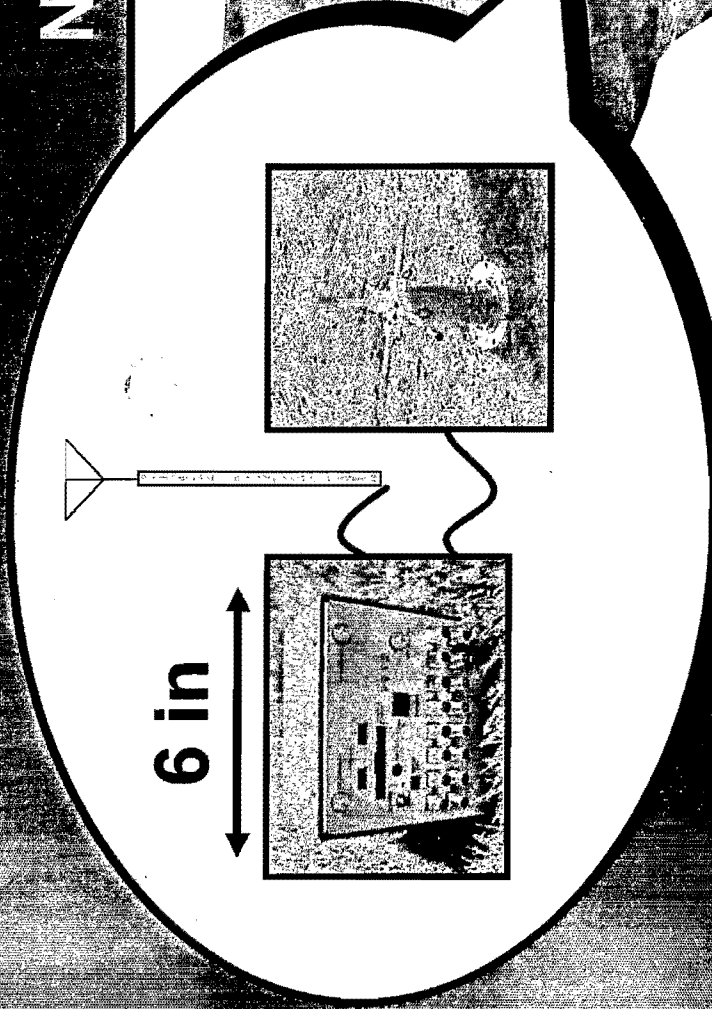
Passive Acoustic, Seismic, and Electromagnetic Monitoring

Exploits the signals emitted by activities
within the Underground Facility (UGF)

