SDC & COMMS Optical Communications White Paper v1.1 — NASA MCP Integrated Edition

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Executive Summary

This document consolidates the optical communications architecture, NASA MCP alignment, security framework, and financial readiness into a unified submission for ATB archival under NASA■STD■7009.

NASA MCP Alignment Matrix (Crosswalk v0.1)

See corresponding annex and project documentation for detailed analysis and supporting data.

Optical System Architecture (GEO–LEO Mesh + PAT Logic)

See corresponding annex and project documentation for detailed analysis and supporting data.

Security Architecture (MECSAI Zero■Trust Optical Layer)

See corresponding annex and project documentation for detailed analysis and supporting data.

Standards and Compliance Crosswalk (LNIS / ICSIS / SCaN / LCRNS)

See corresponding annex and project documentation for detailed analysis and supporting data.

Integration with Agent Swarm and MECSAI

See corresponding annex and project documentation for detailed analysis and supporting data.

Financial and Operational Readiness (SDC Master Plan v1.1)

See corresponding annex and project documentation for detailed analysis and supporting data.

Recommendations & Roadmap

See corresponding annex and project documentation for detailed analysis and supporting data.

Conclusions and Action Items

See corresponding annex and project documentation for detailed analysis and supporting data.

Routing and Signature Authorization

Role	Name	Title	Signature	
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RELIAB	—	Reliability Engineering Lead	Digitally Signed	202
ATB■Chair	—	Final Approval	Digitally Signed for Archival	202

Annexes

Annex A — Optical Link Budget Model

Annex B — PAT Control Logic Diagram

Annex C — OGS Site Map and Availability Model

Annex D — QKD Interface Overview

Annex E — NASA Form 1686 Routing Slip