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Robot Resupply: The Navy's Autonomous Cargo Helicopter Kit

Or, how the Marines in a danger zone will use tablets to call for autonomous resupply helos.

By Eric Tegler



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A group of Marines fighting in some far-flung locale are trapped in harm's way—they need water and ammo but can't be safely resupplied. On the battlefield of the future, unmanned helicopters might answer the call. The Office of Naval Research recently

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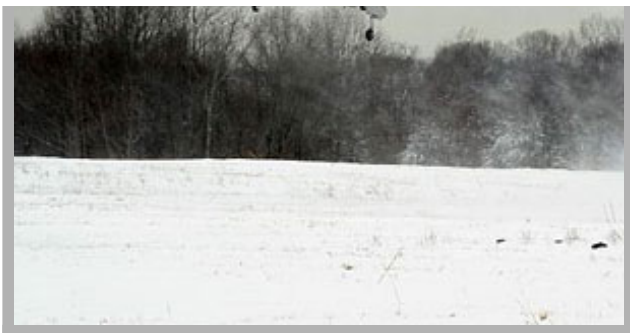
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demonstrated this concept with a test at Marine Corps Base Quantico, Va., in which troops moved cargo via the [Autonomous Aerial Cargo/Utility System \(ACCUS\)](#).

Resupply at the Press of a Button

ACCUS is a suite of hardware and software placed on an unmanned or manned aircraft that's coupled with a tablet device troops can carry in the field. At Quantico those troops successfully summoned a Boeing Little Bird UAV helicopter, which autonomously navigated to their position and landed. While there was no artillery flying or bad guys nearby, the scenario was not far off what Marines might one day experience, ACCUS program manager Max Snell says.

"A Marine needs something in the field, breaks out his tablet, and opens up an assault-support request," he says. "There are pull-down menus to select what's needed: I need batteries; I need water; I need bullets. The Marine submits that

request and provides a landing zone where he'd like the material delivered and when."

A supply base then loads the requested cargo on a UAV, which uploads the unit's position. As the aircraft flies out, the field operator's tablet displays a map showing the potential landing zones that ACCUS has selected. The Marine can accept or reject these, wave off an approach, or abort the mission if necessary.

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The tablet is intuitive for anyone who's used a smartphone or iPad-like device, Snell says. "We're developing ACCUS for use without formal schoolhouse training. Any Marine should be able to use it, not a predesignated individual."

The kit can be transferred between aircraft, and it's not designed for any specific platform. The infrared, electro-optical, and LIDAR sensors enable the UAV's autonomous landing zone selection and the landing itself, providing spatial information such as obstacle detection and avoidance. The package can also aid pilots of manned aircraft who are trying to land in difficult visual environments.

Tough Enough?

The Navy says that this system will allow safer resupply for the soldiers on the ground and save lives for the pilots. That may be true—if it's adaptable to many theatres. The ACCUS was inspired by an urgent request from forces in Afghanistan, where ground resupply convoys proved all too vulnerable to roadside bombs and other improvised explosive devices. For more than a year now [unmanned Kaman K-MAX helicopters](#) have been resupplying American forces there. But these aircraft require skilled operators and considerable supervision.

ACCUS's autonomous quality offers much greater flexibility if the circumstances are right. And the relatively uncontested valleys and mountains of Afghanistan where coalition forces enjoy air

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supremacy is a suitable environment for autonomous aerial resupply. But not all scenarios are like that.

And ACCUS is a demonstration program at the moment; it hasn't answered all the tactical questions that inevitably arise. Will it give away the positions of troops? Can the enemy spoof the system? Would the autonomous helos have their own defenses or need an armed escort? What happens if the enemy captures ones? Snell points out even more: "How will the Marine in the field use it? What will the command and control procedures be? That's just beyond the scope of this program."

The Office of Naval Research has brought people from the Marine Corps Combat Development Command to the Corps' Warfighting Laboratory to figure out these questions. Down the road we'll have a better idea of where ACCUS might be used and what aircraft might fly with it. They'll also sort out how the aircraft will carry their cargo—ACCUS envisions internal cargo carriage, while K-MAX unmanned helicopters carry their loads externally.

Summoning battlefield support will never be like calling for pizza. But before Domino's can deliver your thin-crust pepperoni via drone, American Marines may be able to order 5-inch rockets the same way.

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