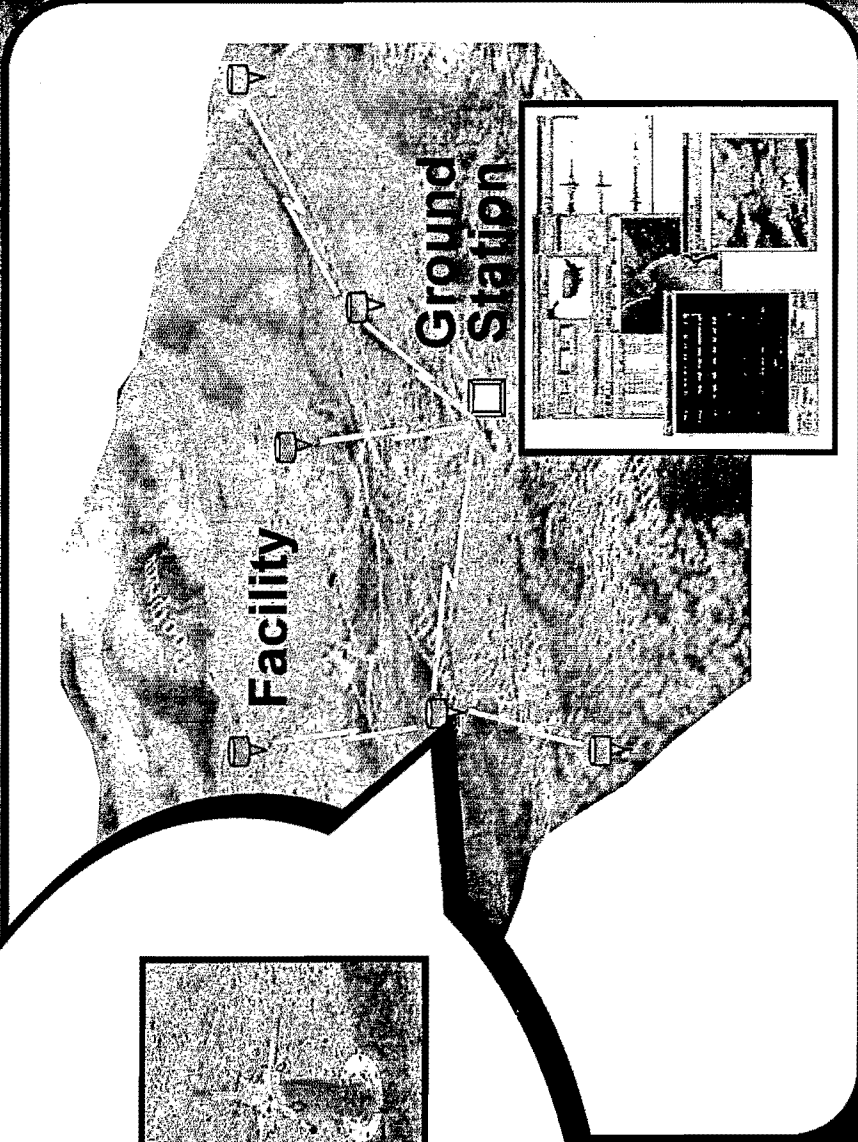


CUGF Ground Sensor System - Functional Prototype

Prototype Sensor Node

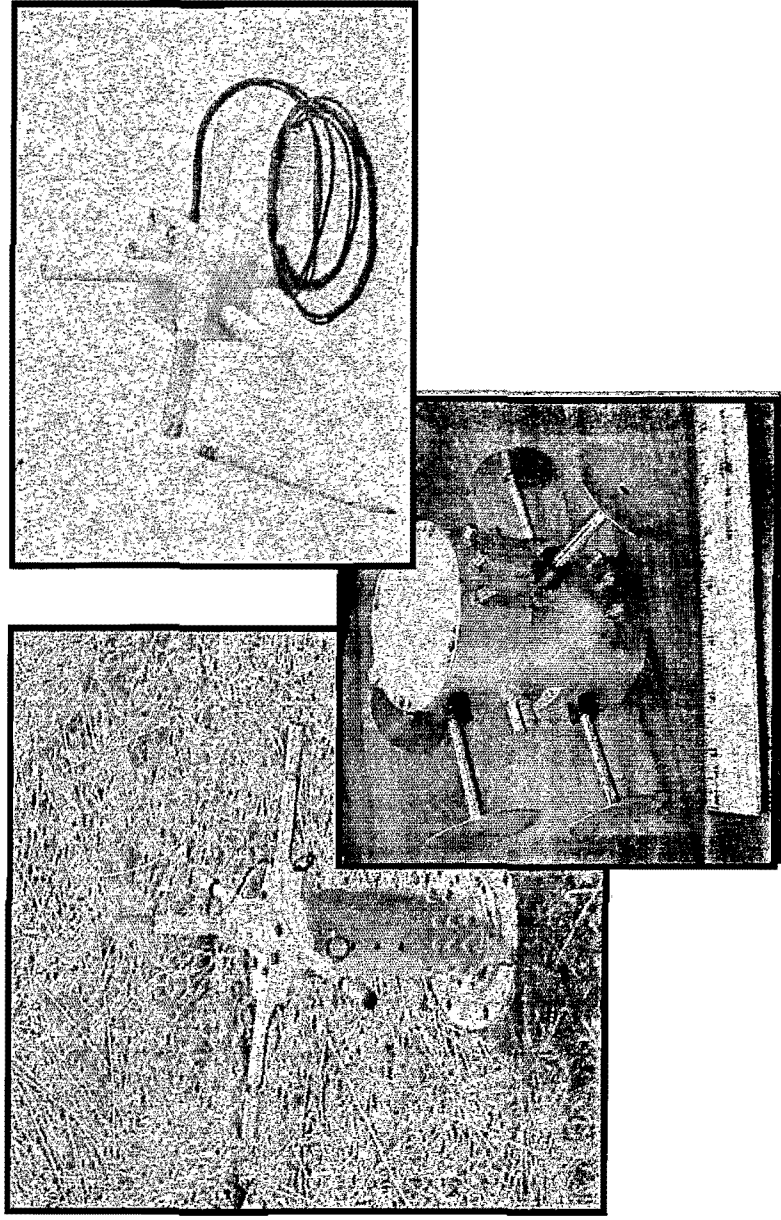


Network of Nodes



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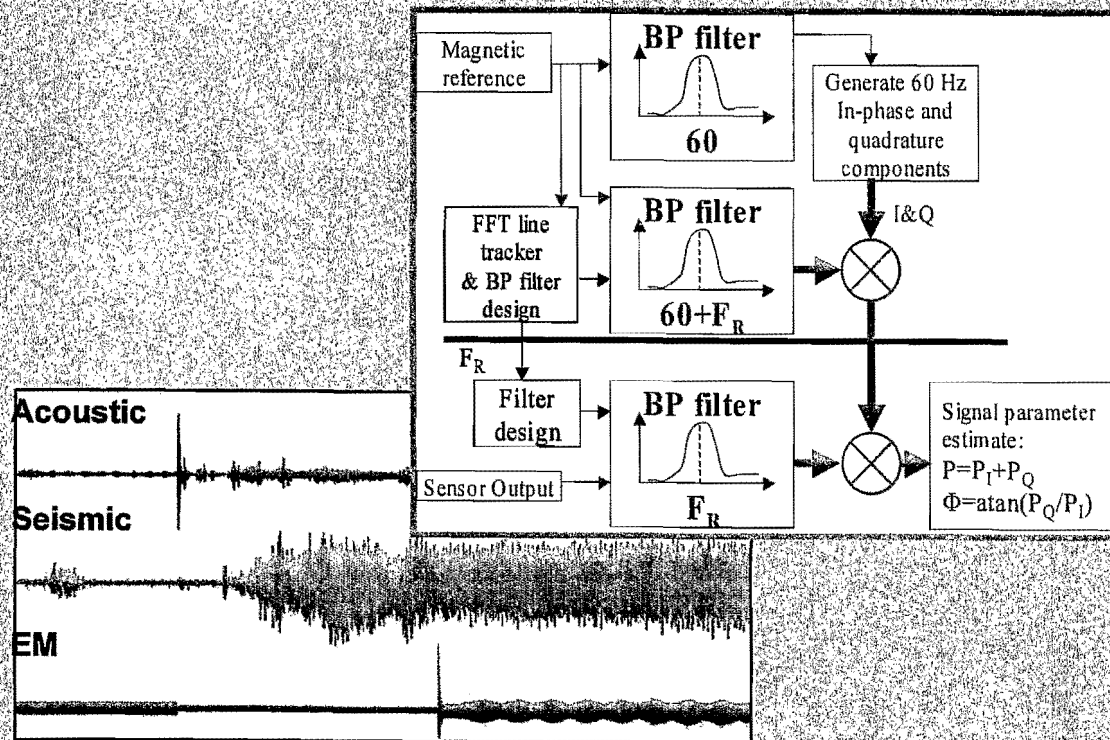
Advanced EM Sensors



