

CASE STUDY _

RAPTR® Enables Next-Gen Global Communications Force Design

RAPID PLATFORM ENGINEERING

Key Highlights

- The U.S. Space Force needed a resilient, hybrid communications architecture to connect military and commercial satellite networks with multi-domain warfighters in contested environments.
- LMI partnered with SWAC to use RAPTR®, our cloud-enabled modeling and simulation platform, to deliver rapid, data-driven force design analysis.
- This effort included developing custom system models, integrating trusted data from commercial providers, and running thousands of large-scale cloud simulations to develop and refine the needed force design.
- LMI's work provided credible, actionable insights that informed the Space Force's transition from force design to acquisition planning, advancing next-generation space communications.

Transforming isolated architectures into a unified space comms system

As global threats grow more complex, the U.S. Space Force is transforming how data is transported, secured, and shared across space and terrestrial-based systems. As the service's analytical team for future force design, the Space Warfighting Analysis Center (SWAC) plays a critical role in shaping space architectures that are effective, efficient, integrated, and resilient.

At the heart of this transformation is the need for a hybrid communications architecture that seamlessly connects military and commercial networks with warfighters to deliver unmatched global force projection capabilities. Known as the "hybrid space

architecture," this next-generation space system is designed to unify mission-critical satellite communications and deliver real-time, secure data transport—even in contested or degraded operational environments.

To move from this vision to reality, SWAC partnered with LMI to develop and execute a comprehensive, analytics-driven force design study. SWAC leadership needed this study to assess architecture alternatives and support informed, data-driven decisions about how to meet requirements for building the hybrid space architecture.

Powering space comms design through simulation at scale

To meet the unique demands of this effort, LMI leveraged RAPTR®, our secure, modular modeling and simulation platform -- built specifically to support data-driven force design, mission engineering, and rapid concept evaluation at scale. LMI developed tailored model-based systems engineering (MBSE) system and component models within RAPTR® to reflect the evolving characteristics of next-generation satellite communication (SATCOM) architectures. We collaborated closely with commercial providers, including SpaceX and ViaSat, to ensure the use of accurate, trusted data throughout the analysis. This collaboration enabled the creation of an authoritative source of truth for the foundational hybrid space architecture, a critical element of any MBSE approach.

This work provided senior Space Force leaders and acquisition planners with:

**Modeling environment**

A validated modeling environment to assess future architectures under peer competitor threat scenarios.

**Intelligence**

Insight into how to disaggregate and proliferate SATCOM capabilities to enable massive communication route options which are very difficult for adversaries to degrade.

**Roadmap**

A detailed, customer-informed roadmap for pivoting from legacy military satellite communications to a hybrid commercial-military architecture.

Leveraging AWS cloud computing, our team ran tens of thousands of RAPTR® simulations, enabling SWAC to evaluate complex architectural options far more rapidly than traditional infrastructure permits. Throughout the engagement, we continuously refined our analytic workflows, ensuring they remained closely aligned with SWAC's priorities. This approach enabled us to deliver credible, mission-relevant insights that directly supported decision-making and force design development – and expedited the completion of the project.

Equipping leaders with decision-ready insights

LMI's use of RAPTR® enabled SWAC to complete the Space Data Transport Force Design on time and on budget, advancing the Space Force's plans for a more resilient, integrated communications architecture. This effort laid a critical foundation for future acquisition and implementation efforts, equipping decision-makers with the trusted data and credible insights needed to move from concept to capability and inform \$5B+ in future Space Force investments.

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The successful completion of this effort enables the Space Force to begin the acquisition transition from force design to implementation. As the hybrid space architecture concept advances, LMI is excited to continue our work with the Space Force, supporting future modeling, acquisition planning, and integration efforts—ensuring space-based data transport capabilities remain resilient, scalable, and interoperable for the joint force.

For more information

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