

Mitigating Risk at the Edge of the Envelope

*Revising Basic Aircraft
Limit Test Procedures*



Capt Benjamin E George
40 FLTS, Eglin AFB



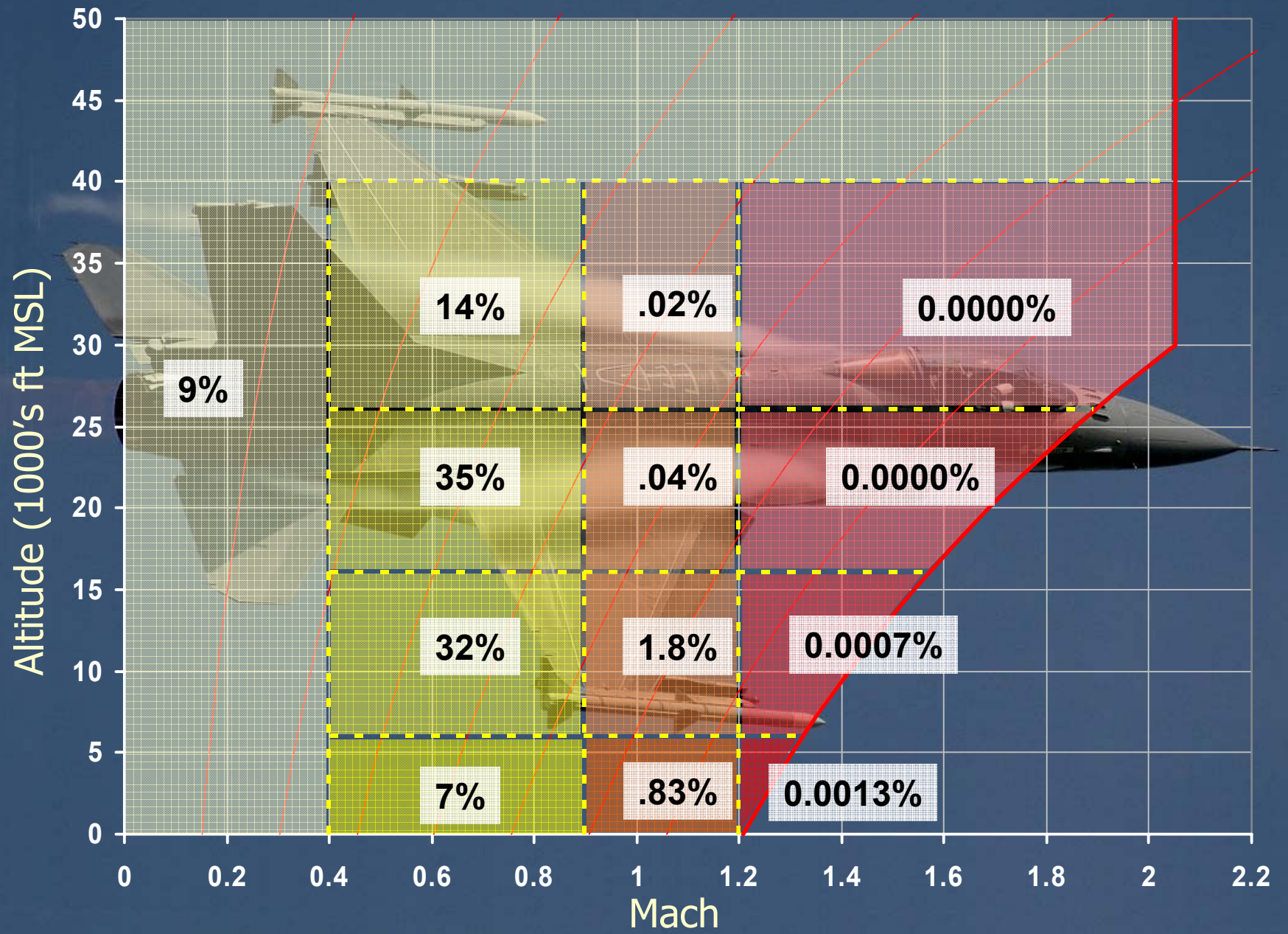
Bad things happen to good airplanes...



