



Lightweight Hydrogen UAV Components Enhanced Through Vapor Smoothing



Industry

Hydrogen-fuelled drone / Clean Energy



Material

SinterWorx G4, Graphite Reinforced Plastic
manufactured using SLS (Selective Laser Sintering)

Intelligent Energy collaborated with Graphite Additive Manufacturing to redesign and produce lightweight casings for their UAV hydrogen power systems. Some components were vapor smoothed using the PostPro SF100 to assess improvements in durability, surface sealing, and resistance to wear.

About the Application

Intelligent Energy develops hydrogen fuel-cell power systems for drones, where every gram saved directly impacts flight time and efficiency. To reduce overall system weight while maintaining protection and structural integrity, the team explored advanced manufacturing approaches for their fuel-cell casings and protective components.

Partnering with Graphite Additive Manufacturing enabled the production of 3D-printed thin-wall, complex geometries that would be difficult to achieve using conventional methods.

Challenge & Solution

Hydrogen-powered UAV systems require components that are lightweight, mechanically robust, and capable of withstanding operational stresses such as vibration, handling impacts, and environmental exposure.

Many of Intelligent Energy's parts feature thin-wall designs and intricate geometries essential for airflow management and internal protection. Traditional manufacturing approaches limited design freedom, increased weight, and slowed development due to tooling requirements and longer iteration cycles.

By integrating 3D printing through Graphite Additive Manufacturing, Intelligent Energy could rapidly design and manufacture housings with optimized shapes, reducing weight while maintaining structural integrity.

The Difference Made by PostPro Vapor Smoothing

To explore additional performance gains, PostPro vapor smoothing was tested on selected components as a finishing step. The process seals the polymer surface, reduces porosity, and enhances the mechanical properties of the part which is an essential production step for UAV applications where reliability and long-term durability are critical.

Vapor smoothing delivers several advantages for drone applications:

- **Improved durability:** Smoother, sealed surfaces reduce crack-initiation sites, enhancing strength and resistance to wear, vibration, and handling stress.
- **Protection from environmental exposure:** Reduced surface porosity helps prevent moisture, dust, and particle ingress, critical for UAV applications.
- **Enhanced aesthetics and cleanability:** A uniform finish supports easier cleaning and a more professional product appearance.



Benefits of AMT PostPro Vapor Smoothing for UAV Applications

- ✓ Sealed surface that prevent moisture ingress and improving resistance to environmental exposure
- ✓ Lightweight yet strong components that improve performance & durability
- ✓ Consistent, repeatable surface quality suitable for serial production part optimization

Conclusion

Intelligent Energy's collaboration with Graphite AM demonstrates how additive manufacturing enables lightweight drone components with greater design freedom and shorter iteration cycles.

PostPro vapor smoothing shows clear advantages in durability, surface sealing, and resistance to environmental exposure. When combined, 3D printing and vapor smoothing provide a pathway to more robust, efficient components for UAV systems.





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