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Preparing for the Unexpected Flight Test Training Lessons


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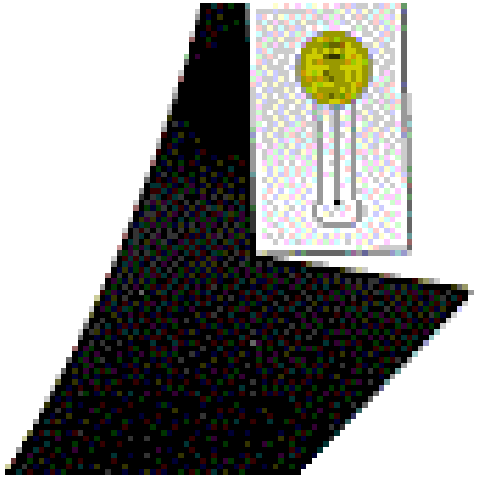


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Outline

- Why is Test Flying Different?
- Preparing for Failure
- Looking for Risk
- Delivering Safely
- Reacting to the Unexpected
- Lessons for Everyone?

Why is Test flying Different? (1)

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Why is Test flying Different? (2)

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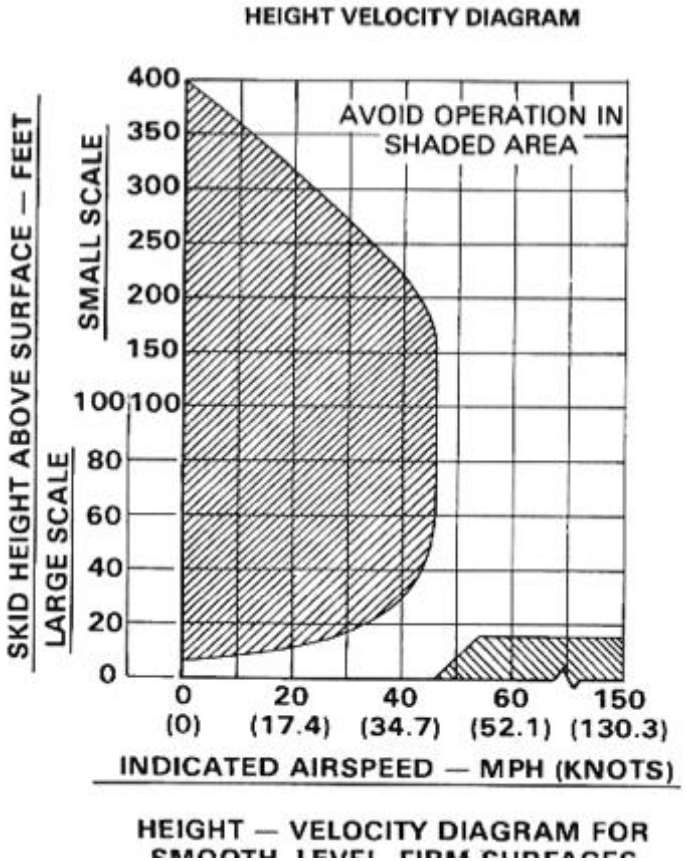
- Process Driven
  - What is the question to be answered?
  - How do we answer the question?
  - Where are the answers?
  - Can I get the answer?
- Peer Review Systems
- Layers of Supervision

