# QAI Product Lifecycle Management (PLM) Framework Proposal

## 1. Introduction & Vision

The QAI Product Lifecycle Management (PLM) Framework aims to offer a flexible, forward/reverse-engineerable system for managing the complete lifecycle of Quantum-AI integrated products. It ensures alignment with national, enterprise, industry, and security standards while supporting modular, agile design approaches tailored for rapidly evolving QAI technologies.

## 2. Strategic Alignment with National and Industry Frameworks

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| Framework | Focus Area | QAI PLM Mapping | Merits |
| NIST AI RMF | Risk & Trust Management | Risk assessment, model testing | Supports explainable, safe QAI |
| NIST Cybersecurity Framework | Security Controls | Secure DevOps, compliance tracking | Ensures CIA triad for QAI |
| DoD CONOPS | Operational Concepts | QAI Robot CONOPS per domain | Clear operational scenarios |
| DRDO | Defense Tech & Labs | QAI for defense-ready robotics | Aligns with Indian defense priorities |
| NATO AI Strategy | Interoperability | Multi-domain QAI simulation | Aligns with allied frameworks |
| US DoC Quantum Initiative | Quantum Tech | Mapping QAI Processor & Datacenter | Supports global QAI leadership |
| ISO 42001 / IEEE 7000 | AI Ethics | Built-in ethical QAI design | Auditable design principles |
| Data Privacy (DPDP, GDPR) | User Rights & Governance | Modular privacy layer in QAI OS | Assures cross-border trust |

## 3. PLM Architecture Block Diagram (Textual View)

[Concept Phase]   
 - Module: Idea/MVP Intake  
 - Function: Capture ideas, SWOT, Canvas mapping  
 - I/O: Raw idea, founder input → MVP sketch, scope doc  
 - Deliverable: MVP Brief, Risk Log  
 - KPI: Idea-to-MVP time, Clarity score  
  
[Development Phase]   
 - Module: Prototype Builder, Agile Sprints  
 - Function: Build in modular AI/Quantum blocks, support change requests  
 - I/O: MVP Brief, customer stories → Working prototype  
 - Deliverable: Sprint-based prototypes  
 - KPI: Sprint velocity, Coverage %, Model Quality (F1)  
 - TRL: 4-6  
  
[Testing Phase]   
 - Module: Simulation Lab, QAI Sandbox  
 - Function: Run QAI units against test dataset/sim world  
 - I/O: Prototypes → Test logs, error metrics  
 - Deliverable: QAI Test Reports, QA Certificates  
 - Quality: ISO 25000, AI Fairness audit  
  
[Deployment Phase]   
 - Module: QAI Integration & Market Fit  
 - Function: Integrate with user ops, gather feedback  
 - I/O: QA-passed build → Pilot deployments  
 - Deliverable: Commercial-ready Product  
 - KPI: Client NPS, Defect Rate  
 - Security: DPDP, NIST 800-53, FedRAMP  
  
[Post-Launch Phase]   
 - Module: Feedback Engine, Reverse Engineering Tool  
 - Function: Harvest logs, optimize pricing, hotfix roadmap  
 - I/O: Market data, usage stats → Product v2.x plan  
 - KPI: Retention %, Referral Index, Upgrade Ratio