

US military developing geolocation system for underground

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(PhysOrg.com) -- The US military is studying the feasibility of a system that could allow them to accurately navigate in enemy underground tunnels, an environment in which GPS does not work.

US military satellites provide [Global Positioning System](#) (GPS) signals used by millions of gadgets, including car satellite navigation systems and smartphones, but GPS needs line-of-sight to the satellites, which is only available on the Earth's surface and not underground. At the same time, the presence of US military and intelligence satellites has driven many people of interest underground, especially since subterranean engineering and tunnel building are becoming less expensive and easier. A deep tunnel system shields a group from spy satellites, and also gives them protection against bomb attacks.

Scientists from the Pentagon agency [DARPA](#) have noted that very low frequency (VLF) radio signals called “spherics” or “sferics” are generated by lightning strikes and penetrate deep underground, and they are therefore studying the feasibility of a system of underground receivers that could possibly built to detect the signals hundreds of miles away. Receiving signals from lighting strikes in multiple directions, along with minimal information from a surface base station also at a distance, could allow operators to accurately pinpoint their position.

The system is known as Sferics-Based Underground Geolocation (S-BUG) and early studies found that it may be feasible. DARPA is now planning to hold a conference, which will mostly be classified as secret, with technology companies interested in developing the project further. The project will need to verify that sferic signals received on the surface can be correlated with sferics received underground to provide geolocation with enough resolution. The ultimate goal of the S-BUG project is to design a full navigation and tracking system for underground uses.

The project coincides with another DARPA project (Nimbus), which aims to trigger and manipulate artificial [lightning](#).

More information: DARPA project:
www.darpa.mil/sto/underground/sferic.html

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