Advanced Aerials removes the mystery from Unmanned Vehicle System development with an assist from Quickparts®

In an industry typically shut off by red "Top Secret" stamps and closed-door meetings, Advanced Aerials is doing things a little differently. They've put a welcome mat on their door in an effort to not only supply Unmanned Vehicle Systems (UVS) but to perfect their designs and innovate through open-source collaboration. Think of Advanced Aerials' work as the launching point for creating affordable UVS designs that fulfill the exact requirements of users from military intelligence units to first responders

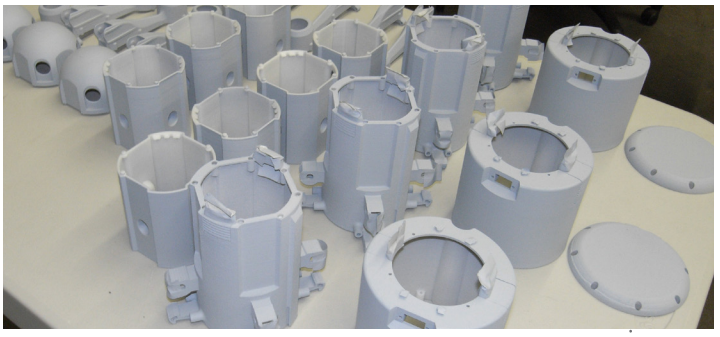
"There's a lot of forcing of designs that aren't fully baked. We don't want to force technology because it inevitably falls short," says Advanced Aerials founder Bert Wagner. "We're crowd sourcing UVS design by sending prototypes to end users so they can collaborate and build something that fits a need perfectly. We want to solve problems, not sell products."

Wagner, a former professional photographer, taught himself CAD and vehicle design in order to make drones for aerial photos. Over the years, that side project morphed into Advanced Aerials. For a homegrown business like this, it's sometimes difficult to fulfill manufacturing requirements: tooling and injection molding are far too expensive and owning a 3D printer would be cost prohibitive at this point.
At the same time, the advantages of 3D printing fit perfectly with Wagner's needs. "I had to focus on design intent and less on how to provide enough clearance for a given tool. I didn't want to worry about a machinist."

What Wagner needed was his own 3D printing manufacturing unit, a way to produce parts quickly and iterate design without equipment and labor overhead. That's where Quickparts—the on-demand printing service by 3D Systems—came in. Ten years later, Wagner still uses Quickparts, which produces Advanced Aerials' ready-to-use vehicle components using 3D Systems' Selective Laser Sintering (SLS®) technology.

"We use Quickparts for anywhere between $3,000 and $10,000 worth of parts per year," says Wagner. "The beauty is that if I'm in a rush, I can get parts in a couple of days. You can't beat that."

Bear in mind, these are not concept model parts or casting patterns, as is sometimes the case with robotics developers. Instead, they are characteristically tough SLS parts, made in Duraform® and Duraform Flex materials, that Advanced Aerials installs onto their UVSs for direct field use. "Our parts have held up under crashes. We're real happy with that," says Wagner.



SLS parts for the MSEV

Above, Bert Wagner assembles the MSEV
Below, MSEV parts made with Duraform® EX Black

Take the Miniature Surveillance Expendable Vehicle (MSEV), for instance, a UAV made largely of SLS components from Quickparts and being developed for one of Advanced Aerials' DoD customers. MSEV, a deployable, four-rotor vehicle, will eventually aid in situational awareness. Other Advanced Aerials vehicles will support short-range, short-duration counter IED operations. The company is also supporting software and vehicles that would allow users to operate UVSs in environments where external guidance signals, e.g., GPS or RF, are weak, unavailable or actively jammed. These could drastically improve the safety of soldiers and first responders as they inspect buildings or other dangerous enclosed areas. And that's a huge goal for Advanced Aerials—improving safety and saving lives.

As Wagner puts it, "We want our vehicles to go from A to B in some pretty brutal environments." But there's so much more to it; they're democratizing UVS development, and using the speed and affordability of Quickparts SLS manufacturing to do it. UVSs don't have to cost so much or be so shrouded in red tape to be effective, and Advanced Aerials is proving it. Down the road, they even see educational opportunities brought about by their open-source model, giving students the opportunity to discover, explore and contribute to the emerging science of robotics. All in all, that's how you build a better UVS: accept ideas from all around, appeal to the next generation of engineers, and find the perfect partner to help you make it.

For more information about Advanced Aerials, visit their website at www.a2usa.com.