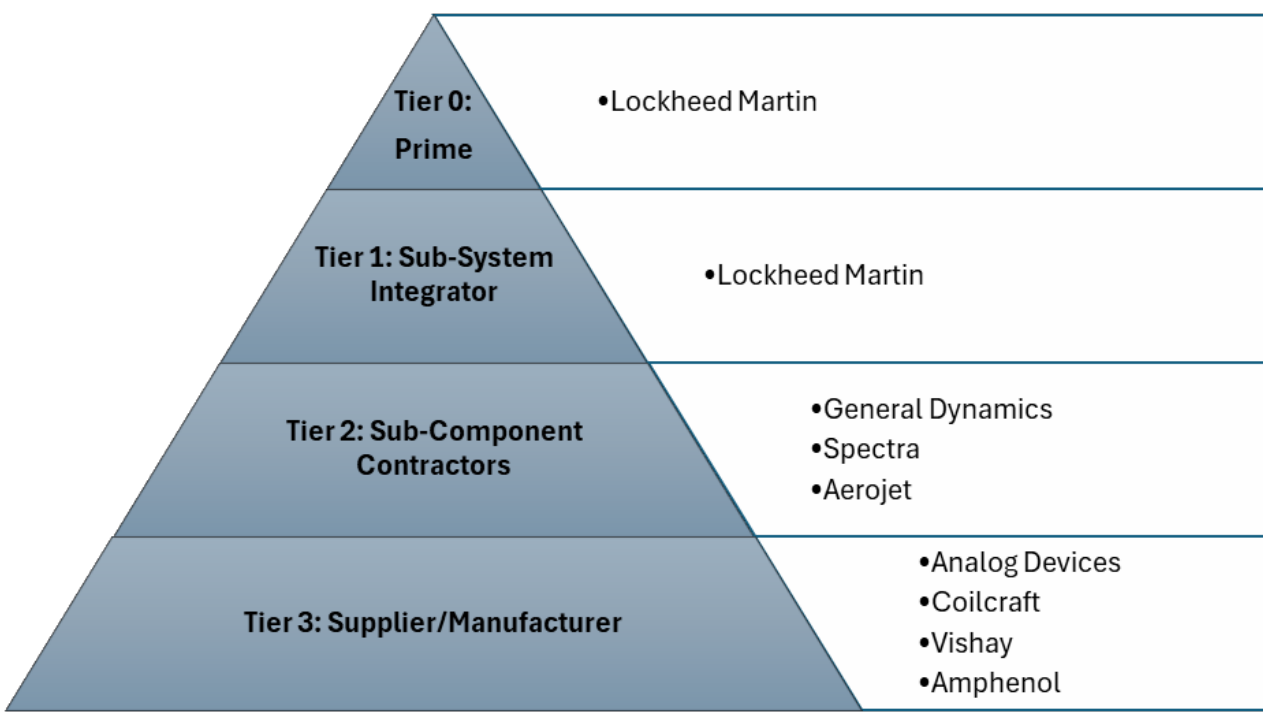
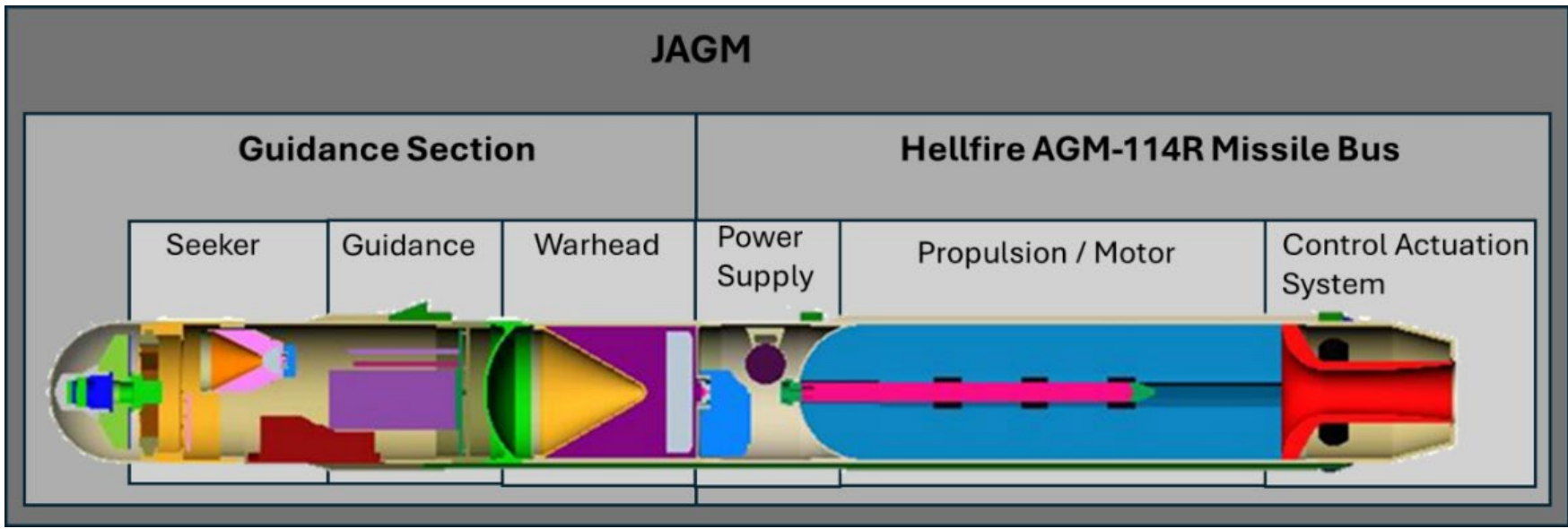


