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Fiber optics could be used to discover underground tunnels without looking for the actual entrances  
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## [Fiber Optic Cables Can Detect Underground Tunnels](#)

*These are the same cables used in telecommunications*

Technion-Israel Institute of Technology researchers have recently announced that they have devised a way of using telecommunications-grade fiber optic cables to detect war-time underground tunnels, like those used by Hamas in the Gaza strip to smuggle in weapons across the Israeli border. Their finds are to be presented in Orlando, Florida, in April 2009, at the Defense, Security and Sensing Conference of SPIE. The Society of Photographic Instrumentation Engineers is a group seeking to further scientific advancements in areas related to optics and photonics, and was founded in 1955 in California.

"Tunnel excavation is accompanied by the release of stresses that cause permanent - though very tiny - displacements and strains in the ground. If you can measure these strains in the soil with sensitive equipment, you can find the tunnel's location," Dr. Assaf Klar, one of the two main researchers and a member of the Technion Faculty of Civil and Environmental Engineering (FCEE), explains.

He adds that the disturbances generated by underground excavations are quite different from those generated by other causes, which would undoubtedly make their system work. Alongside Klar, Dr. Raphael Linker has also played a major role in the new research. He is, likewise, a member of FCEE.

Using high-tech computer simulations, the two have "trained" a computer to recognize various soil profiles, which are to be recognized by a device known as Brillouin optical time domain reflectometry (BOTDR). The signal that the fiber optic ensemble transmits propagates through the ground, where a natural process known as "wavelet decomposition" breaks it into smaller patterns.

These patterns are then filtered and analyzed, and any irregularities are matched against the existing databases, featuring the profiles of tens of thousands of tunnels discovered worldwide. The researchers say that if there's an artificial structure below the ground, the system will locate it, allowing the army to get a tactical advantage over the combat zone.

If the supply routes are localized, patrols could be set at tunnel entrances, and capture militants who supply extremists with weapons. Their contact people could also be found, which would virtually put an end to the Hamas weapon supplies. Needless to say, that would almost surely mean victory for Israel. The only thing that is standing in the way of this happening is time.