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An Integrated Performance Model of City Infrastructures

ASSESSING THE UNDERWORLD

WS3b – High Frequency Electromagnetic and GPR Techniques

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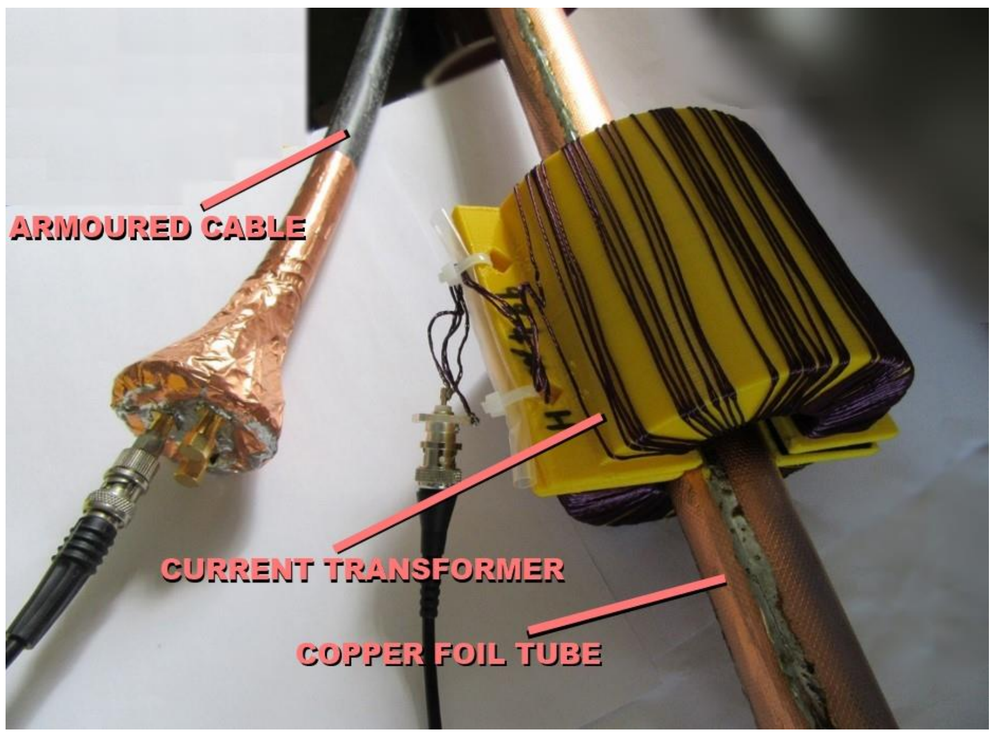
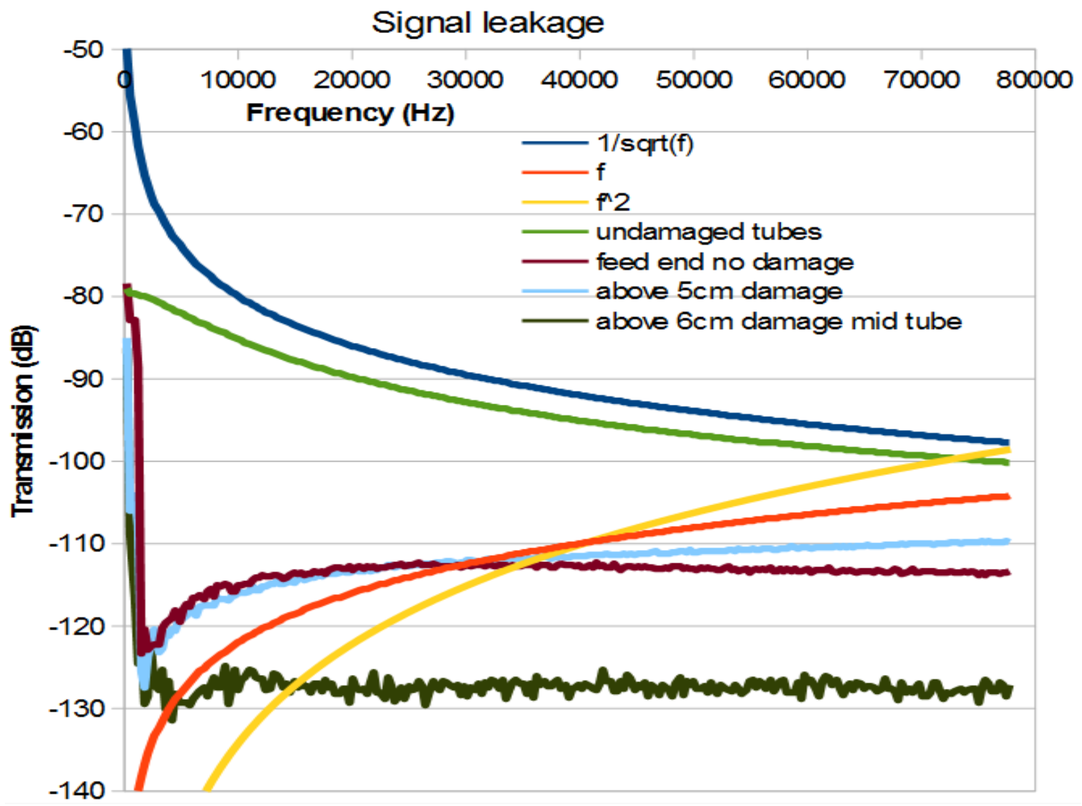
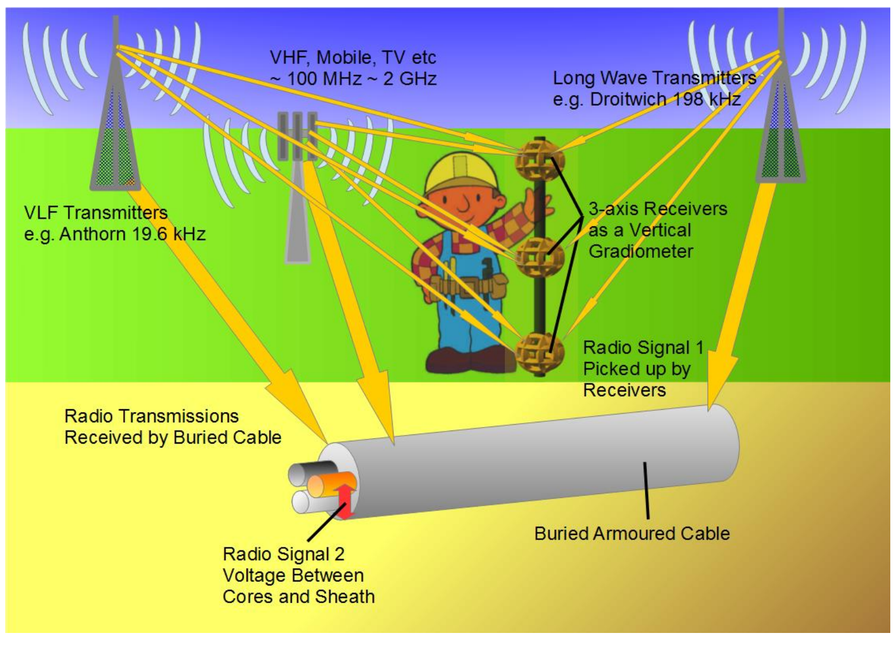
Signals of Opportunity