TIS-1166 Loads Test

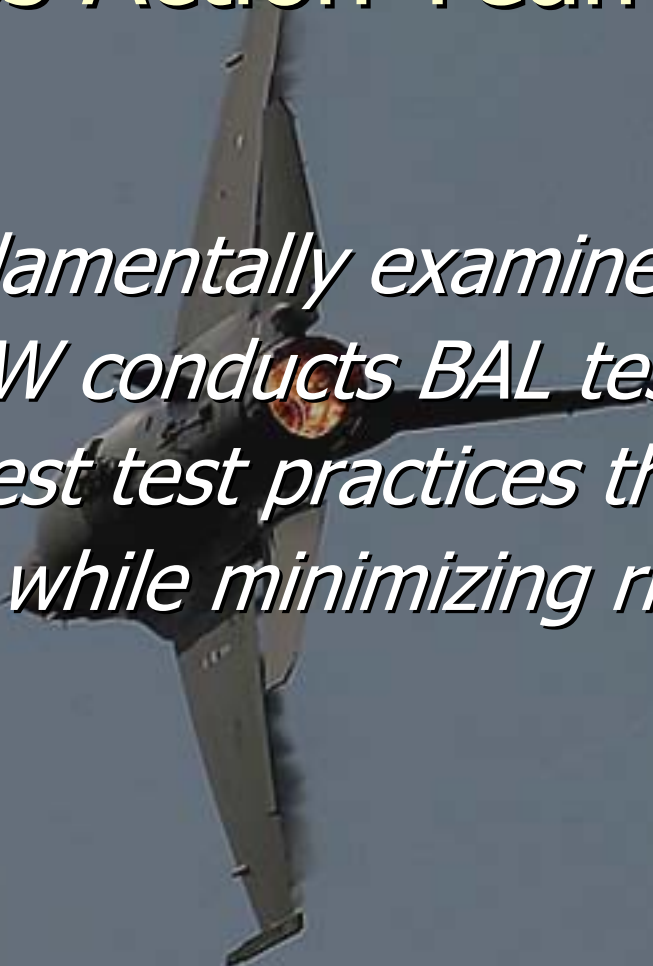
F-16C # 83-1123 RUDDER &
FLAPERON FAILURE (FY90)

F-16 CSFDR Operational Employment

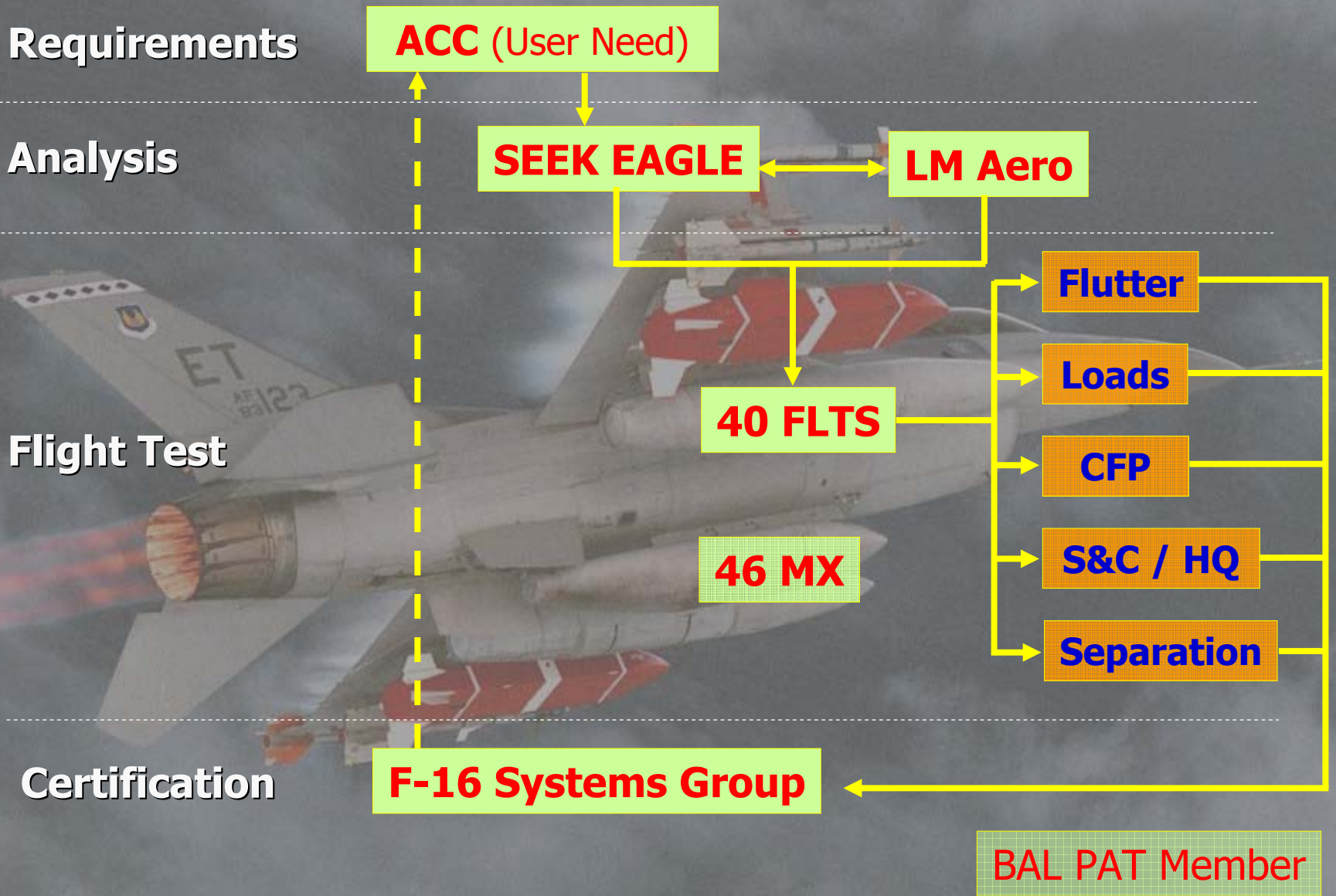


Basic Aircraft Limit (BAL) Process Action Team (PAT)

