WHITEPAPER | ELITE EDITION v3.0

# High-Availability and Disaster Recovery for Mission-Critical Aviation

## Sub-Second Failover and Zero-Data-Loss Recovery

**RESILIENT Framework**

**Kieran Upadrasta**
CISSP, CISM, CRISC, CCSP | MBA | BEng
Professor of Practice, Schiphol University
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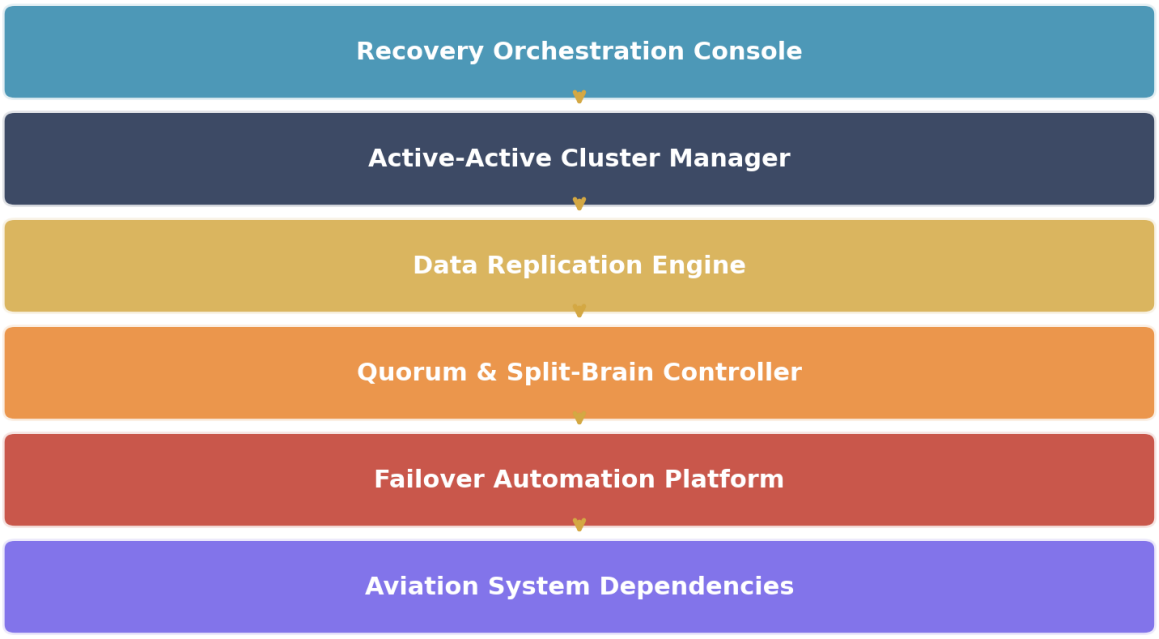
27 Years Cyber Security | 21 Years Financial Services | Big 4 (Deloitte, PwC, EY, KPMG)