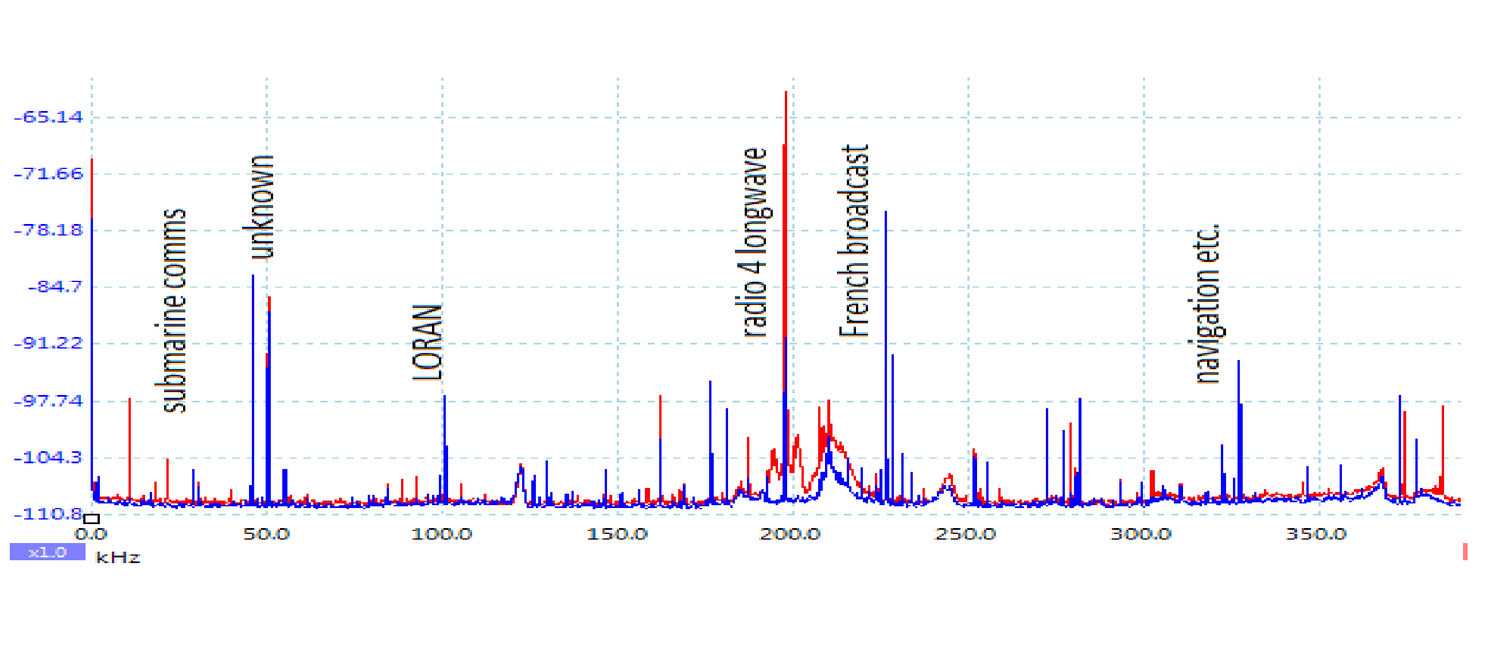
- Measure the leakage of signals of opportunity through a metal shield to determine the integrity of the shield.
- A tube of thin copper foil and a coil are used to determine the transmission as a function of frequency and gap distance.
- An air-cored current transformer has been made which gives improved sensitivity compared to a simple cylindrical coil.