- ▶ Charter: *Fundamentally examine and review how the 46 TW conducts BAL tests and identify the best test practices that meet ACC requirements while minimizing risk to aircraft and aircrew*

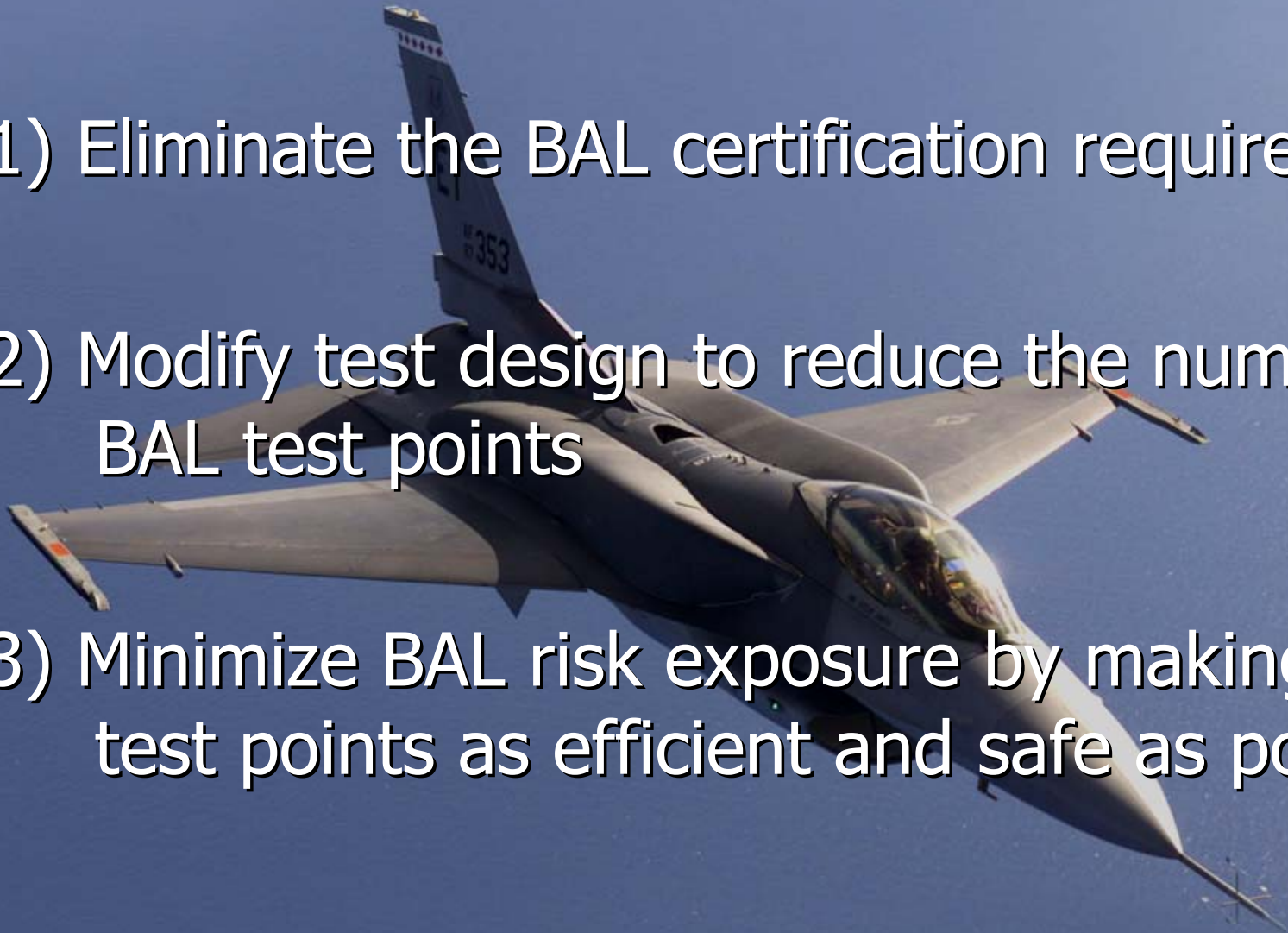


Stores Certification Process



BAL Risk Mitigation Strategies

- 1) Eliminate the BAL certification requirement
- 2) Modify test design to reduce the number of BAL test points
- 3) Minimize BAL risk exposure by making BAL test points as efficient and safe as possible

