Design and Assessment of Strategic Airlifters for Rapid Deployment & Humanitarian Aid

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Abstract:

Strategic airlift is an essential capability for rapid global movement of cargo, especially in humanitarian aid and disaster relief operations. Despite the collective purchase of A400M aircraft to enhance airlift capacity, a capability gap remains to exist due to its limited ability in transporting heavy outsized engineering equipment essential for such missions. This study uses Knowledge-Based Engineering aircraft design tools coupled with Agent-Based simulation tools to assess a fleet's ability to deploy heavy and outsized equipment. Furthermore, the study examines the often overlooked cargo hold volume constraint and quantifies its effects on airlift capacity. Results indicate that the current and future European fleets can't meet deployment timelines, with the volume constraint significantly reducing airlift capacity by about 20\% for lighter cargo. A new aircraft design with a larger cargo hold, increased cruise speed and greater design payload mass could improve efficiency and reduce the required fleet size to meet the response deadlines.

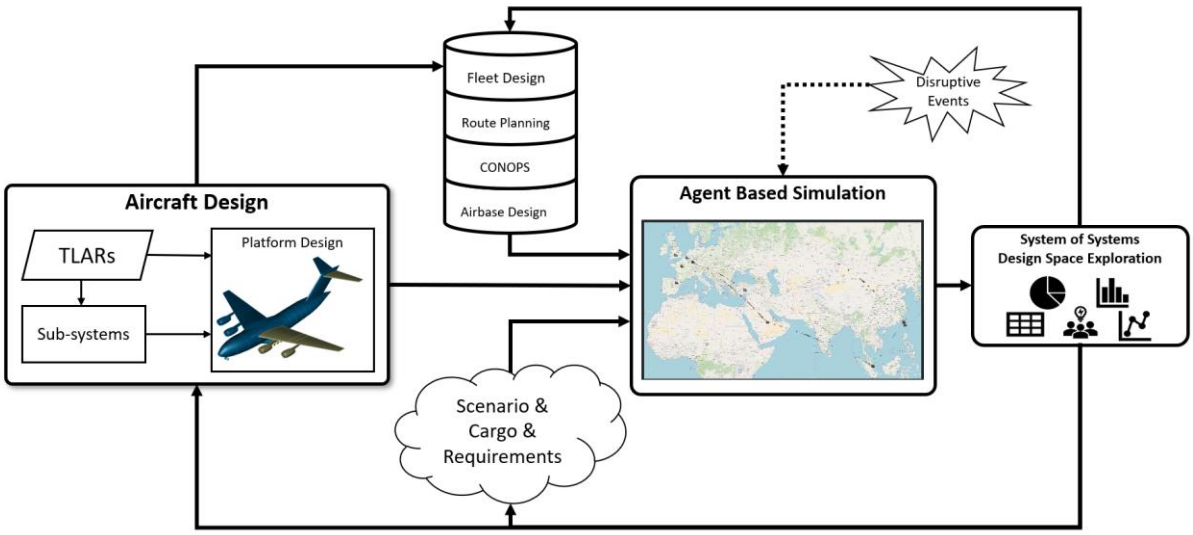

Figure: A System of Systems Framework for Strategic Airlifter Design