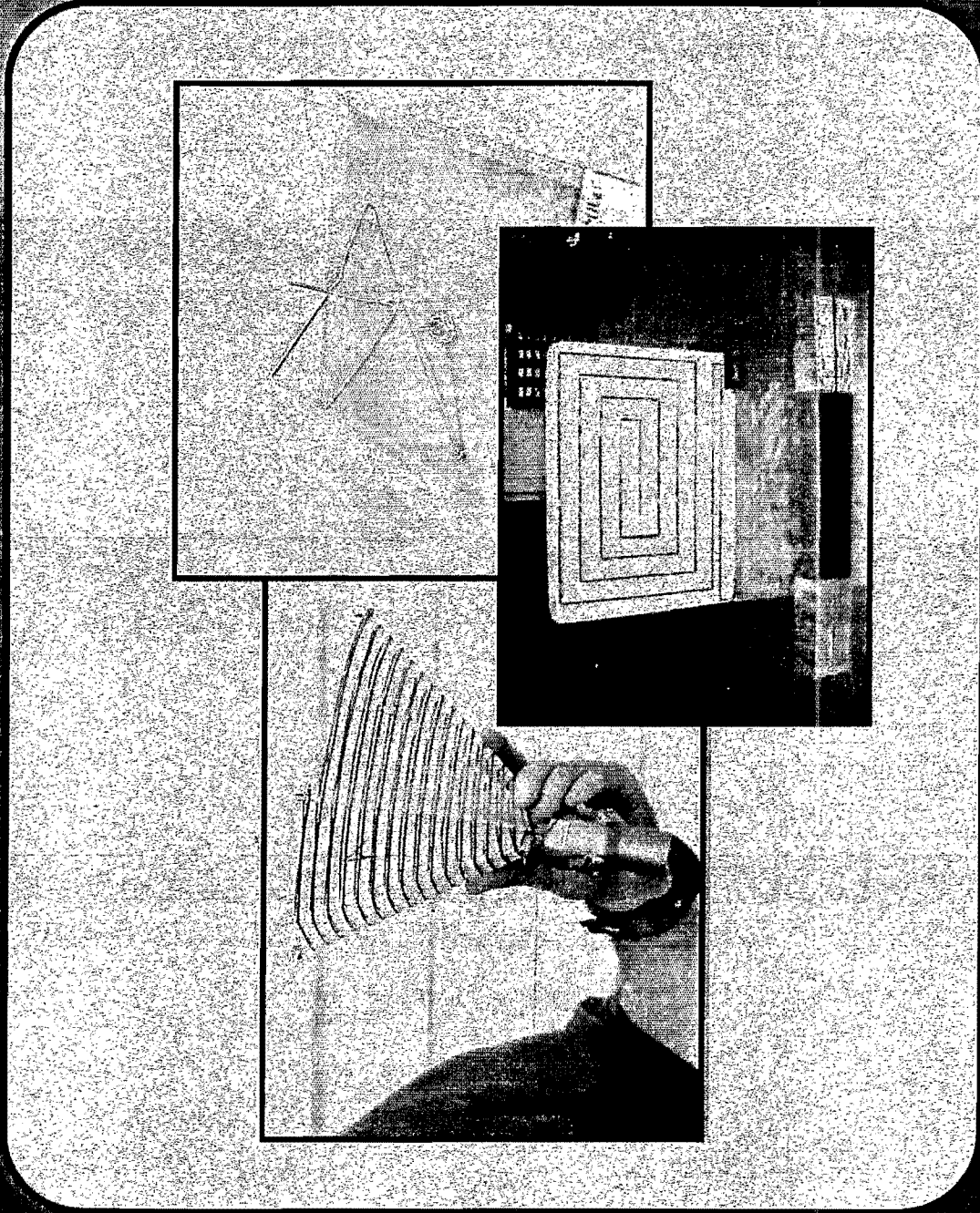
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Coherent Signal Processing

