



AFRL

COMPARATIVE ANALYSIS OF AMRAAM SEVERITY ASSESSMENTS BETWEEN AEROMEDICAL CONSULTATION SERVICE AND GROUND-BASED OPERATOR PHYSICIAN-PILOT EXPERTISE

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Disclosure Information

- I have no actual or potential conflict of interest in relation to this presentation.
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**Aeromedical Consultation Service
Medical Risk Assessment &
Airworthiness Matrix (AMRAAM)**



Version 1.0 CAO 28 Jun 2022

LIKELIHOOD

FREQUENT
(or continuous)

PROBABLE

OCCASIONAL

REMOTE

IMPROBABLE

Likelihood of a Single Occurrence Per Year

Greater than 99%

60% to 99%

10% to 60%

1% to 10%

Less than 1%

Likelihood of a Single Occurrence Per 5-Years

Greater than 99%

Greater than 99%

40% to 99%

5% to 40%

Less than 5%

Likelihood of a Single Occurrence Per 10-Years

Greater than 99%

Greater than 99%

65% to Greater than 99%

10% to 65%

Less than 10%

Medical event of concern expected to occur more than 10 times per 1 person-year on average.

Medical event of concern expected to occur between 1 and 10 times per 1 person-year on average.

Medical event of concern expected to occur between 1 and 10 times every 10 person-years on average.

Medical event of concern expected to occur between 1 and 10 times every 100 person-years on average.

Medical event of concern expected to occur less than 1 time every 100 person-years on average.

SEVERITY
Potential Duty-Specific Adverse Outcomes

CATASTROPHIC impact on performance, mission, and system safety. Complete inability to accomplish duty-specific operational requirements, death, permanent disability, or loss of system expected.

1

2

4

8

12

CRITICAL impact on performance, mission, and system safety. Decreased ability to accomplish critical or essential duty-specific operational requirements, severe injury requiring hospitalization, temporary disability, or major system damage expected.

3

5

6

10

15

MARGINAL impact on performance, mission, and system safety. Decreased ability to accomplish non-critical or non-essential duty-specific operational requirements, injury resulting in lost work day(s) without permanent or temporary disability, or minor system damage expected.

7

9

11

14

17

NEGLIGIBLE impact on performance, mission, and system safety. No decrease in ability to perform duty-specific operational requirements, injuries resulting in lost work day(s), or system damage expected.