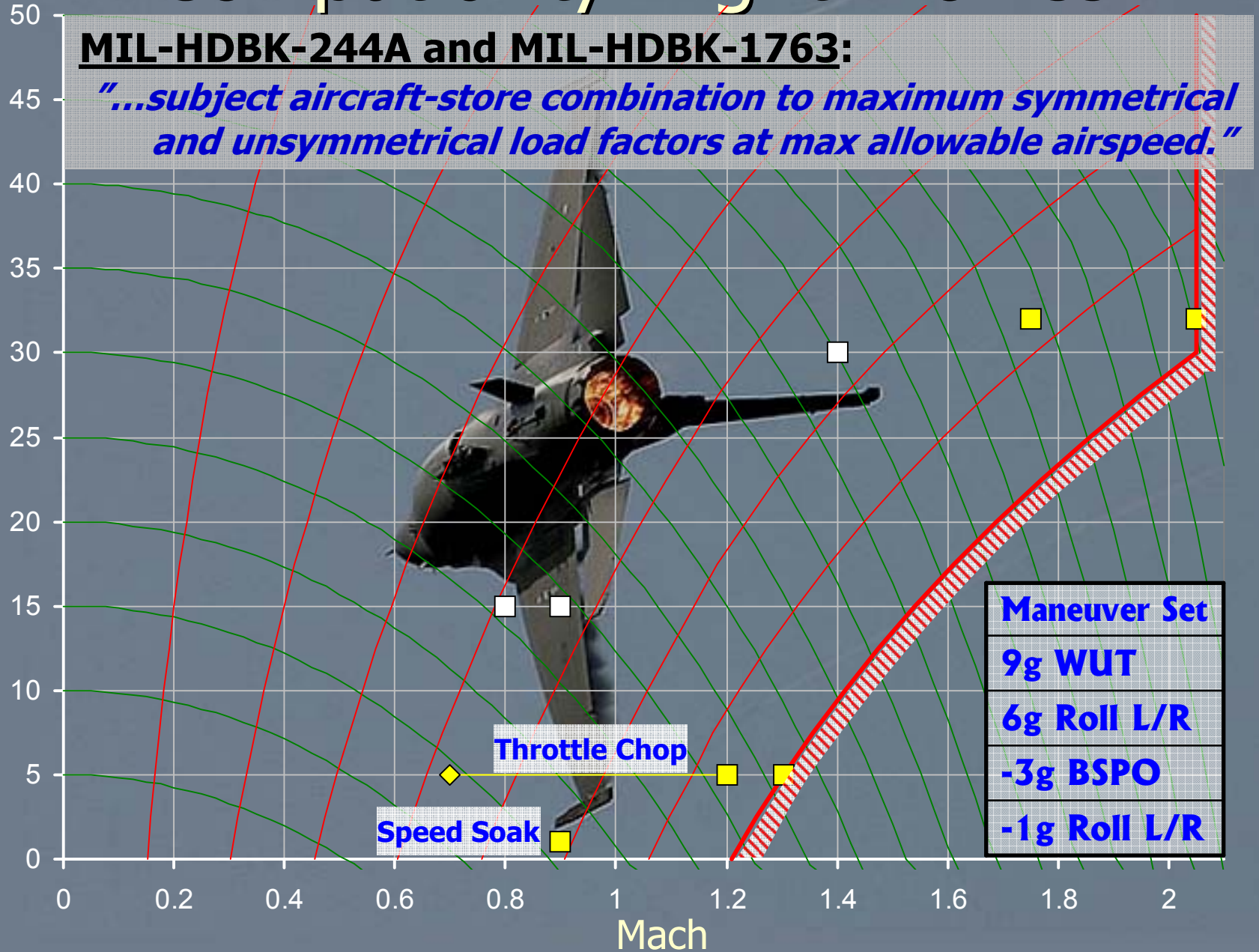


Compatibility Flight Profiles

MIL-HDBK-244A and MIL-HDBK-1763:

"...subject aircraft-store combination to maximum symmetrical and unsymmetrical load factors at max allowable airspeed."

Altitude (1000's ft MSL)



Throttle Chop

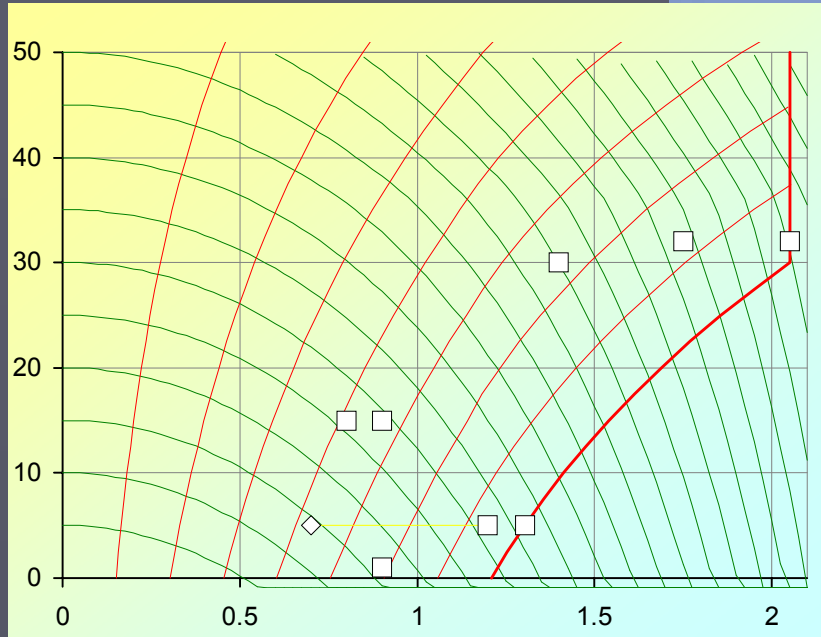
Speed Soak

Maneuver Set
9g WUT
6g Roll L/R
-3g BSPO
-1g Roll L/R

Mach

Strategy 1

Eliminate BAL Requirement



Fighter Aircraft C2
Enhancement Pod
(FACE)



