White Paper: Next-Generation Aerospace Systems

Executive Summary

The aerospace industry is at a pivotal technological juncture. It is driven by the convergence of sustainable propulsion, advanced micro-engineering, and autonomous intelligence. This white paper outlines three market-ready products designed to address the critical challenges of carbon neutrality, operational efficiency, and urban air mobility (UAM).

By integrating high-temperature materials with agentic AI and hybrid-electric architectures, these solutions offer a clear roadmap for OEMs and operators to maintain a competitive edge in an increasingly regulated global market.

The UltraFan 80 Sustained-Propulsion Engine

The UltraFan 80 represents the evolution of high-bypass turbofan technology, specifically engineered for 100% Sustainable Aviation Fuel (SAF) compatibility and maximum thermal efficiency.

A few key innovations set the UltraFan 80 engine apart. This engine features carbon composite titanium fan architecture including advanced fan blades with a titanium leading edge and a composite casing. These features significantly reduce overall system weight while maintaining structural integrity under high-stress cycles. By having an ALECSys (Advanced Low Emissions Combustion System), the lean-burn combustion demonstrator is designed to drastically reduce *NOx* and particulate emissions. Lastly, it is equipped to scale with megawatt class high-voltage power distribution components to support future hybrid electric integration for a medium range aircraft.

With global air traffic demand remaining resilient, the UltraFan 80 provides a solution for airlines looking to meet net-zero targets without compromising the range and reliability of traditional air-breathing propulsion.

Aero-Link Agentic AI Avionics Suite

The transition from big data to agentic AI is the defining shift in avionics. The Aero-Link suite moves beyond simple predictive diagnostics to autonomous, domain-specific reasoning systems.

Key attributes include multimodal domain reasoning, edge-computing biometrics, and real-time operational orchestration. Unlike generic LLMs, Aero-Link utilizes domain-specific reasoning tailored for safety-critical operations, interpreting sensor data and airport environments with human-like contextual awareness. The software integrates secure biometric identifiers and edge processing to validate identities and system access in real-time, reducing dependence on remote cloud services and increasing system resilience. The system uses AI agents to synchronize data from air traffic control (ATC), ground equipment, and airline operations to anticipate incidents before they propagate.

Aero-Link acts as an operational integrator, allowing airlines to stabilize operations under pressure and protect revenue during disruptions, a key differentiator in this volatile market.

Verti-Lift Gen-2 eVTOL Propulsion System

As Advanced Air Mobility (AAM) moves toward operational deployment, the Verti-Lift Gen-2 provides a certified, modular propulsion solution for electric Vertical Takeoff and Landing (eVTOL) aircraft.

Important differentiators from other products include the vectored thrust configuration, passive thermal management, and the high-voltage inverter integrity. The vectored thrust configuration utilizes a combination of fixed wings and vectored rotors that transition from vertical lift to horizontal cruise, optimizing aerodynamics and extending the range of urban air taxis. The aerospace system employs oscillating heat pipes to manage the high thermal loads of battery-electric systems without the weight penalty of active liquid cooling. It also features next-generation megawatt-class inverters designed to regulate electricity safely between high-density battery packs and electric motors.

The Verti-Lift Gen-2 is designed specifically to meet the stringent FAA and EASA LIFT certification standards, making it a propulsion system for the dozens of eVTOL startups entering the commercialization phase.

Conclusion

The aerospace sector in 2026 is no longer just about faster flight. It is about smarter, cleaner, and more resilient systems. By deploying SAF-ready propulsion, agentic AI, and certified eVTOL components, technology providers can tap into a market that values technical differentiation and regulatory compliance above all else.