13

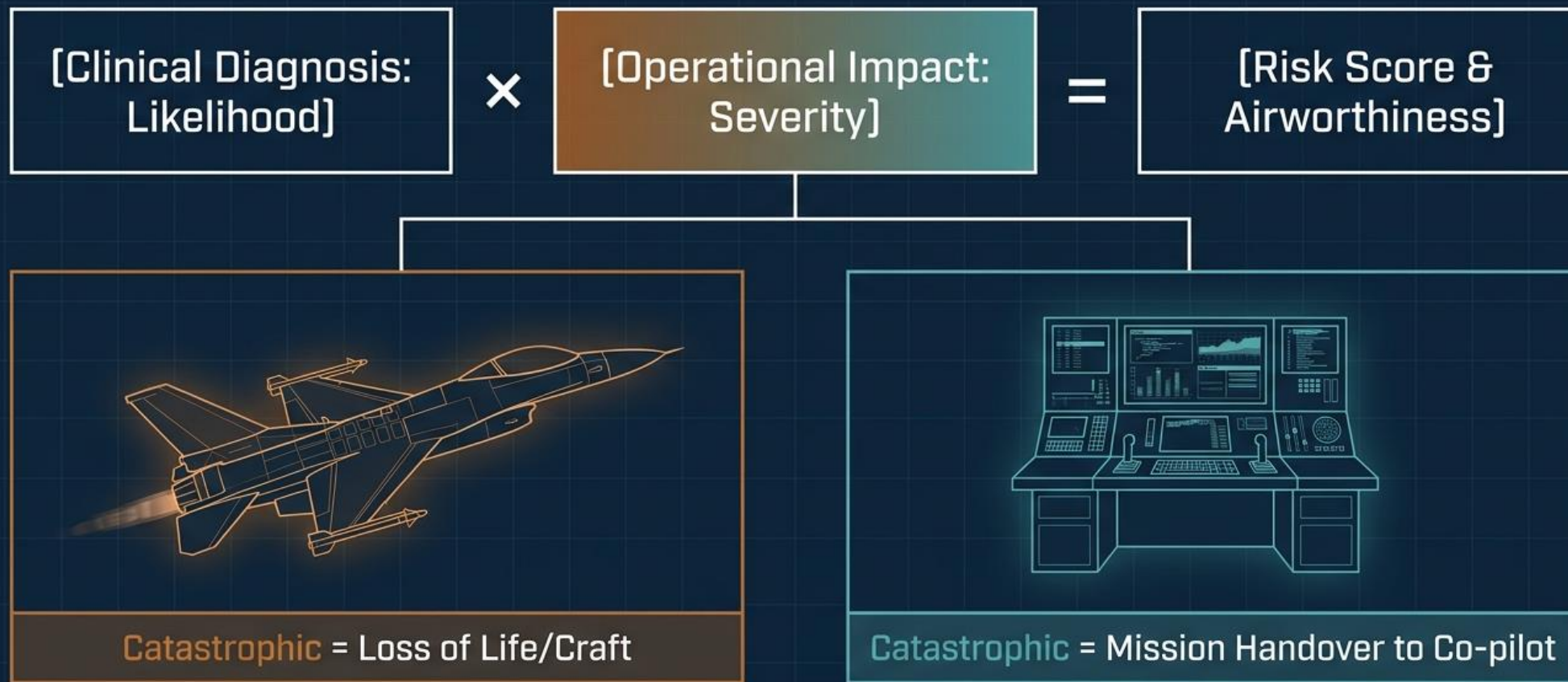
16

18

19

20

The Subjective Variable in Objective Risk





Measuring the Gap Between Clinic and Control Station

ACS Clinician



- Established Medical Science
- Established Medical Science
- Broad Clinical Baseline

RPA Pilot-Physician (PMD)



- Direct Operational Reality
- Direct Operational Reality
- Duty-Specific Application