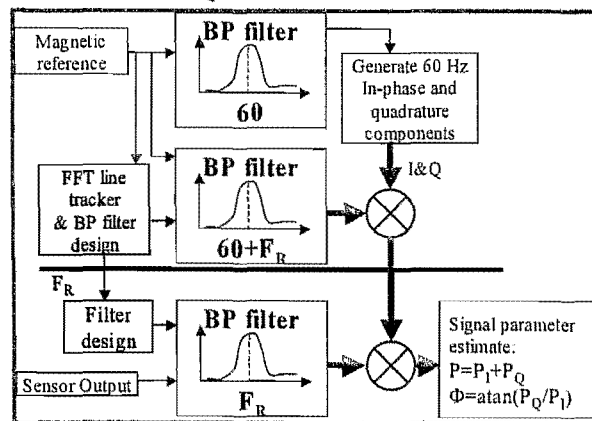
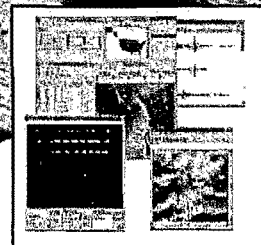
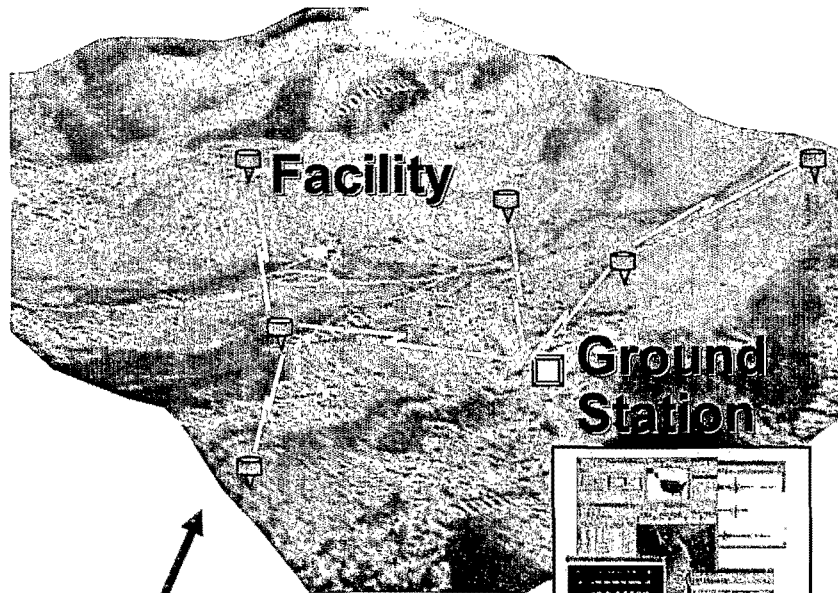


NLOS Antennas

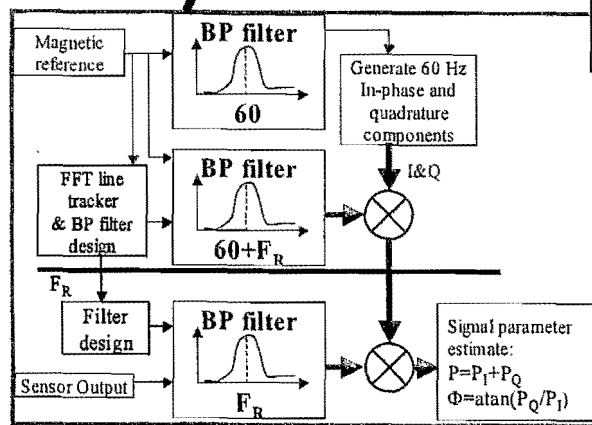
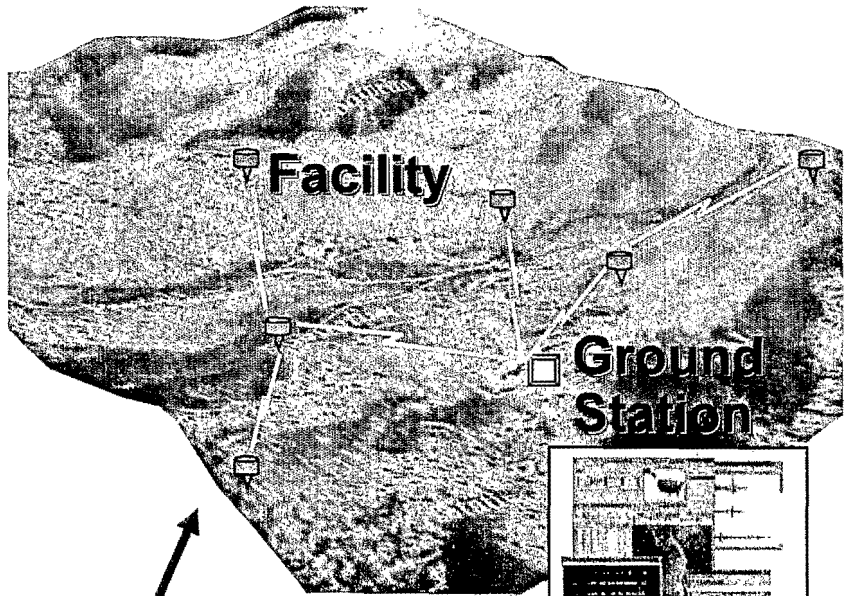


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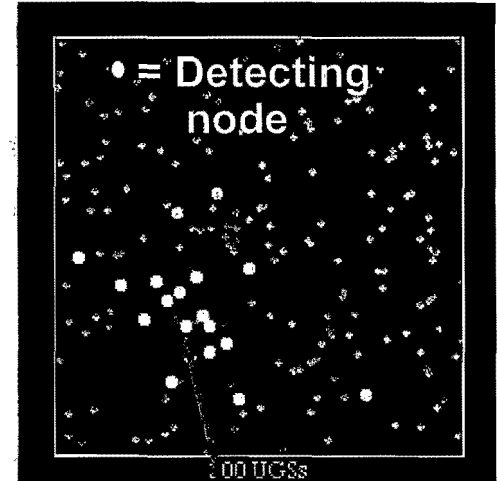
Small "N" systems High performance sensors