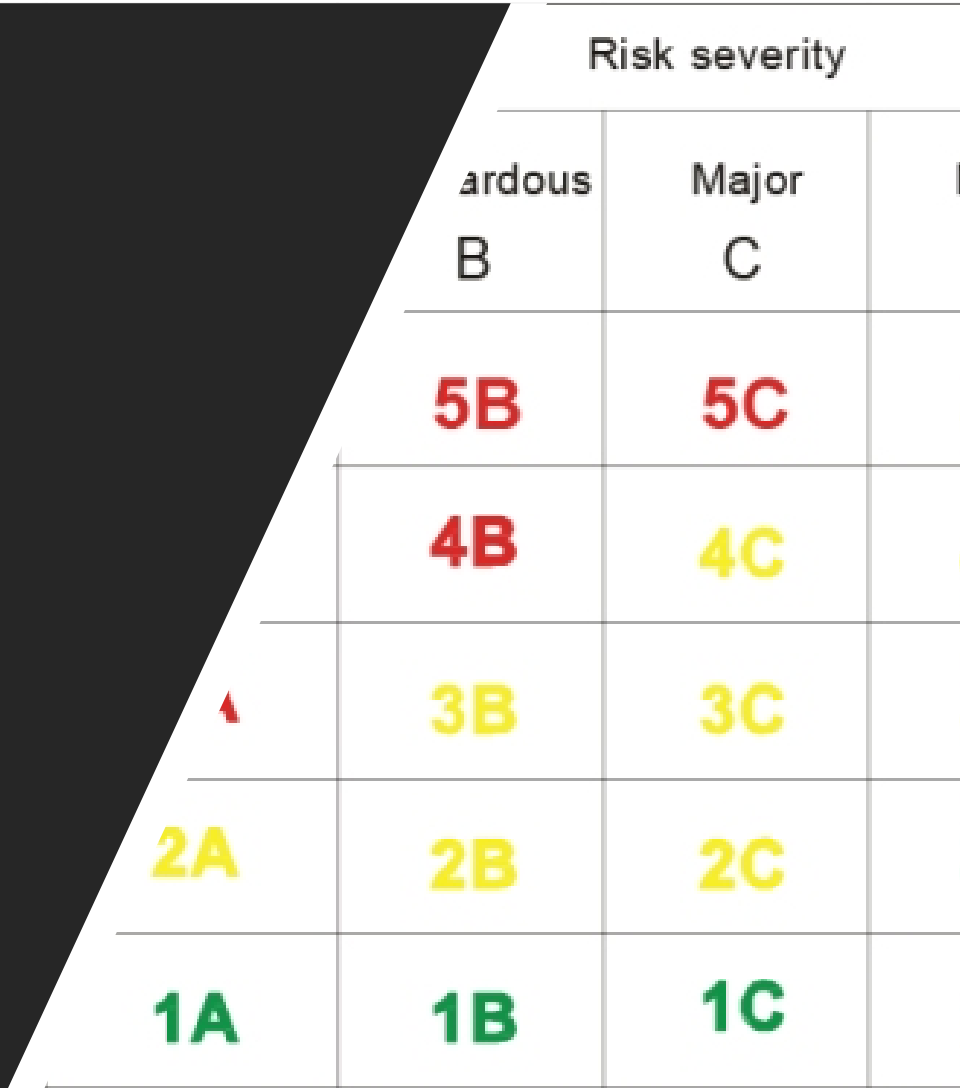
Preparing for Failure -Looking for threats



- The Obvious?
  - Technical
  - Operational
  - End Points
- The Hidden?
  - Technical
  - Operational
  - End Points
- Crawl, Walk and Run – progressive approach
- Always beware of the cliff edge

Looking and Training for Risk

- Tailored Training Exercises
  - Real tests
  - Real aircraft limits
  - Real application of safety
- What level of risk?
- Who accepts the risk?
  - Individually – crew
  - Collectively - organisation



Exercises Involving Risk

- Engine Off Landings – Engine running and shutdown
- Avoid Curve
- Lever Delays
- Ceiling Climb
- OEI Performance
- OGE Hover Performance
- Tethered Hovering

Level of Risk – Too High?

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Delivering Safely

- Cooper Harper and DIPES
- Applying Risk Mitigations Practically?
- Ready for the Cliff Edge?
- Knock-it Off Criteria
- Crew Awareness and CRM
- Flight Readiness Review

Delivering for Failure – Flight Readiness Review

- Description of System Under Test (SUT) including instrumentation and data system, control room, concept of operation, pilot displays and control room display content.
- Test Plans & Objectives.
- Flight Profiles and Flight cards (include back-up test cards/points if applicable).
- Flight Crew, Ground Crew and Ground/Mission Control system personnel (names, certifications and training).
- Ground and Flight Operations Limitations.
- Planned response to potential anomalies (What Ifs).
- Go/No-Go and knock-it-off criteria.
- Aircraft tests, retests, and laboratory tests that have been completed, including anomalies identified and the corrective action taken.
- System Pedigree, including test procedure, service life history, scheduled maintenance and calibrations. Verify Quality Plan compliance to quality processes & procedures.
- Qualification and certification status of software and hardware installed on the aircraft and ground/mission control station.
- Verification that systems and functions have been tested satisfactory and changes do not adversely affect these functions.
- Known or suspected deficiencies, test anomalies, and associated corrective action plans
- Failure modes & effects analyses.
- Aircraft system capability to successfully pass ground and flight acceptance test requirements. Include approach to maintaining system weight & balance.
- Configuration changes or modifications to the aircraft design. For aircraft having flown previously, configuration changes or modifications completed since the last FRR.
- Deviations and waivers effective for the aircraft system.
- Maintenance status to include open work and the impact on ground operations, flight operations, and safety.
- Test Hazard Analyses.
- Pre-Mishap Plan complete.
- Open safety issues.
- Status of action items from previous reviews.
- Status and recommendation of Safety Review Board.