106 GBO Medical Waivers
(2022-2024)



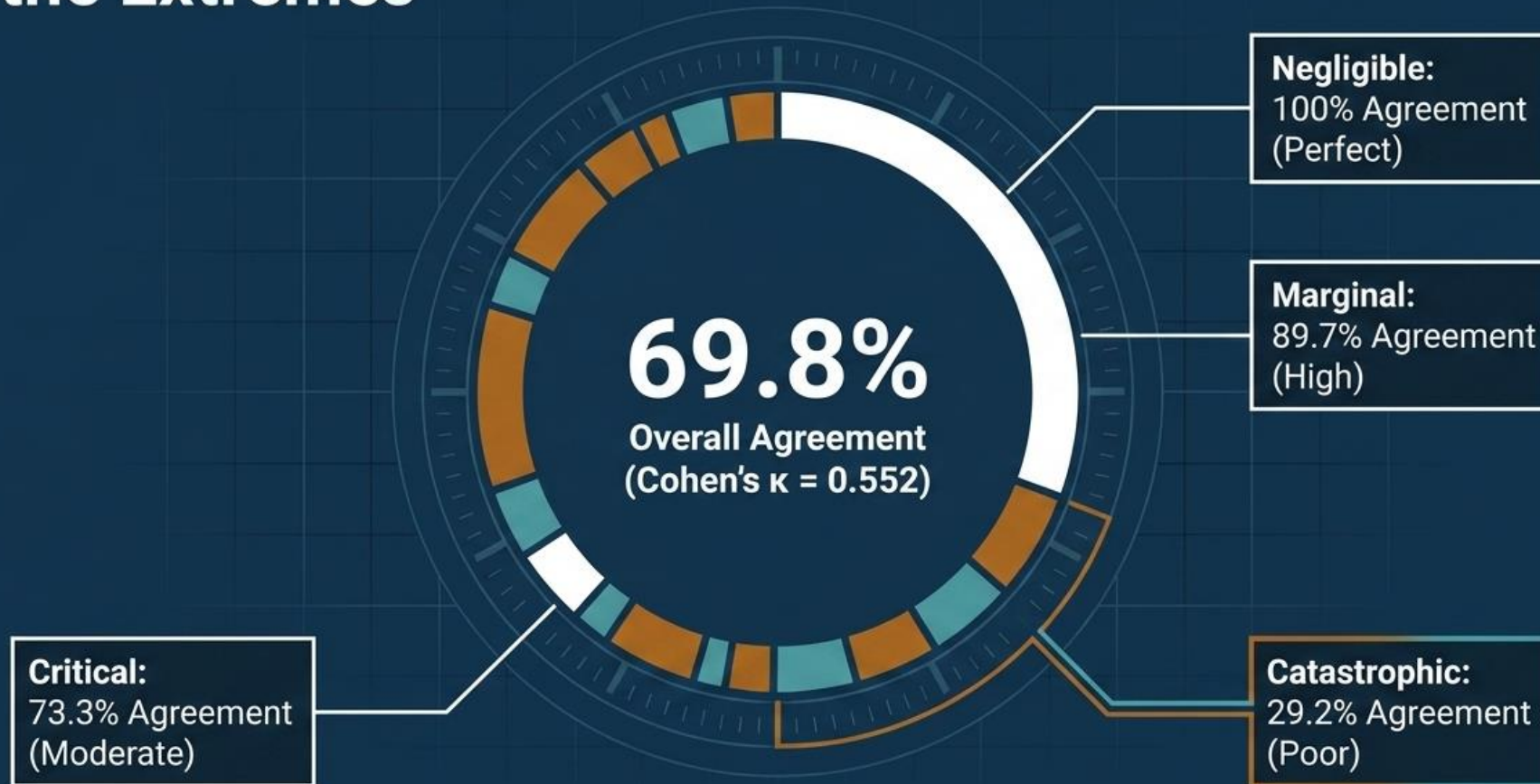
The Anatomy of a Waiver Decision



(Note: In AMRAAM, lower scores = higher risk)