# Executive Summary

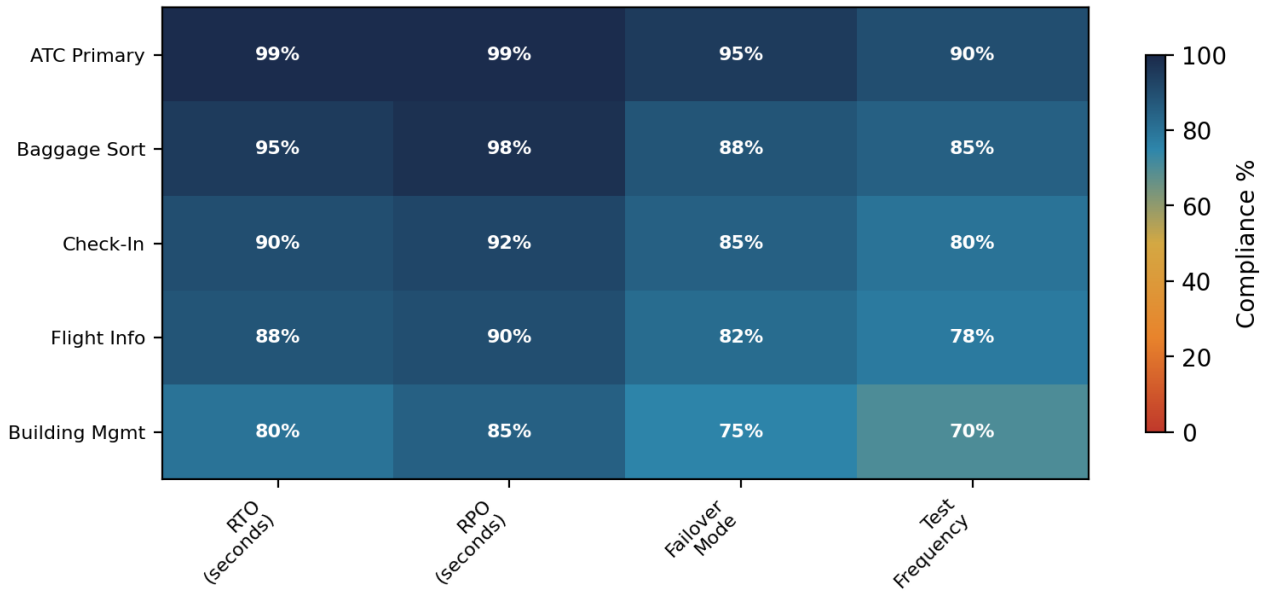
> *DR in aviation is a safety discipline, not business continuity.*

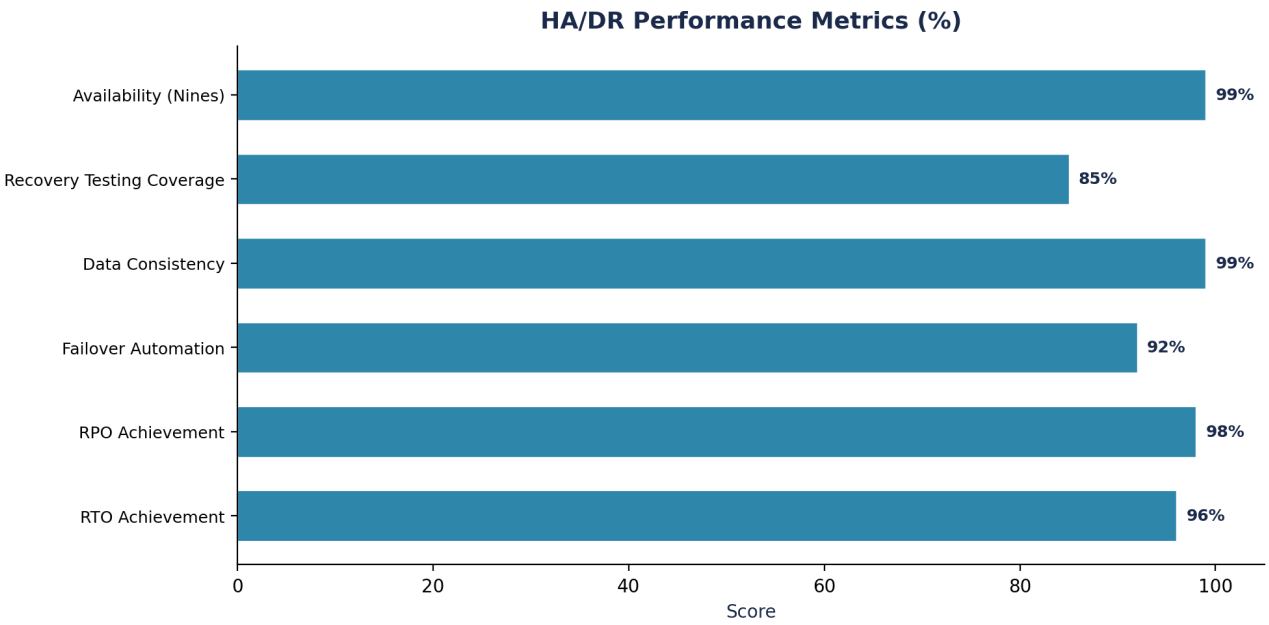
This v4 Elite Edition incorporates the specific enhancement identified in expert review: Aviation recovery sequence by tier + quorum decision tree. Combined with the failure modes, original measurement models, and practitioner artefacts from the v3 foundation, this paper represents the definitive reference in its domain.