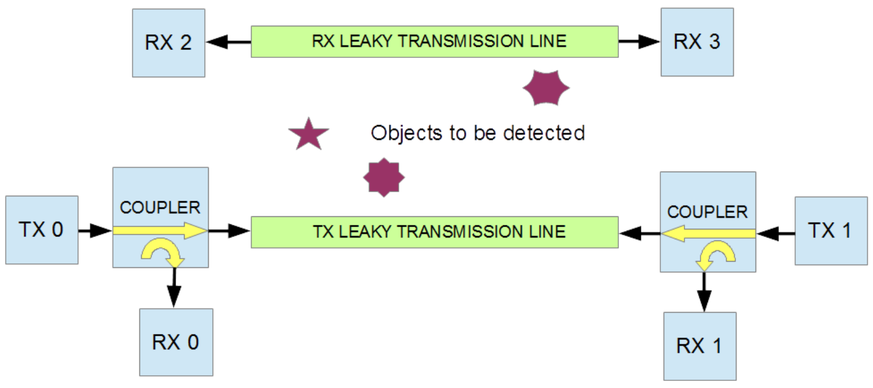
- For detecting lower frequencies (submarine, LORAN, medium wave signals) coils with high gain pre-amplifiers are used. In order to determine magnitude and direction the coils are 3-axis types. Three are used as a gradiometer.
- Sensitive from around 30 Hz to 2+ MHz (with improved amplifier).



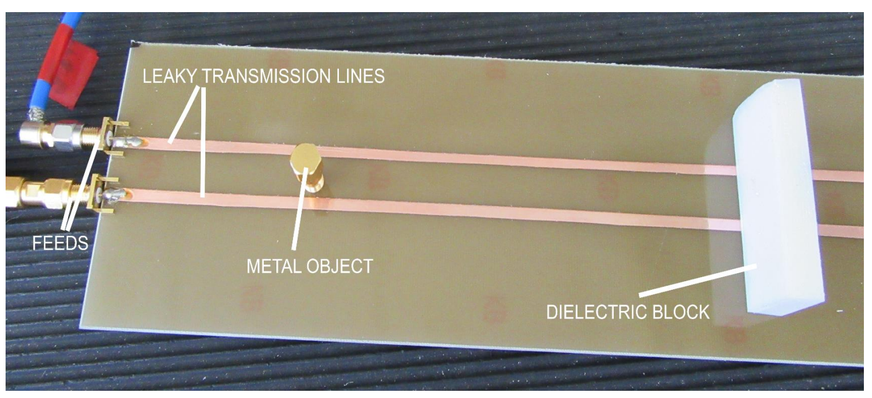


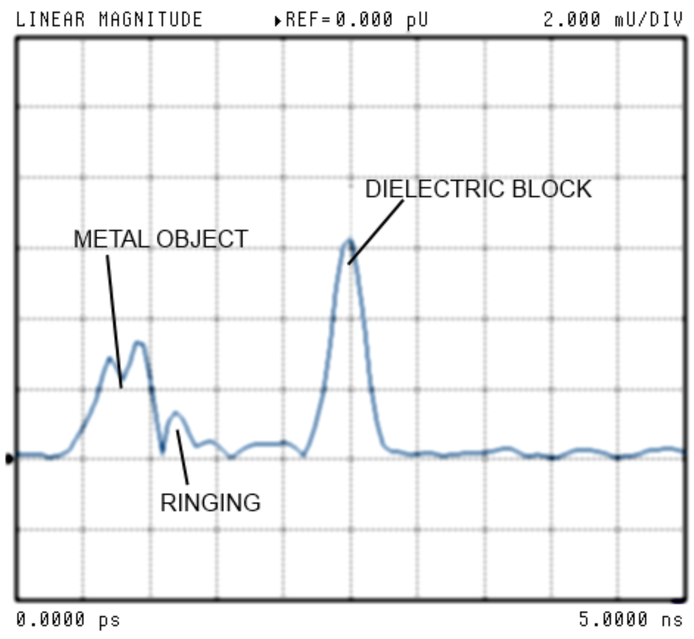
Transmission Line Antenna Scanning

- Potential for rapid scanning along lengths of tens of metres of roadways and cable runs.
- Investigations have identified desired bandwidths and source signals.
- Proof of concept using copper trace leaky transmission lines and VNA.



LEAKY TRANSMISSION LINE OVERVIEW





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