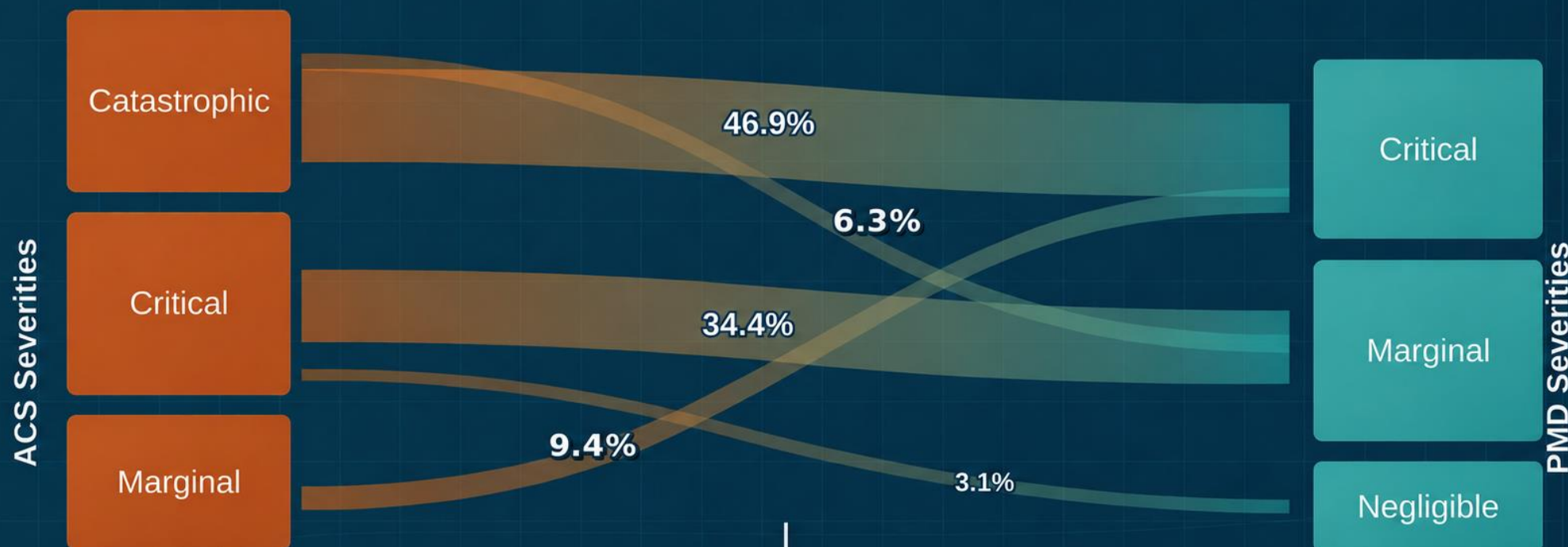


System Reliability Fractures at the Extremes



Visualizing the Calibration of Risk

Severity changeovers only: ACS → PMD, n = 32 of 106 GBO waivers

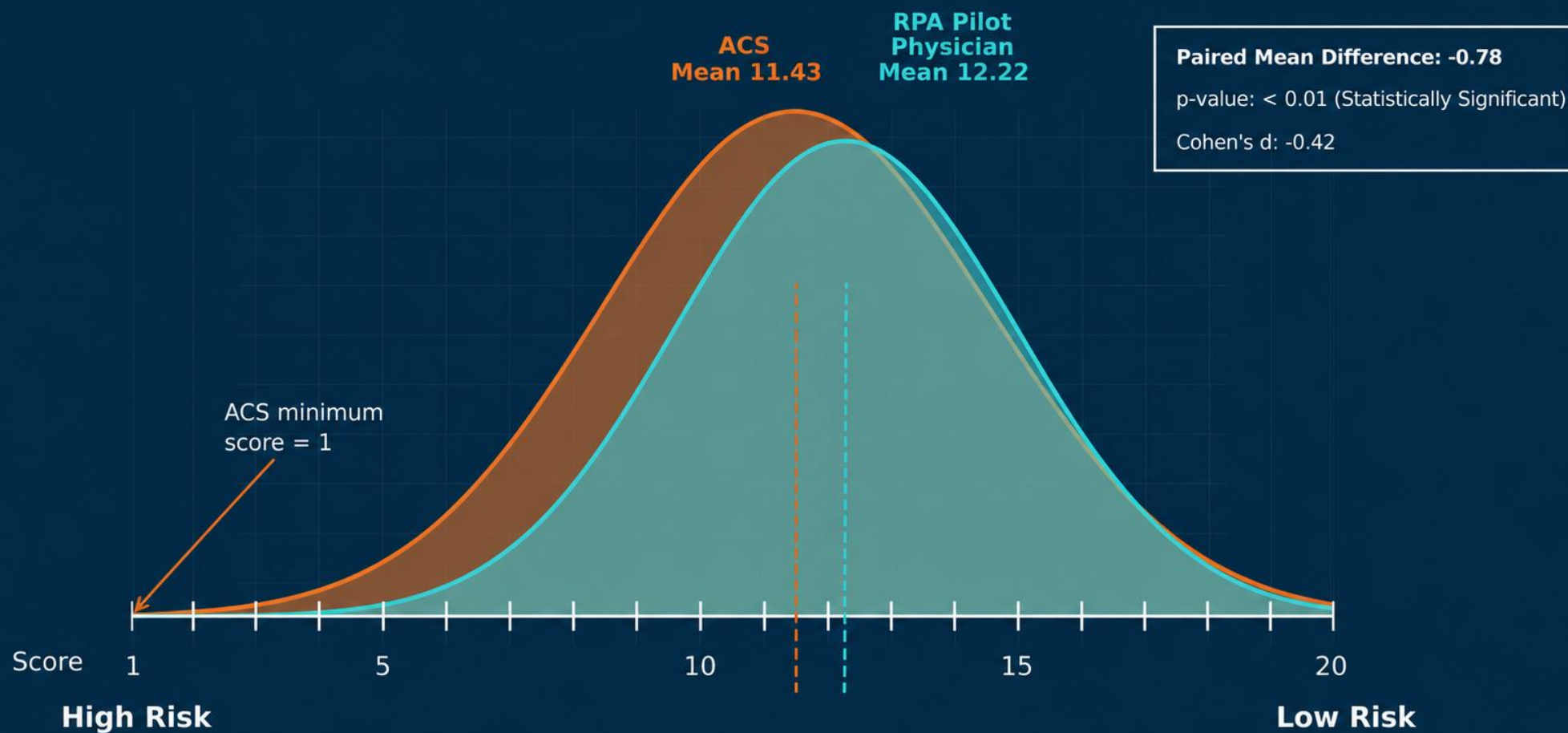


Extreme downgrades were uncommon: 2 Catastrophic → Marginal; 1 Critical → Negligible; **0 Catastrophic → Negligible**. Pattern supports calibrated operational adjustment, not reckless leniency.

Source: Table 2/Fig. 1 severity transition counts from provided paper text, AMRAAM Severity Comparison, COI



Clinicians Anchor Lower; Operators Anchor Moderate



AMRAAM scoring: lower scores indicate higher perceived medical risk



The Divergence Matrix: Fear vs. Reality

Specialty (Changeover %)	The Clinical Fear (ACS)	The Operational Reality (PMD)
Sleep Medicine (100%)	Untreated OSA causes sudden incapacitation (Catastrophic)	Co-pilot assumes control; degraded but not fatal (Critical)
Ophthalmology (39%)	Visual acuity loss equals system loss (Critical)	Screen proximity and software aids mitigate loss (Marginal)
Pulmonology (75%)	Asthma is a manageable baseline condition (Marginal)	Asthma deeply impacts drone cognitive load (Critical - Reverse Bias)



