Defense Battlespace as Governed Spatial Mesh

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What This Application Specifies

Each force element — ground unit, aircraft, vessel, satellite, cyber asset — operates as a credentialed mesh participant. Observations of position, intent, status, and engagement enter the mesh as credentialed events; coalition partners admit observations through declared cross-authority federation rather than through coalition-specific data fabrics.

The architecture supports the political and operational reality of coalition battlespace: national authority over national assets, declared cross-authority cooperation, and structurally-supported partition operation when communication is denied or intentionally severed.

Why It Matters Operationally

Current defense data fabrics (Project Maven, JADC2 efforts, partner-specific tactical clouds) face structural problems at coalition scale: authority disputes, data-fabric capture concerns, integration complexity that grows superlinearly with partner count.

Governed spatial mesh produces structural decomposition. Each authority maintains its observations and admissibility profiles; cross-authority federation operates

through declared agreements; coalition battlespace coheres without forcing a single data-fabric architecture.

How It Composes With the Domain

Force elements contribute observations under their credentialing chains. Cross-coalition operations admit through federation agreements. Engagement decisions admit composite admissibility from multiple authorities. All operations carry lineage that supports post-incident audit.

Adversarial actions surface as credentialed events: jamming as observation-rejection patterns, deception as cross-modality disagreement, intrusion as governance-chain integrity events. The architecture supports the contested-environment reality structurally.

What This Enables

Joint-all-domain operations gain structurally-coherent battlespace awareness. Coalition operations gain structurally-supported authority composition. Adversarial operations gain structural defense without architectural compromise.

The architecture also supports doctrine evolution. As emerging engagement classes (autonomous, cyber-physical, space-coordinated) mature, the architecture admits the new classes through declared specification rather than requiring battlespace-fabric rebuild.