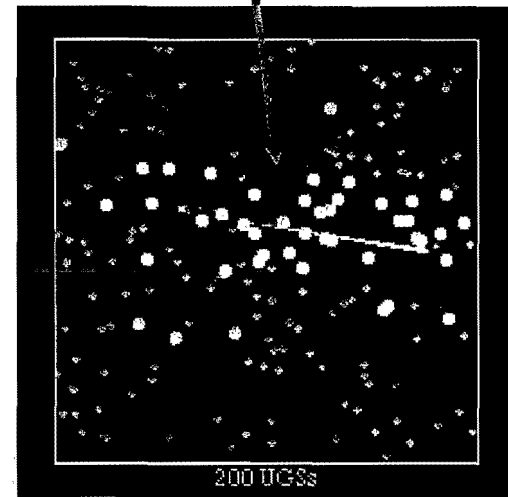
Small "N" systems High performance sensors



Large "N" systems μ-sensors

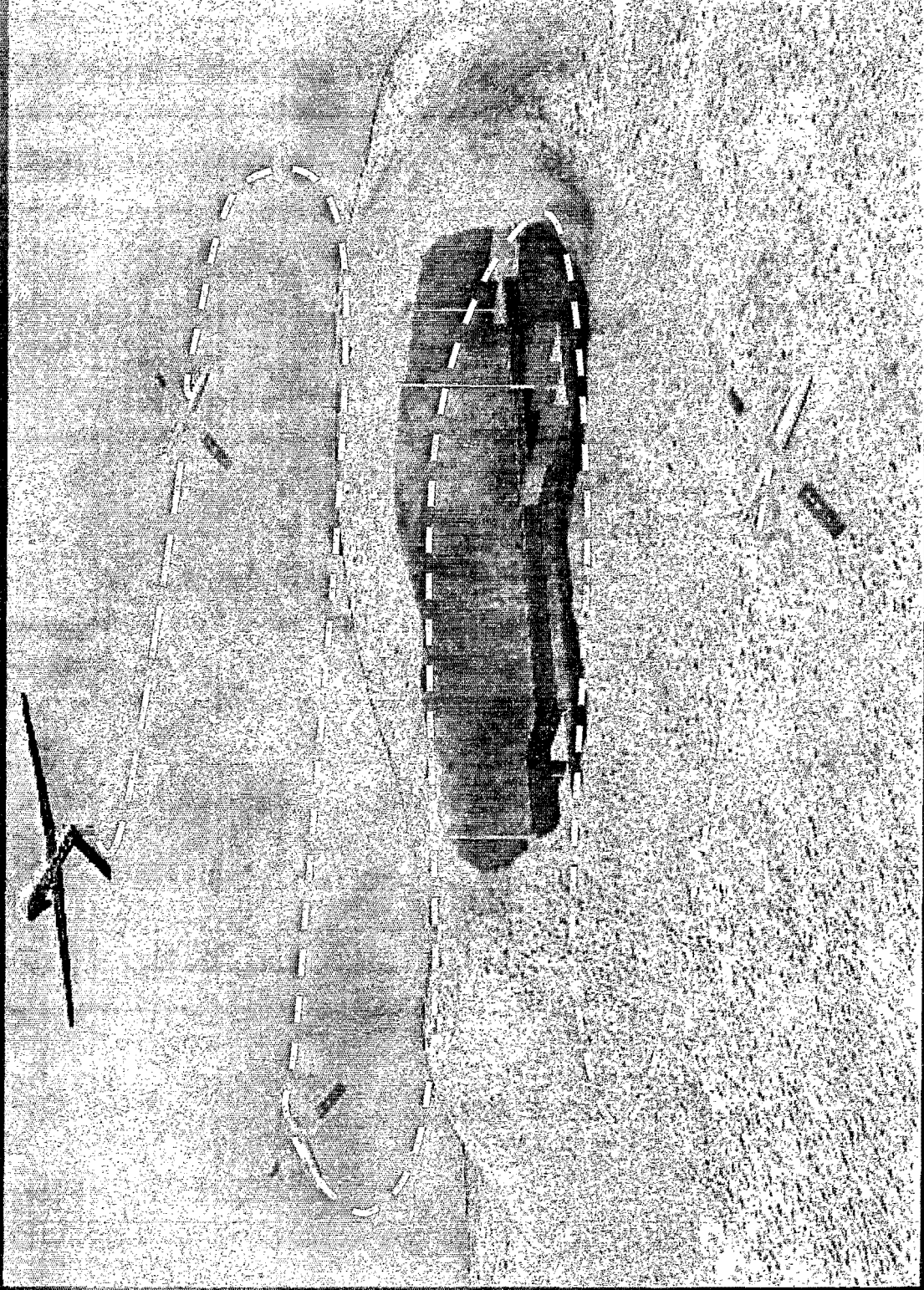


Facility



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LAASS Low-Altitude Airborne Sensor System