Cooper-Harper Handling Qualities Rating Scale

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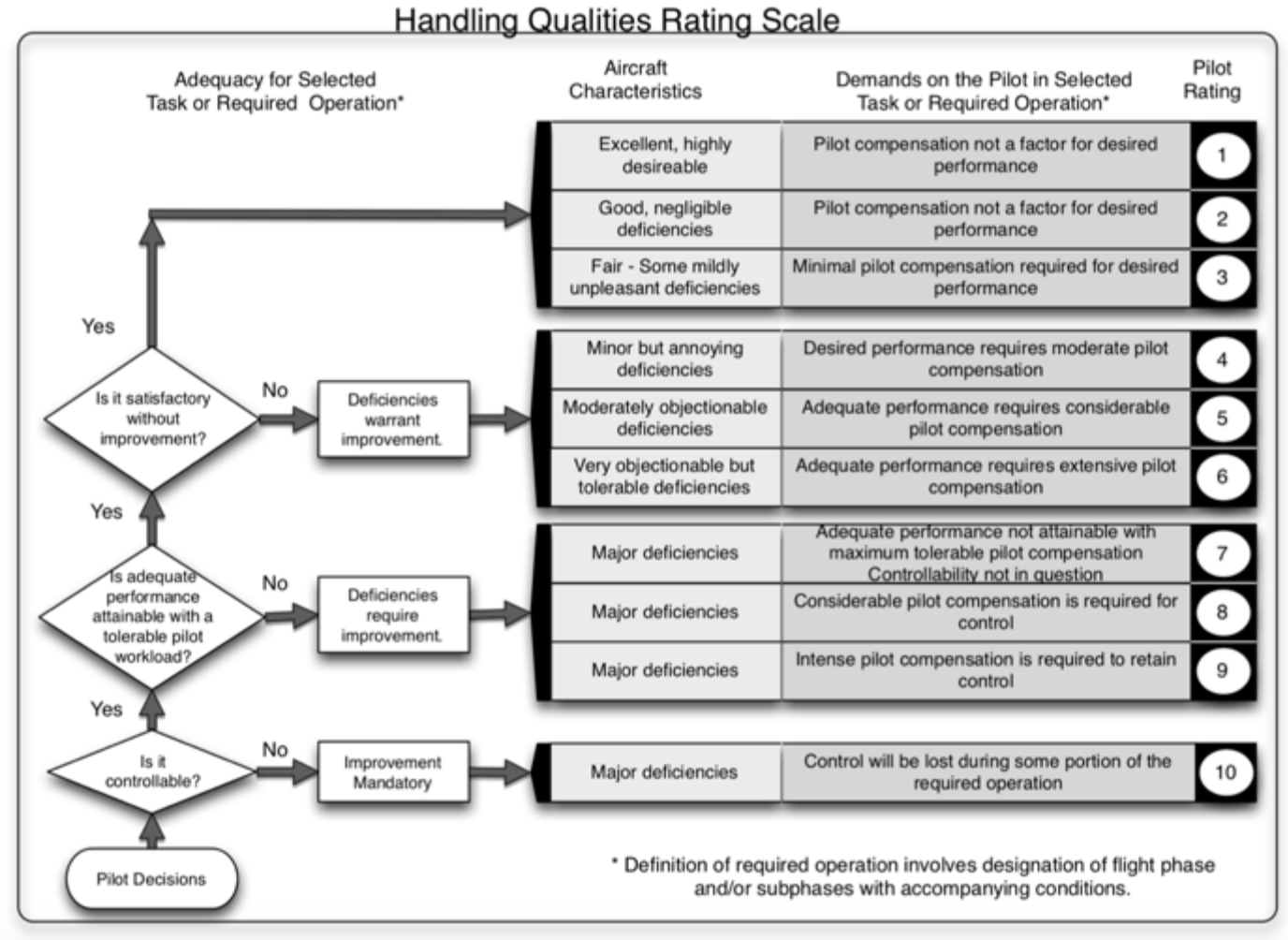

Reacting to the Unexpected

- Recovery Techniques
- Specific Mitigations for Each Exercise
- Specific Crew Duties
  - Sometimes Offboard- Higher Risk
  - ’External Crew’
  - ‘Live Data’
- Emergency or Escape (yes parachutes)

Lessons for Everyone?

- Not practical in the real world but…
  - Is your risk management plan just on paper?
  - How do you actively manage risk?
  - Do you brief your top risks and mitigations on all sorties?
- How do your train for risk?
  - OPC?
  - LPC?
- Do you have knock it off criteria for sorties and tasks?

Questions?

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