



*The new designed-for-SLS tank featured above integrates mounting brackets and support structures. The newly designed SLS tanks help provide longer flight times due to their light weight and increased fuel storage capabilities.*



*Pictured above is the original UAV Fuel Tank design complete with fastening hardware. The new SLS fuel tank design eliminated as many as seven piece parts and improved performance reliability.*

## SLS Direct Digital Manufacturing of Aviation Fuel Tanks

### Solid Concepts Provides Direct Digital Manufactured SLS Fuel Tanks for UAV's

Solid Concepts has worked with several Unmanned Technology companies to achieve success in building one-piece integrated aviation fuel tanks that hold up in very demanding environments. The new application of the SLS (Selective Laser Sintering) build style to fuel tanks for unmanned aircraft has provided great benefits not available with other manufacturing methods.

To evaluate initial product designs and prove the SLS process capabilities, test tanks have been subjected to a week of repeated testing – including several hours of deformation under 8 inches of vacuum followed by overnight submerged leak tests with 5 psi pressure loads. They are then loaded with aviation gasoline, pressurized to 8 psi and exposed to a 140°F environment for three days. The tests

*“The new single piece integrated design SLS tanks are up to 12% lighter and have provided up to 25% more fuel storage in the same footprint as traditionally manufactured UAV tanks.”*

have successfully demonstrated Solid Concepts SLS manufacturing process to produce UAV Aviation Fuel Tanks to withstand the intended application.

UAV Fuel Tanks designed specifically for the SLS process have eliminated as many as seven (7) piece parts and have improved performance reliability. The new single piece integrated design SLS tanks are up to 12% lighter and have provided up to 25% more fuel storage in the same footprint as traditionally manufactured UAV tanks, providing longer flight times.

The integrated, single-piece design is more durable and provides greater structural integrity. The ability to create a more complex geometry provides clearance for hardware and fasteners, and integrated clearance passages for routing of electrical wiring and cables. The ability to create internal bulkheads adds additional strength and reduces fuel movement, resulting in a more stable flight. These re-



*The DRS Sentry HP has a wingspan of 12.8 ft. and can accommodate various internal payloads of up to 75 lbs. for military and civilian applications. The aircraft is controlled through a sophisticated digital flight control system and integral mission computer.*

sults speak for themselves and UAV manufacturers have continued to look to Solid Concepts for additional fuel tanks for both retrofit and new construction.

Solid Concepts has pioneered Direct Digital Manufacturing (DDM) technology utilizing the SLS manufacturing process. The SLS process can provide production parts directly from 3D CAD data in as little as one day, without any tooling and with minimal NRE dollars. The SLS process can also produce parts with very complex geometries, including interior features that would be prohibitively expensive to produce using traditional manufacturing techniques. Solid Concepts utilizes its' proprietary NyTek™ 1100 material that produces fully dense SLS parts compatible with many petroleum based products to manufacture UAV fuel tanks.

### **Solid Concepts Inc.**

Solid Concepts Inc. is a supplier of rapid prototyping, direct digital manufacturing, tooling and production molding services. Capabilities in PolyJet, SLA, SLS, QuantumCast™ cast urethanes, CNC and FRP prototypes and short run production parts. Tooling and Molding expertise to bring your project through to completion. ISO 9001 and AS9100 certified.