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From undersea drones to \$1M satellite launches: DARPA outlines its priorities

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Imagine unmanned systems — drones, essentially — lying dormant on the ocean floor for years at a time, housing sensors or non-lethal weapons, which rise to the surface when triggered by the Navy.

That's one program underway by the Defense Advanced Research Projects Agency, which was detailed in a report Thursday. And by underway, it's in Phase 2 — with plans for initial test designs to be taken into the water later this year.

"Today, the U.S. Navy puts capability on the ocean floor using capable but fairly expensive sub platforms," said Steven Walker, DARPA deputy director, during a media briefing Wednesday. "We'd like to preposition capability on the ocean floor and have it available to be triggered real-time when we need it."

Obviously, there are technological challenges to overcome. For example, how do you trigger those payloads when you want them to be used? What's the best design for the riser technology associated with getting those payloads to "upwardly fall," as DARPA puts it, to the ocean surface? How might you deal



Tern — a program to give forward-deployed small ships the ability to serve as mobile launch and recovery sites for medium-altitude, long-endurance unmanned aerial systems— has just entered the second phase, with AeroVironment Inc. and Northrop Grumman Corp. the prime contractors.

with power supplies, and protecting payloads on the ocean floor for more than a year at a time?

Those details will get sorted out, as they often do in DARPA's seemingly impossibly ambitious programs — with help from the contracting community. In the case of this particular effort, known as the Upward Falling Payloads program and with a budget of \$63 million over four years, The **Boeing Co.** (NYSE: BA), Global Aerospace Corp., Sparton Electronics, **General Dynamics Corp.** (NYSE: GD) and **Lockheed Martin Corp.** (NYSE: LMT) are all supporting the program.

Another example is Tern — a joint program between DARPA and the Navy to give forward-deployed small ships the ability to serve as mobile launch and recovery sites for medium-altitude, long-endurance unmanned aerial systems. On March 23, the agency announced the award of prime contracts for Phase 2 of the program to **AeroVironment Inc.** (NASDAQ: AVA) and **Northrop Grumman Corp.** (NYSE: NOC). In Phase 3, one performer will be selected to build a full-scale demonstrator Tern system for initial ground-based testing.

And then there's the Airborne Launch Assist Space Access program, which seeks to propel 100-pound satellites into orbit for less than \$1 million per flight, using expendable upper stages launched from existing conventional aircraft.

All of these programs fall into four priority areas that DARPA detailed this week:

Rethinking complex military systems by assuring dominance of the electromagnetic spectrum, improving position, navigation and timing without GPS, and maintaining air superiority in contested environments.

Mastering the information explosion by deriving meaning from big data and building trust into information systems

Harnessing biology in technology by accelerating progress in synthetic biology, outpacing infectious diseases, and mastering new neurotechnologies

Expanding the technological frontier through the application of deep mathematics, invention of new chemistries, process and materials, and

harnessing of quantum physics.

And it does this with a \$2.9 billion budget in fiscal 2015 and 219 employees.

“The reason we’re able to have this big impact is because we work with and tap the resources of a vast technological ecosystem,” said DARPA Director Arati Prabhakar during the briefing. “Much is done with universities and companies of every stripe — defense contractors, but also commercial companies as small as startups and as big as major firms.”

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