Abstract

- The DoD lacks visibility into the sub-tier suppliers supporting critical weapon systems, creating vulnerabilities related to fragility, dependencies, and potential supply chain disruptions. This thesis applies a qualitative Sector-to-Sector, Tier-to-Tier (S2T2) analysis and a Fragility and Criticality (FaC) assessment to map and evaluate suppliers of the Hellfire and JAGM programs. Results show concentrated fragility in lower-tier vendors, high criticality in sector-unique components, and varying degrees of financial dependence on DoD or commercial revenues. Finding offer recommendations for the TAGM Product Office and support broader DoD SCRM practices.

Methods



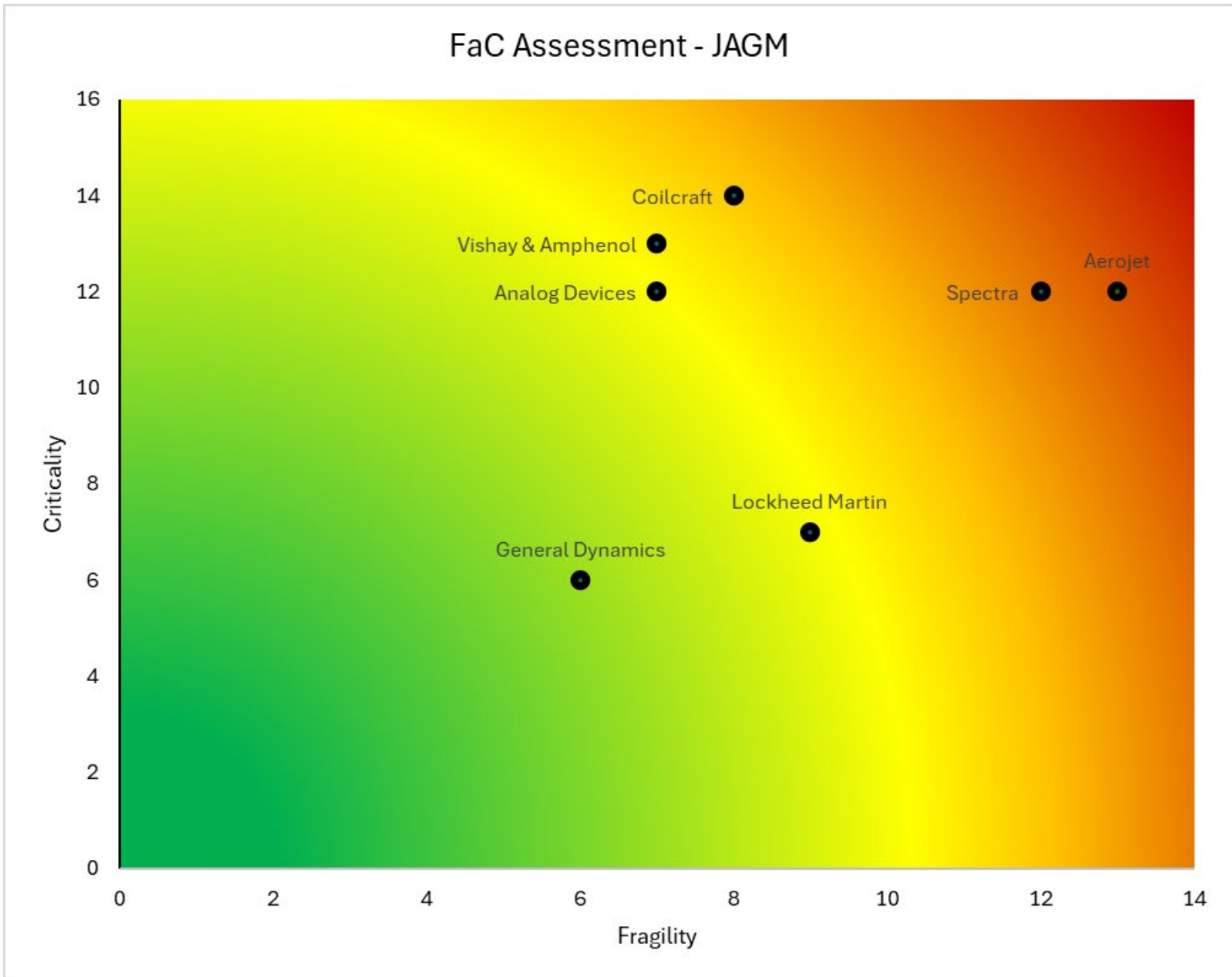
Fragility Factors	Description	DoD SCRM Taxonomy Category
Financial Health Risk	Does the supplier have sufficient liquidity and solvency to maintain stable operations and survive shock?	6.2 Liquidity 6.3 Solvency
Dependence on Defense Revenue	How vulnerable is the supplier to DoD budget shifts?	6.7 Dependence on Defense Contracts
Industrial Capacity Limitations	Does the supplier have sufficient production capacity and surge ability?	2.3 Industrial Capacity Limitations
Limited Funding Sources	Can the supplier reinvest, scale, or stabilize operations?	6.5 Lack of Funding Sources
Labor availability / Workforce Constrains	Does the supplier operate in a region or skill field where specialized labor is scarce?	9.2 Lack of Access to Capable Workforce