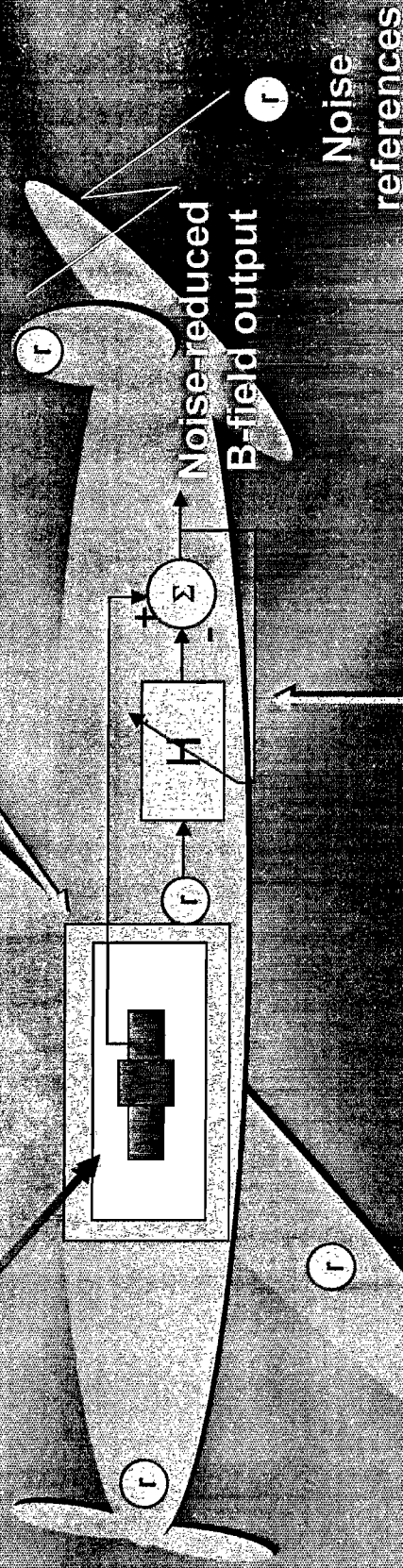


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EM noise mitigation approaches

