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SMALL



BUSINESS

BIG OPPORTUNITY

'SHOULD' DOES

Five years on, should-cost is showing real results

IT'S ALL IN THE DELIVERY

Q&A with Army small business director Tommy Marks

AN HONOR AND A CHALLENGE

Small business sounds off about doing business with the Army

Silence IS GOLDEN (AND HYBRID)

For nearly a century, the military motorcycle has roared through American warfare, from troops riding with GEN John J. “Black Jack” Pershing chasing Francisco “Pancho” Villa across the southwestern United States in 1916, to evacuating the wounded from the battlefield during World War I, to delivering vital messages to forward units during heated battles in World War II. Used again in Vietnam and in Operation Desert Storm, with riders scouting hostile territories and leading convoys to American special forces units crisscrossing the treacherous terrain of Afghanistan, the military motorcycle, with its courageous and skilled riders, has proven irreplaceable on the battlefield.



Artist's Concept

While the utility of military motorcycles may reverberate through the decades, when it comes to stealth and eluding enemy reconnaissance, the roar of such bikes may be history.

That’s potentially thanks to SilentHawk, the hybrid-electric motorcycle prototype under development by Logos Technologies LLC in partnership with Alta Motors, now in phase II of a Small Business Innovation Research award from the Defense Advanced Research Projects Agency (DARPA).

The requirement is for a lightweight, rugged, single-track vehicle that can operate in near-silence (quieter than 55 decibels in “quiet” mode, or roughly the volume level of a conversation) for extended periods while transporting small numbers of troops over hostile terrain. This initiative will mark the first time that a two-wheel-drive, multifuel hybrid capability has been integrated into a full-size off-road motorcycle.

BUILDING ON SILENCE

SilentHawk promises to fill DARPA’s demands with the combination of Logos’ drone multifuel hybrid-electric power system and Alta’s off-road RedShift MX electric motocross frame as a basis for the prototype. The preproduction RedShift MX all-electric off-road racing bike weighs 260 pounds, produces 40 horsepower and runs on a 5.2-kilowatt-hour battery. Its new hybrid system incorporates a multifuel generator comprising a Wankel-type rotary engine and an electric motor.

Among other qualities, the Wankel rotary engine is noted for its relative silence. Indeed, an article on Page 169 of the November 1969 edition of Army AL&T’s predecessor publication, Army Research and Development, carried an article about the silent YO-3A

NO MORE ROAR

Concept drawing shows the SilentHawk hybrid motorcycle, developed in response to DARPA’s requirement for a lightweight, rugged, single-track vehicle that can operate in near-silence for extended periods while traveling over hostile terrain. (Photo courtesy of Logos Technologies)

observation plane, an outgrowth of research on the “silent-flying Q-Star” aircraft. Independently developed by the Lockheed Missiles and Space Co., it “became the first aircraft in the U.S. to fly using a Wankel-type rotary combustion engine developed by Curtiss Wright Corp.”

When combined with an electric motor, the Wankel engine becomes a generator that can run on gasoline, diesel or JP-8 (jet fuel), or even a combination of the three. The quiet SilentHawk uses an electric motor to power the rear wheel and a small, front-hub-mounted electric motor to drive the front wheel, producing an all-wheel drive capability. The hybrid components can be removed quickly to convert the bike to an all-electric configuration when the hybrid system isn’t required. Additionally, the hybrid system can be used as a power generator for equipment in the field, eliminating the need to carry separate generators or batteries.

The goal for range, in hybrid mode under nominal operating conditions, is 170 miles, including 50 miles in silent mode (no generator running). The bike would maintain speeds above 50 mph for long distances, with a maximum speed of 80 mph.

FUTURE SCENARIO

Logos engineers envision a small special operations team being dropped off with their SilentHawks by a small helicopter, then



ADVANCING THROUGH HISTORY

The American military ordered more than 20,000 Harley-Davidson motorcycles during World War I and has employed motorcycles in battlefields across the world for nearly 100 years. Thanks to technology advances from a DARPA-led initiative, troops could soon be using a full-size off-road vehicle that incorporates two-wheel-drive and a multifuel hybrid capability. (Photo courtesy of BikeBandit.com)



STRONG SUPPORT

Currently in the prototyping phase, the SilentHawk would combine a hybrid-electric power system with Alta Motors’ RedShift MX motocross frame. The 40-horsepower off-road racing bike weighs 260 pounds and can run on a 5.2-kilowatt-hour battery. The SilentHawk was developed in part by DARPA, which foresees commercial as well as military applications for the vehicle. (Image courtesy of Alta Motors)

closing in on the enemy in the bike’s silent mode. After engaging the enemy, the team would rendezvous stealthily at a second landing zone. Also, the bikes could be used to evade ambushes by traveling over terrain that would be impassable in a four-wheel vehicle.

“The goal is to provide small teams of warfighters with the ability to traverse difficult terrain without being detected,” said Dale Turner, Logos program manager. “By combining the terrain capabilities of a two-wheel-drive dirt bike with the low acoustics of a hybrid drivetrain, you get covert mobility and portable charging capabilities without the range and power limitations inherent with battery-only systems.”

Once the SilentHawk prototyping phase is complete in fall 2016, the next phase could see the military replace motorcycles in service, such as the Kawasaki M1030 M1. DARPA anticipates that special operations forces will buy the SilentHawk, and that there could also be a substantial commercial market.

All said, it’s been a tremendous, duty-filled century for the military motorcycle and its courageous riders. In the future, SilentHawk promises to bring the warfighter an even more elusive advantage on the battlefield, where riders will patrol and protect in silence and then safely return home.

For more information about the SilentHawk, go to <https://www.logostech.net/products-services/slienthawk/>. For a historical tour of Army AL&T for the last 55 years, go to the Army AL&T archives at <http://asc.army.mil/web/magazine/alt-magazine-archive/>.