Re-Imagining Air Force Advanced Energy Storage Supply Networks to Control Safety, Effectiveness and Efficiency: Current and Future Case

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Background. Advanced Energy Storage (AES) technologies are a key component to the success of the USAF Air Superiority 2030 Flight Plan. The problem is that AES technology, batteries in particular, can be volatile, capable of spontaneous fire ignition (thermal runaway), subsequent explosion, toxic gas release, and electric shock (discharge), presenting serious safety issues. These power supply components, including lithium batteries, are indispensable to the viability of directed energy weapons, sensor packages, stealth technologies, autonomous systems, electrified warfighting assets, and electronic countermeasures. Success of the 2030 Flight Plan will require that AES be managed safely, throughout their design, manufacturing, integration, and eventual deployment.

Objective. The objective is to inventory, make clear known risks, and mitigate failure events associated with AES technology throughout Air Force supply networks. Goals include identifying risk origins and developing process-driven solutions that seek to control costs, increase safety, encourage efficiency, prove reliability, and allow for deeper collaboration among supply network partners. In order to facilitate this "re-imagining" of current supply practices, the Air Force might seek to characterize processes within its control ("inside the gate") as well as those outside ("outside the gate"). Proper management will require new and novel approaches that leverage commodity-specific processes, controls, technologies, and newly defined best practices that highlight safety and are shared by all Air Force AES supply network partners now and as technology advances.

Methods. A scaffold methodology is instituted to examine gaps in internal processes within each partner (e.g., manufacturing, assembly and system integration) in the supply network. Next, deep-dive assessments will provide data that leads to the development of best practices to be adopted and shared by all network partners. "Smart" shipping and storage technologies will be designed to create the safest possible cradle-to-grave logistics pathways. Lastly, real-time, cloud-based, cybersecure (NIST 800-171/ITAR compliant) software is shared, network-wide, to facilitate seamless communication and collaboration among partners. This group has formed an agreement with the software owner to integrate the package into any Air Force projects at initiation and leverage it for the entirety of the initiative.

Result. The result of these interventions is a hyper-safe, efficient AES supply network that limits Air Force risk, encourages innovation, increases efficiencies, fosters redundancy, reduces cost, shortens cycle time, and allows for quicker, more seamless adoption of current and future state technologies that support the warfighting mission.

Conclusion. These models encourage dynamic problem-solving and shared risk avoidance throughout Air Force AES networks, while identifying cost savings and shortened cycle times.

Discussion. The proposed models used for re-imagining the Air Force AES supply networks encourage all partners to share safety, efficiency and effectiveness responsibilities and controls from the very beginning of the stream. Most importantly, the models, processes, collaborative ecosystem, and continuous assessments ensure that the Air Force can begin to rely on AES with confidence as it meets the stated goals of the Air Force Air Superiority 2030 Flight Plan.