Passive Vibration Isolation

Sensor
Modifications



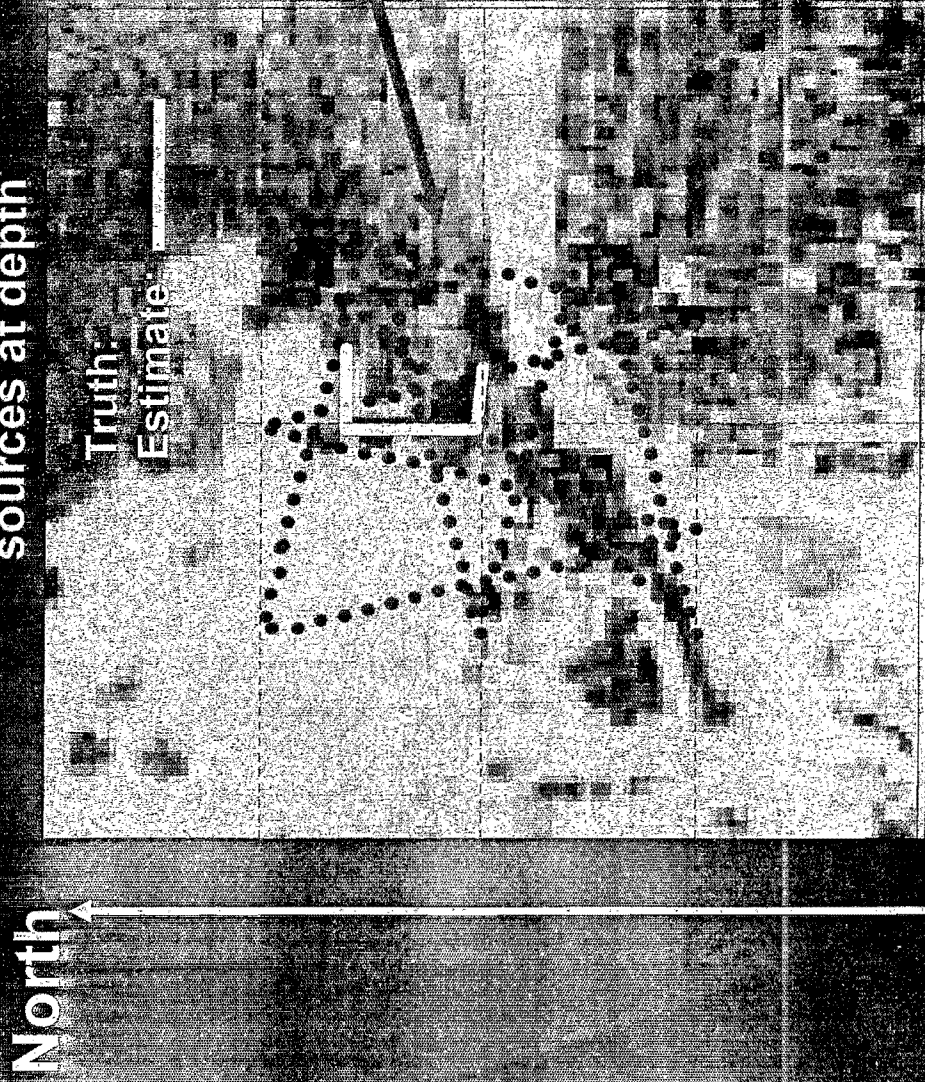
Active Electronic Noise Cancellation

Platform Choice and Modifications

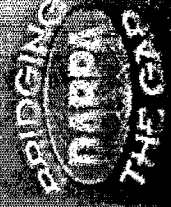


LAASS EM Inversion Problem

Parametric inversion of EM
sources at depth



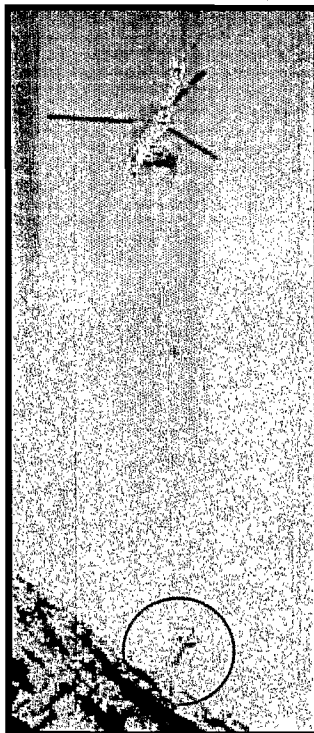
East



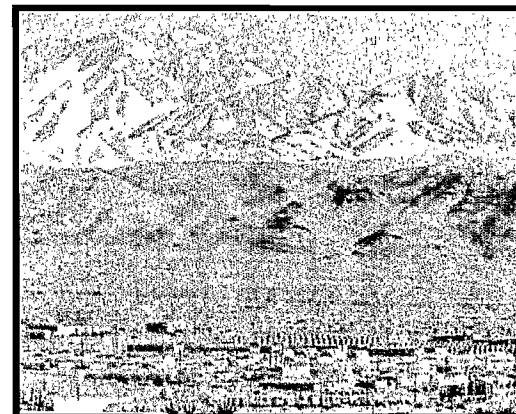
LAASS

Data Collection and Proof-of-Principle Demo

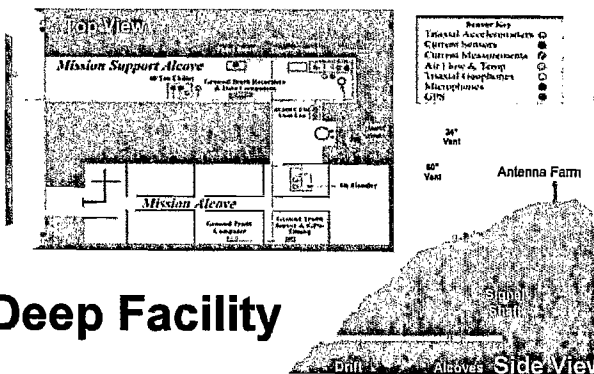