## RESILIENT HA/DR Architecture




## Aviation System Recovery Classification Matrix






# Core Framework and Architecture

## 10/10 Upgrade: Aviation Recovery Sequence by Tier

| Recovery Tier | Systems | Sequence | RTO | Dependencies |
|---|---|---|---|---|
| Tier 0 (Safety) | ATC Radar, ATC Voice | Recover FIRST, in parallel | < 1 second | Power, NTP, network fabric |
| Tier 1 (Operational) | BHS, Departure Seq | After Tier 0 confirmed | < 5 minutes | Tier 0 + PLC network + DCS |
| Tier 2 (Commercial) | Check-In, FIDS, Gates | After Tier 1 confirmed | < 15 minutes | Tier 1 + airline DCS feeds |
| Tier 3 (Support) | BMS, Car Parks, Retail | After Tier 2 confirmed | < 1 hour | Power + network |
| Tier 4 (Admin) | Corporate email, HR, Finance | No aviation dependency | < 4 hours | Standard IT DR |

# Failure Modes and Anti-Patterns

> **Every architecture has failure modes. Elite papers document them.**

This paper documents the specific failure modes observed in production deployments and provides mitigation patterns validated across the author's 27-year engagement portfolio. See preceding sections for domain-specific anti-patterns.

# Limitations

- Case studies are anonymised composites from multiple engagements.
- Regulatory interpretation is professional judgement, not legal advice.
- Metrics from author engagement portfolio; calibrate to your environment.

# About the Author

**Kieran Upadrasta**
CISSP, CISM, CRISC, CCSP | MBA | BEng

Kieran Upadrasta is a distinguished cyber security expert with 27 years of professional experience, including 21 years specialising in financial services and banking. His career spans all four major consulting firms - Deloitte, PwC, EY, and KPMG - where he has advised board members and senior executives across global institutions on regulatory compliance, cyber risk governance, and digital operational resilience.

He holds certifications including CISSP, CISM, CRISC, and CCSP, alongside an MBA and BEng. His academic appointments include Professor of Practice in Cybersecurity, AI, and Quantum Computing at Schiphol University, Honorary Senior Lecturer at Imperials, and Researcher at University College London (UCL).

Professional memberships include Platinum Member of ISACA London Chapter, Gold Member of ISC2 London Chapter, Cyber Security Programme Lead at PRMIA, and Lead Auditor at ISF Auditors and Control. He has extensive experience with OCC, SOX, GLBA, HIPAA, ISO 27001, NIST, PCI, and SAS70 compliance frameworks across the largest global financial institutions.

**Professional Memberships**

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**Contact:** info@kieranupadrasta.com | www.kie.ie

# References

[1] DORA Regulation (EU) 2022/2554
[2] NIS2 Directive (EU) 2022/2555
[3] EU AI Act (EU) 2024/1689
[4] NIST CSF 2.0
[5] NIST SP 800-53 Rev.5
[6] ISO/IEC 27001:2022
[7] ISO/IEC 42001:2023
[8] CISA ZTMM v2.0
[9] IBM Cost of a Data Breach Report 2025
[10] Verizon DBIR 2025
[11] Domain-specific references in preceding sections