BAL Certification

800 KCAS / 2.05 M

9/-3 g Symmetric

6/-1 g Unsymmetric

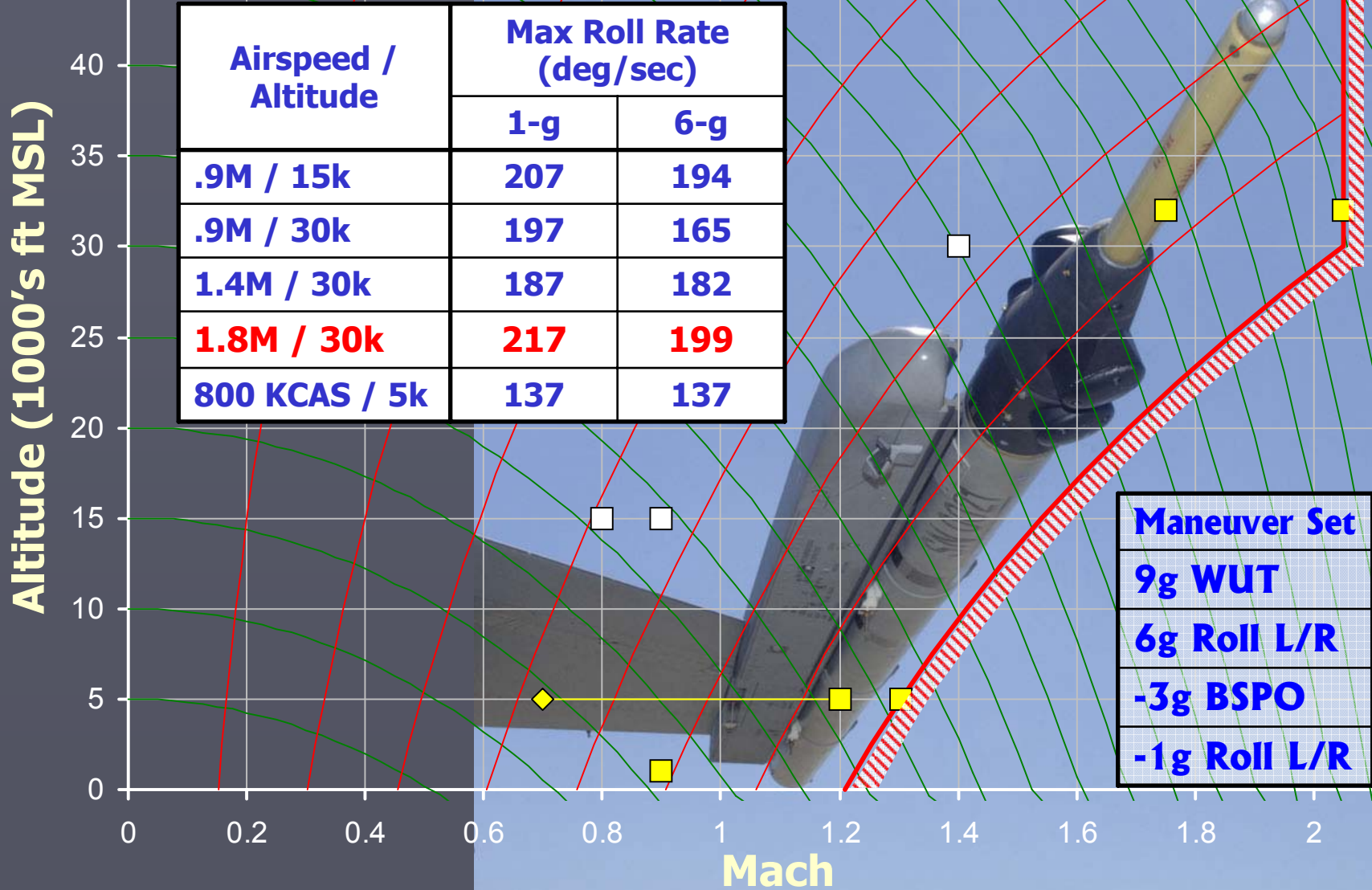
ACC (User Need)