Rural Site



"Urban" Site

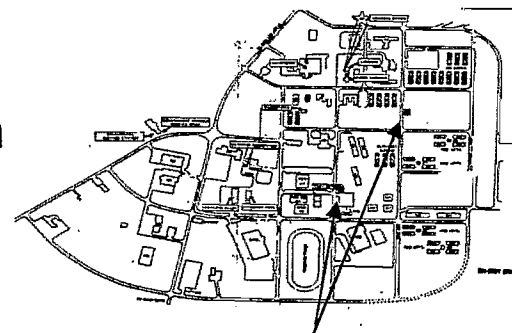


Ground Truth Sensors



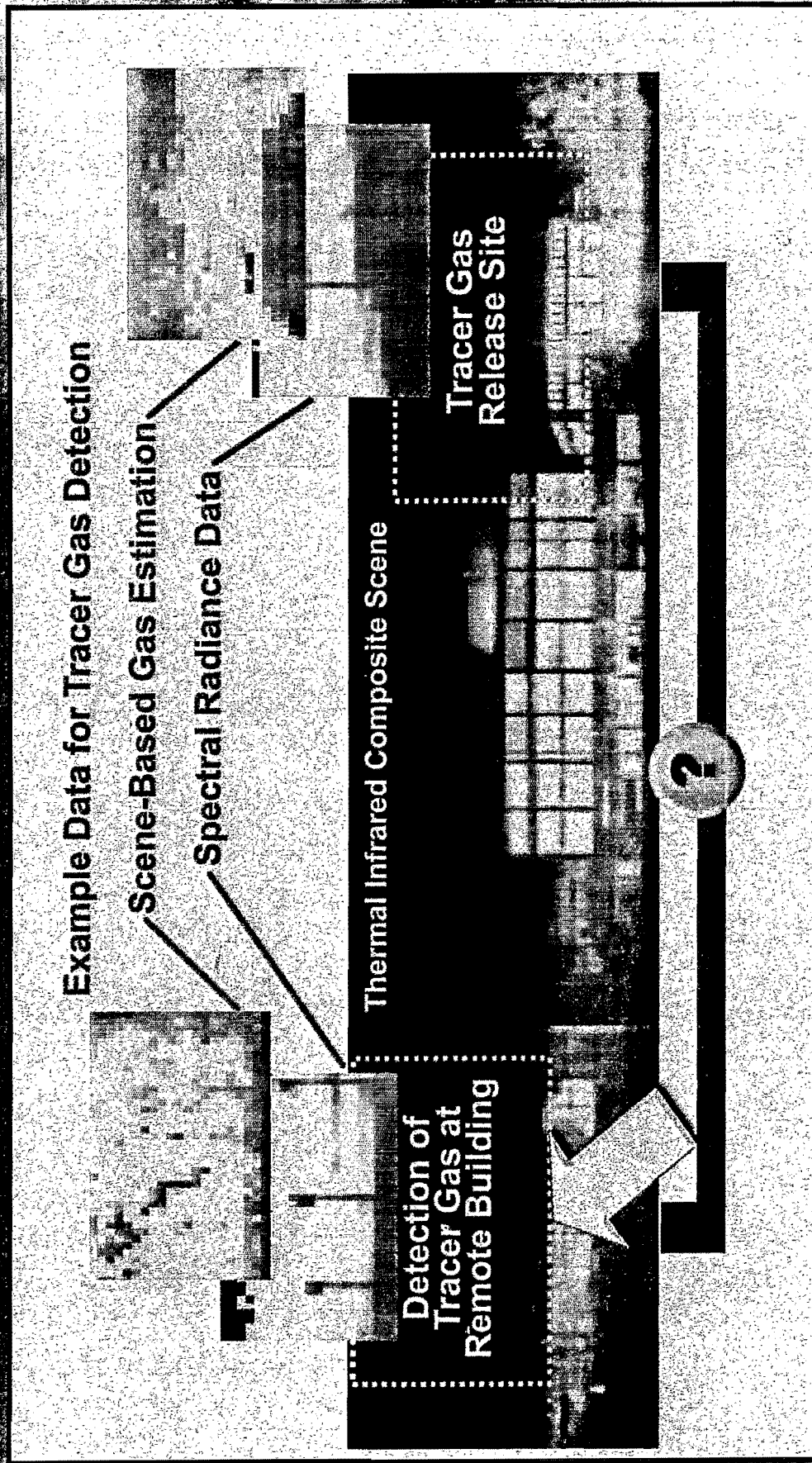
Deep Facility

Collection Platform



Generators/Ground Truth Sensors

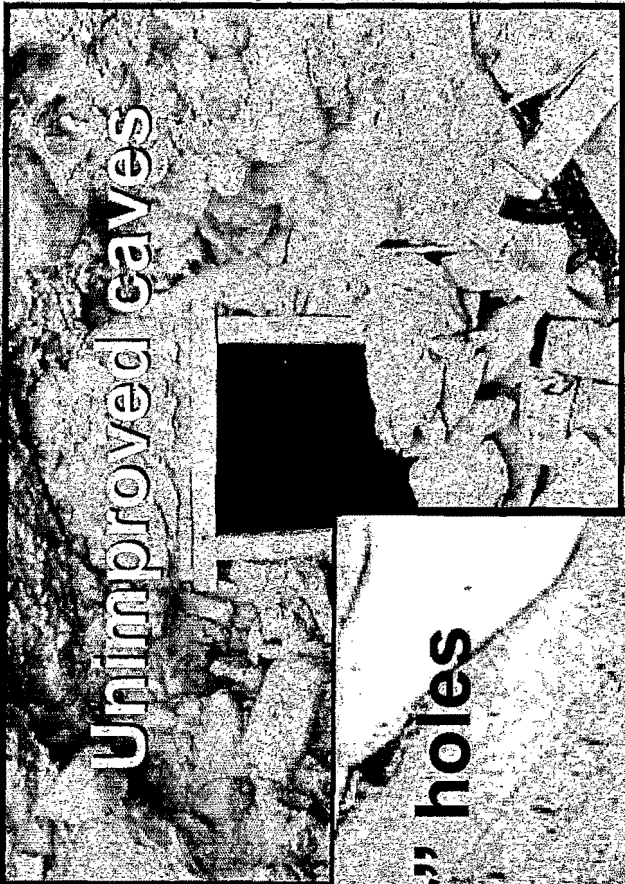
Interconnect Assessment Strategic and Tactical Applications



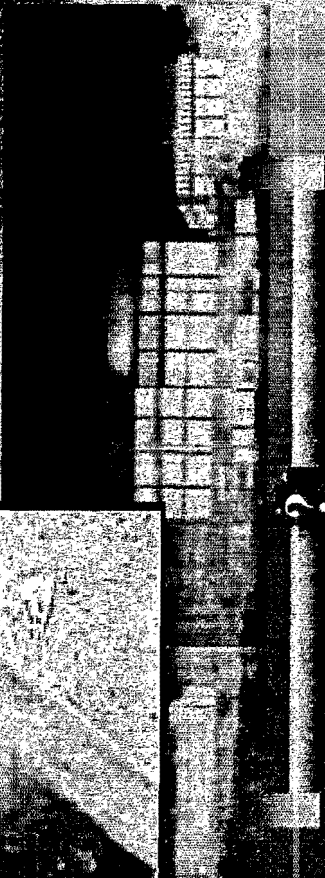
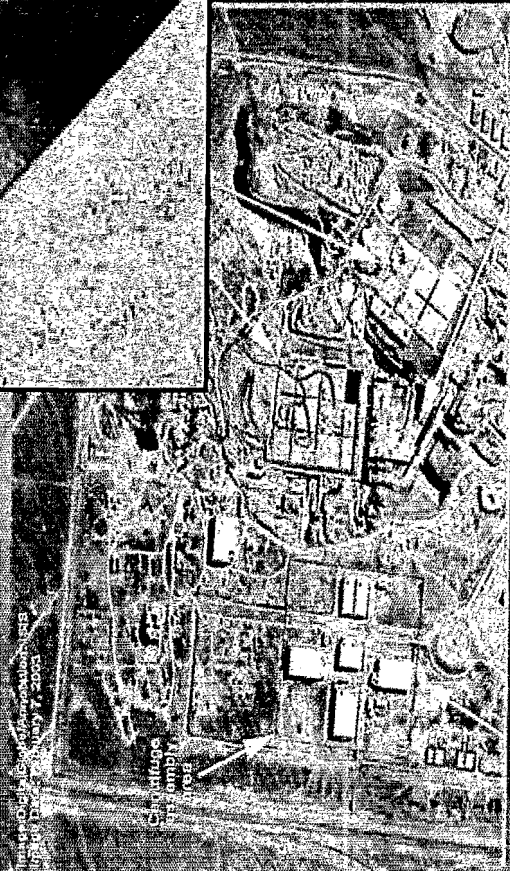
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