- S2T2 Mapping:** Three major missile sectors from the WBS across three vendor tiers.
- Financial Dependency Analysis:** FY24 data from USAspending.gov to compare number of contracts and dollar amounts of total DoD contract vs. contract from missile related NAICS codes.
- Supplier Risk Assessment Matrix:** Qualitatively ranked suppliers using fragility and criticality factors aligned with DoD SCRM taxonomy.
- FaC Heat Map:** Combined fragility and criticality scores into a visual heat map indicating relative risk levels.

Criticality Factors	Description	DoD SCRM Taxonomy Category
Single-Source / Limited Competition Risk	Is the supplier providing a component with no or few alternative?	2.4 Single Source Reliance 2.6 Concentration
Specialized Industrial Capability	Does the supplier possess unique technical processes or qualifications that make replacement difficult?	2.2 Industrial Capability Limitations
Position within the Tiered Network	Will suppliers problems cause issues for other parts of the supply chain?	2.6 Concentration (network concentration)
Exposure to Trade Policy and Global Sourcing Disruptions	Is the supplier's component or material subject to trade policy change, potentially causing system-wide delays?	10.1 Change in Trade Policy 4.6 Trade War
Product Traceability / Provenance Risk	Is the supplier able to trace the history of components from point of origin through final production?	8.1 Product Characteristics Availability 8.2 Lack of Provenance

Results & Impact

- Fragility tied to DoD dependence and criticality tied to component uniqueness and global sourcing constraints.
- Tier 1:** Lowest overall risk, due to diversified revenue and strong supply networks
- Tier 2:** Highest overall risk, driven by financial fragility and constrained production capacity on specialized manufacturing and limited alternative component sources.
- Tier 3:** Low fragility but high criticality, due to specialized component concentration and global market positioning.



Future Research

- Expand FaC analysis across additional missile systems and platforms to validate patterns of the JAGM.
- Review contracting strategies to incorporate SCRM data reporting and sourcing strategies.
- Develop a data collection framework that integrates supplier SCRM reporting data into a FaC analysis.



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