The Operational Ripple Effect

Airworthiness Score

Waiver Disposition
(Approved/Denied)

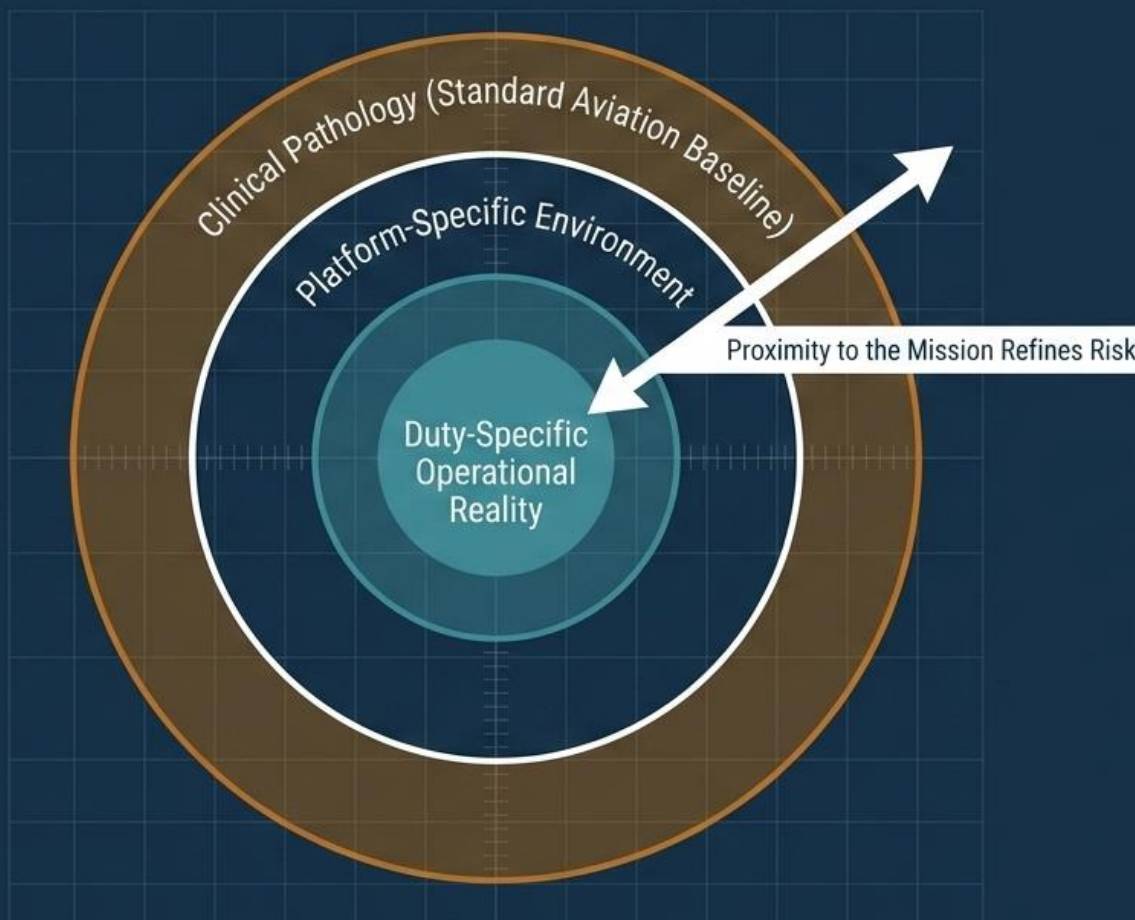
Interval Duration
(Short-term vs. Indefinite)

**Mission Readiness &
Administrative Cost**

**Extrapolated Impact:
~100 careers
safely preserved
annually.**



Synthesis: Proximity Refines Risk



Methodological Constraints



Single Dual-Designated Expert

Relied on one pilot-physician's operational judgment.



Severity Isolation

ACS strictly controlled Diagnosis and Likelihood variables.



Administrative Data

Evaluated risk perception matrix, not post-mishap outcomes.



Strategic Calibration: The Path Forward



Integrate Safety Data

Collaborate with AF
Aerospace Safety
Center for concrete
mishap evidence.



Cross-Pollinate Expertise

Conduct base site
visits and host
operational
specialists at ACS



Expand to Manned Crew

Run parallel FC II
manned study to
establish universal
baseline

**Combining clinical rigor with operational reality
ensures both crew safety and mission readiness.**



QUESTIONS?