



ENGINEERING STANDARDS LIBRARY / EMERGING AND ADVANCED TECHNOLOGY

Emerging Technology, Quantum, and Autonomy Reference Architecture Compendium

Coordinated architectures for controlled transition, hybrid quantum research, autonomous robotics, and photonic-neuromorphic edge compute.

PERMANENT DOCUMENT ID

MYTHOS-EMERGING-RA-COMP-0001

PUBLICATION

Candidate Reference Architecture Compendium
Version 1.0.0-candidate

ASSURANCE PROFILE

Research / Pilot / Transition
High Assurance

PERMANENT PUBLICATION IDENTITY

Emerging Technology, Quantum, and Autonomy Reference Architecture Compendium			DOCUMENT ID MYTHOS-EMERGING-RA-COMP-0001
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0 ATOMIC CRITERIA	6 ASSURANCE VIEWS	4 IMPLEMENTATION PROFILES	1 PERMANENT IDENTITY

Publication doctrine. This publication establishes durable requirements for its defined scope. Interpretation must preserve the permanent document identity, required evidence, controlled exceptions, source currency, and formal revision history.

EMERGING TECHNOLOGY AND ASSURANCE TOPOLOGY

Emerging and Advanced Technology

A trustworthy emerging technology, quantum, and autonomy reference architecture compendium program is a governed path from research claim through baseline, experiment, safety and security challenge, transition decision, bounded operation, and preserved evidence.

CLASSIFY

Separate established practice, candidate standard, reproduced result, vendor claim, implementation hypothesis, and open research.

EXPERIMENT

Declare baseline, configuration, uncertainty, scenario coverage, stop conditions, and independent reproduction before conclusions.

CONSTRAIN

Identity, policy, safety envelopes, physical boundaries, cryptographic authority, and human intervention limit consequence.

TRANSITION

Adoption, pilot, production, rollback, supplier exit, lifecycle, and retirement decisions remain evidence-bearing and reversible.

EVIDENCE - BOUND TRANSITION FLOW



No novelty claim becomes an operational claim without reproduced evidence and an explicit authority decision

INTERPRETATION AND ASSURANCE

How to apply this publication

Normative intent

Requirements define outcomes and constraints. Implementations may vary, but evidence must demonstrate equivalent control.

Evidence over assertion

Vendor documentation and design intent are not equivalent to reproduced behavior. Record evidence grade and uncertainty.

Risk-proportional depth

Higher consequence, autonomy, sensitivity, and irreversibility require stronger isolation, review, verification, and recovery.

Controlled exception

Exceptions require an owner, rationale, compensating control, residual-risk acceptance, expiration, and reevaluation trigger.

Normalized assessment scale

0	1	2	3	4	5
ABSENT	AD HOC	PARTIAL	OPERATIONAL	ADVANCED	LEADING

A numeric score must never hide a failed mandatory gate, missing evidence, untested workload, or unacceptable residual risk.

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Architecture 01 - Transition Control Plane

Coordinated architectures for controlled transition, hybrid quantum research, autonomous robotics, and photonic-neu

OPERATING POSITION

Source authority, evidence states, research isolation, experiment orchestration, challenge, pilot, rollback, supplier exit, and decision ledger.

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Architecture 02 - Hybrid Quantum-Classical Lab

OPERATING POSITION

Classical baseline, simulator, quantum backend, calibration registry, workflow, reproducibility, and PQC interoperability.

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Architecture 03 - Autonomous Robotics Fleet

OPERATING POSITION

Identity, safety controller, autonomy, perception, fleet control, simulation, telemetry, human intervention, and recovery.

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Architecture 04 - Photonic-Neuromorphic Fabric

OPERATING POSITION

Optical I-O, event sensors, neuromorphic acceleration, classical host, calibration, thermal and power control, and fallback.

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Cross-Architecture Invariants

OPERATING POSITION

Bounded claims.

- Named authority.
- Equivalent baseline.
- Reproducible evidence.
- Independent safety and security controls.
- Rollback and supplier exit.

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Publication Controls and Decision Record

Permanent identity, evidence, exceptions, and revision discipline

- Document identity remains stable across revision and packaging.
- Evidence grades and uncertainty accompany consequential claims.
- Exceptions are time-bounded and independently visible.
- Source currency is reviewed at assessment and scheduled publication review.
- Release artifacts are hashed and listed in the public manifest.

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11. Source Authority and Reference Register

Primary sources informing interpretation; verify current status at assessment time

NIST CSF 2.0

Cybersecurity Framework 2.0

<https://doi.org/10.6028/NIST.CSWP.29>

Enterprise governance and cybersecurity outcome framework.

NIST Integrated Photonics

Integrated Photonics Program and Metrology

<https://www.nist.gov/programs-projects/integrated-photonics>

Primary research and measurement work for heterogeneous integrated photonic devices.

NIST SP 800-53 Rev. 5

Security and Privacy Controls for Information Systems and Organizations

<https://doi.org/10.6028/NIST.SP.800-53r5>

Broad organizational control baseline for technology systems and services.

ITU-R M.2160

Framework and Overall Objectives for IMT-2030

<https://www.itu.int/rec/R-REC-M.2160-0-202311-I/en>

In-force framework for IMT-2030 objectives, use cases, and capabilities.

NIST PQC Project

Post-Quantum Cryptography Standardization and Migration

<https://csrc.nist.gov/projects/post-quantum-cryptography>

Final PQC standards, continuing algorithm work, migration direction, and official project status.

ETSI ISG PDL

Permissioned Distributed Ledger Specifications

<https://www.etsi.org/committee/pdl>

Primary technical work for governed distributed-ledger systems and decentralized trust.

IEEE P3706

Guide for Brain-Inspired Computing Technologies

<https://standards.ieee.org/ieee/3706/12098/>

Published guide describing brain-inspired computing technology options and terminology.

3GPP Release 20

5G-Advanced Studies and 6G Study Roadmap

<https://www.3gpp.org/specifications-technologies/releases/release-20>

Official release program separating continued 5G-Advanced work from initial 6G studies.

Source currency rule: authorities, specifications, laws, provider services, hardware, protocols, standards status, and research evidence MUST be checked at assessment time. This publication records a 2026-07-24 source snapshot.