SEEK EAGLE

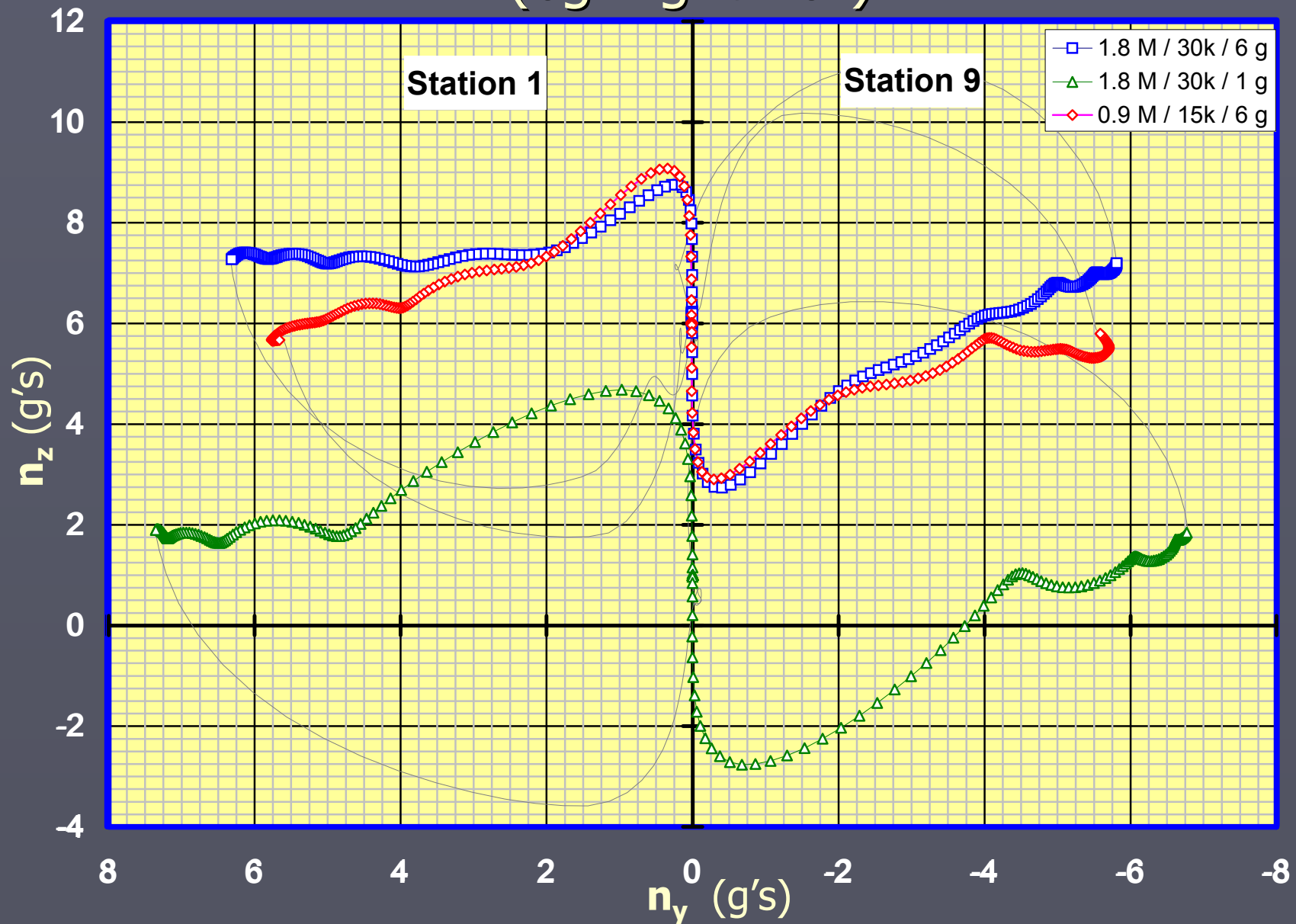
40 FLTS

Revisiting CFPs

"...subject aircraft-store combination to maximum symmetrical and unsymmetrical load factors at max allowable airspeed."



Wingtip Store Inertial Loads (6g Right Roll)

