HOPPING OUT OF HOT ZONES

When there’s no safe escape, call in the Mules: These unmanned aerial vehicles could save lives on the battlefield—and off.

U.S. TROOPS ARE PINNED DOWN in a crowded city center. Several are wounded and need immediate evacuation. There are miles of labyrinthine roads and thousands of enemy gunmen between them and the nearest base. The threat from rocket-propelled grenades has grounded the big helicopters.

There’s one final hope for these soldiers: the Mule, a compact, fully autonomous vehicle powered by ducted fans—fully enclosed spinning blades that are smaller and more efficient than conventional helicopter rotors. This concept, created by trend-pushing Urban Aeronautics, could revolutionize military and civilian emergency care. Within minutes of troops radiating in their GPS coordinates, two drones dart in at 100 mph and land neatly on a narrow rooftop. The casualties are loaded into pods on the UAV’s sides—each vehicle can carry two patients—and the forward-and-rear lift fans speed up for vertical takeoff. Once airborne, a robot’s voice, piped in by radio, comforts the wounded soldiers, distracting them from the gunfire outside and the disorienting notion that their rescuers are robots.

The idea, says 55-year-old designer Raffi Youl, is a vehicle that can brave dense forests, urban centers and combat zones where choppers, with their vulnerable rotors, can’t. Youl, who founded Urban Aeronautics in 2001 after decades with companies like Bell and Israel Aerospace Industries, is currently building a prototype, aiming for a first flight in 2009. As an unmanned craft, it’s both light and able to avoid enemy fire. Youl is also trying to make it inexpensive, and civilian and military authorities in the U.S. and elsewhere have already expressed interest in his $1.5 million concept.

The dual-ducted fan configuration used on the Mule is derived from failed “flying jeep” experiments of the 1950s. Those early models were doomed by aerodynamic problems, excessive weight and ducted fans that were too weak. Youl relies on new lightweight composite materials, sophisticated autonomous flight software and a patented duct design that boosts the fans’ efficiency.

The key is a series of directional vanes on both the top (inlet) and bottom (outlet) of the fans. This type of “ vectored thrust” forces the craft using directed airflow instead of control surfaces. “It gives you full degrees of movement,” says Joanna Frankel-Youl, Raffi’s wife and marketing director. Urban Aeronautics faces several hurdles: Ducted fans have been around for years, says Bob Fisher, a retired Air Force general who once flew medevac aircraft and now works for the MITRE Corporation, which conducts technical research for the government. “They’re very efficient, but reliability is questionable with vectored thrust.” Nevertheless, Behler says that ducted-fan aircraft are great for urban operations. “You’ve got to have something that travels slowly and can maneuver around obstructions,” he explains. He remains concerned, however, about not having a medical attendant with the patient.

Francois Youl, agrees, up to a point. “For regular evacuation, it’s certainly not the preferred means,” she says. “But if the casualty is in critical condition and you have no other means of getting them help, it’s not a difficult question.”