

DARPA seeks new positioning, navigation, timing solutions

March 28 2015, by Nancy Owano



Navstar-2F satellite of the Global Positioning System (GPS). Image: USAF

The Defense Advanced Research Projects Agency (DARPA), writing about GPS, said: "The military relies heavily on the Global Positioning System (GPS) for positioning, navigation, and timing ([PNT](#)), but GPS access is easily blocked by methods such as jamming. In addition, many environments in which our military operates (inside buildings, in urban canyons, under dense foliage, underwater, and underground) have limited or no GPS access." This raises the questions of what DARPA plans as a step up. Will DARPA introduce relevant new technologies? Let DARPA say it in its own words: "GPS has provided a tremendous strategic advantage to the U.S. military, but heavy reliance on GPS has also become a strategic vulnerability. The need to be able to operate effectively in areas where GPS is inaccessible, unreliable or potentially

denied by adversaries has created a demand for alternative precision timing and navigation capabilities."

Agam Shah of the IDG News Service reported on Thursday that DARPA is preparing an alternative technology to GPS. By alternative, the search is on for technology where signals won't disappear in blind spots and cannot be jammed. DARPA wants to work on a more flexible and customizable technology with the help of algorithms, said Shah. While GPS technology has provided a strategic advantage, he said, it is not foolproof, as it can be jammed by opponents or be [inaccessible](#) in some parts of the world. DARPA is developing "radically" new technologies to deliver a more advanced position- and navigation-tracking system, said Shah.

A portion of a DARPA report which was [released](#) this month titled "Breakthrough Technologies for National Security" summarized the Agency's mission and evolving focus areas. They discussed GPS as part of the report. DARPA said the new technologies in which they are investing "have the potential to deliver GPS-quality position, navigation and timing information for military systems, including novel inertial measurement devices that use cold-atom interferometry; chip-scale self-calibrating gyroscopes, accelerometers and clocks; and pulsed-laser-enabled atomic clocks and microwave sources."

Shah said DARPA is developing sensors that "use signals of opportunity" such as television, radio, cell towers, satellites, and even lightning, for real-time tracking. The effort, called ASPN (All Source Positioning and Navigation), alleviates issues related to fixing locations in buildings, deep foliage, underwater or underground, where GPS access can be limited.

As for when this may happen, DARPA's research typically takes years or even decades to turn into actual products, said Shah. He said "the U.S.

military will likely have first dibs on the GPS alternative before the technology reaches everyday users."

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