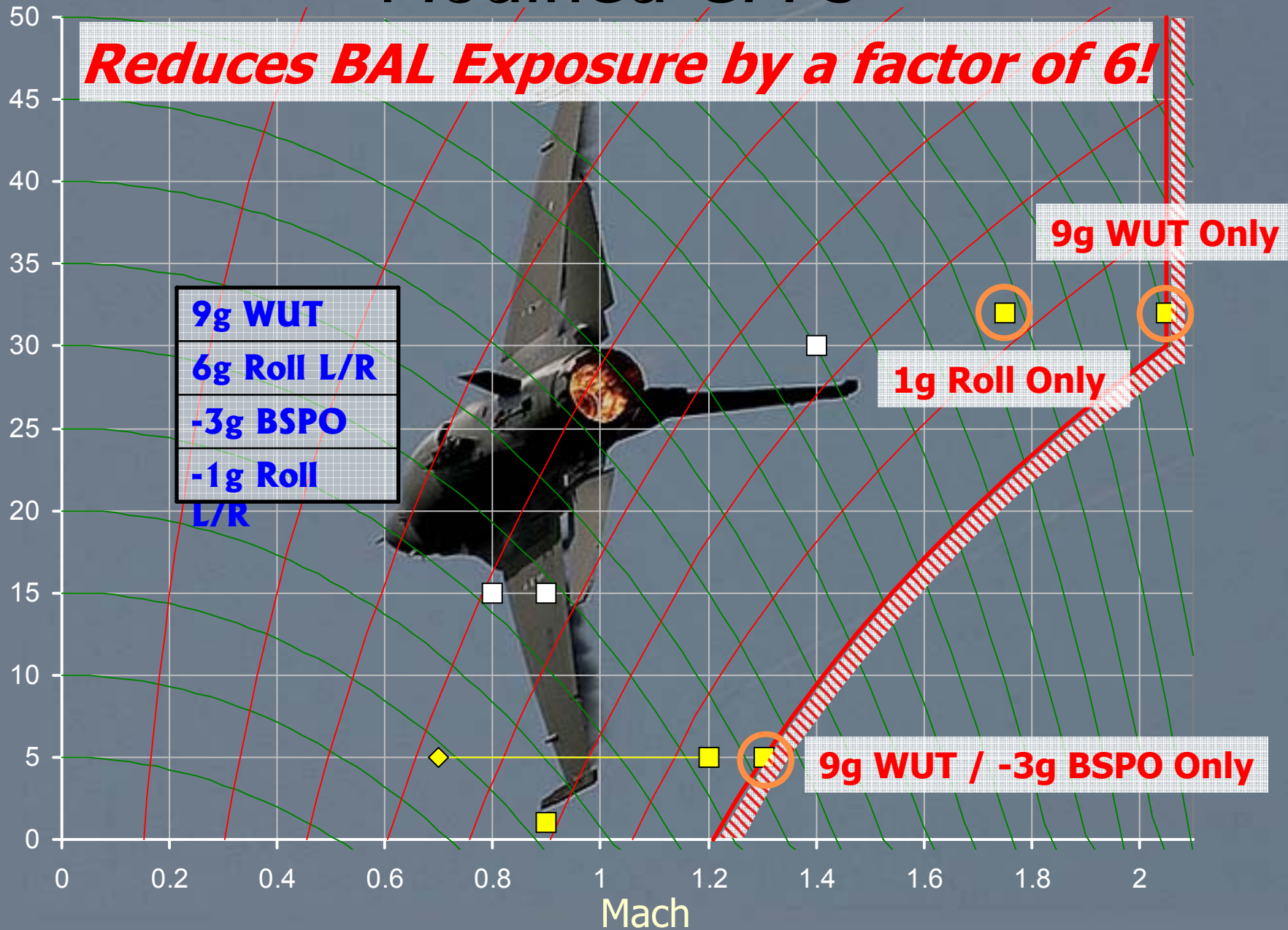


Strategy 2

Modified CFPs

Reduces BAL Exposure by a factor of 6!

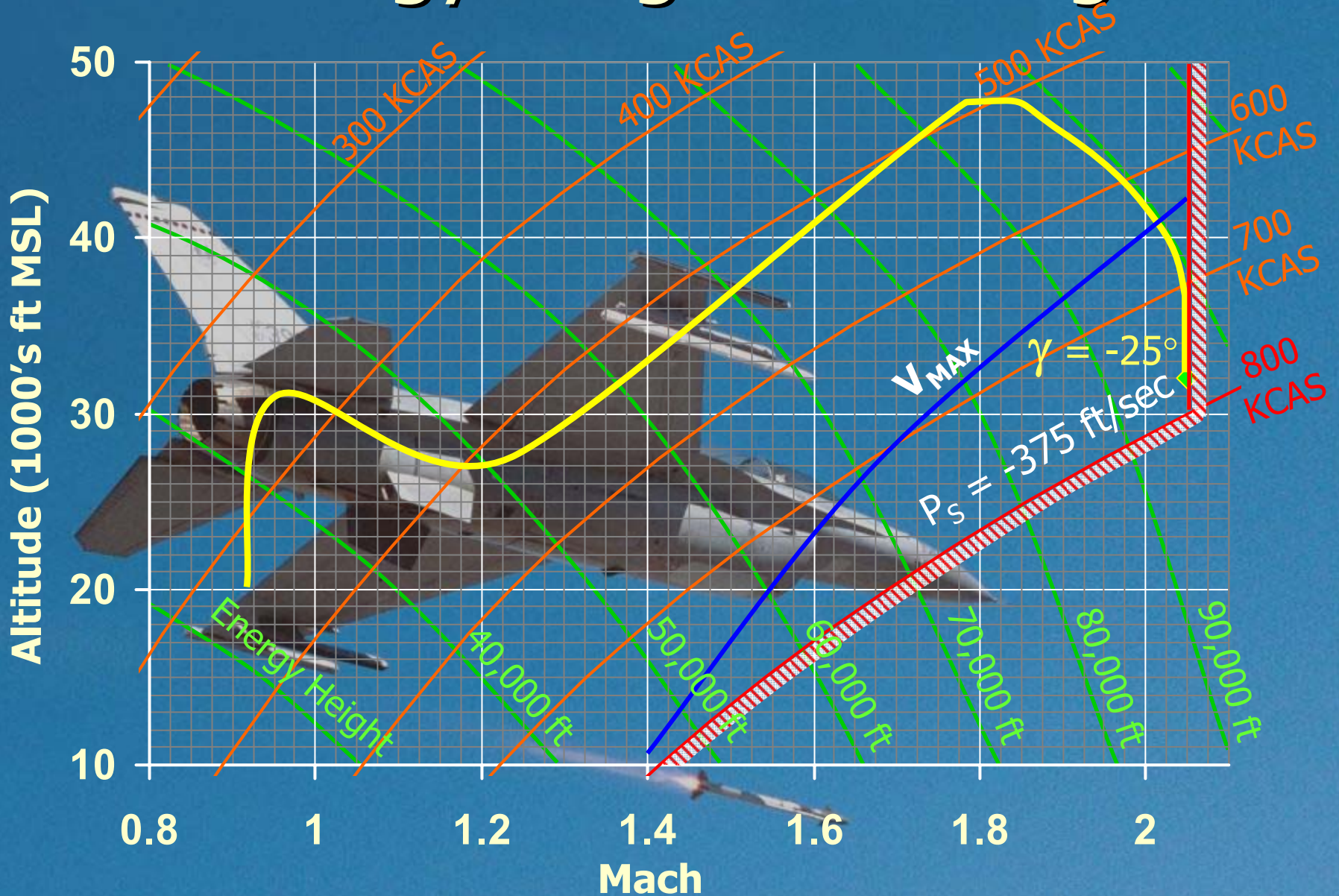
Altitude (1000's ft MSL)



Max Efficiency / Min Risk Exposure

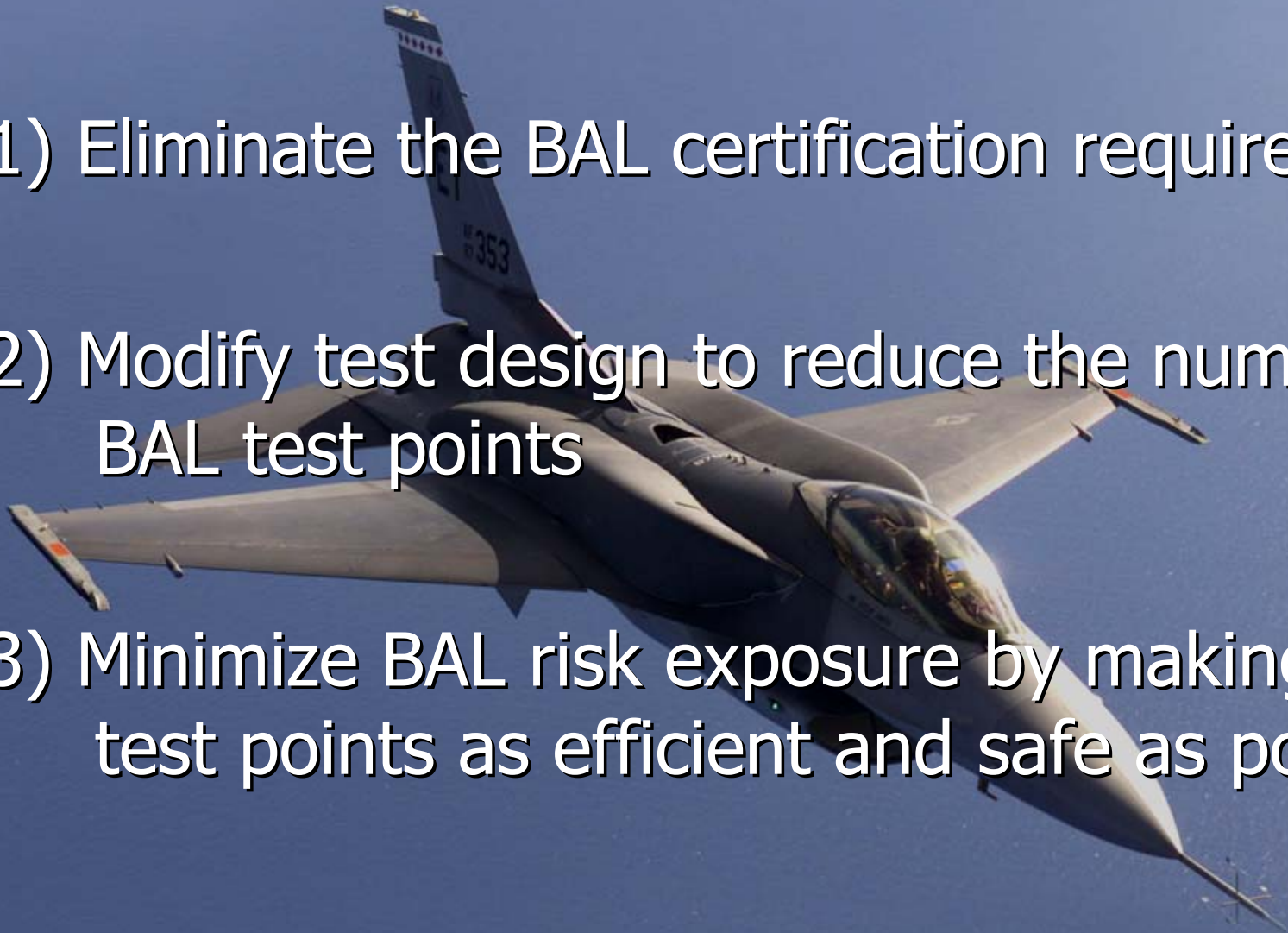
- ▶ **Pre/Post-mission high-speed MX inspections**
 - New NDI procedures for key structural areas?
- ▶ **Test Aircraft Usage Review**
 - Airframe equivalent age analysis
- ▶ **High-speed test planning tools**
 - Flight Path Angle & Energy Height analysis
 - Energy height IADS plots in Control Room
 - Dive recovery analysis

Energy Height Planning



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Conclusions & Lessons Learned

- ▶ **BAL Risk Mitigation**
- ▶ **Periodic Review of Assumptions**
- ▶ **Process Action Team Make-up**



Questions?

