AFTER-MARKET FLIGHT TESTING - SAFETY COMPROMISES OR NOT?

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OUTLINE

- After – Market Dilemma
- Issues
- Some techniques/Tools available
- Case study
- Discussion
After – Market Dilemma

• OEM Prototypes
  • Organizational structure
  • Early design safety features
  • Can address safety concerns early in the program
  • In-house personnel / expertise
  • Management support / understanding

• After-Market
  • Modifications to existing designs
  • Usually quick-reaction
  • Budget-limited
  • Schedule-limited
  • TC change or STC
  • TC Change – still under OEM organization
  • STC – most of the time by third party companies (e.g. DERs)
STC Approvals – Safety Concern

Ref: FAA presentation  FTSW 2008

• Little or no development flight testing
• Applicant’s tests often not done by experienced flight test personnel
• Generally the applicant’s pilot will not be a Test Pilot:
  – Will usually have a good operational understanding of the aircraft; but,
    • May not understand the need for the test
    • May not understand the test
    • Can be resentful
• Higher probability of unexpected results during FAA certification tests
After – Market Dilemma

• After-Market Safety Dilemma

  • Same safety provisions as original prototype?
    • Spin chute, helmets/parachutes, escape hatch, etc.
After – Market Dilemma Cont’

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  - Cost / schedule of modifications
  - Available airspace
Challenge – Test Site
After – Market Dilemma Cont’

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  • Crew training / proficiency
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  • Are risk levels (H/M/L) the same?

  • Cost / schedule of modifications

  • Available airspace

  • Crew training / proficiency

  • How much safety
After – Market Dilemma Cont’

- After-Market Safety Dilemma
  - There is a temptation to cut corners
  - Sometimes risk assessment is not as deliberate
Lessons learned

• Are we exposed to re-learn lessons learned?
• Miles O’Brien: “We don’t properly evaluate our risks”
• The most dangerous phrase in the language is: “We’ve always done it this way”
  (…and got away with it..)
Lessons learned

- Are we exposed to re-learn lessons learned?
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- The most dangerous phrase in the language is: “We’ve always done it this way”
Safety is Relative

- There are no hard rules
- Evaluate each project on its own merit
- The key question is: when is the risk acceptable
- Best practice: A deliberate process to reach acceptability
Some techniques to mitigate risks

- Limit GW/CG
Limited C.G.

Flight Test Weight & Center of Gravity Limits

WEIGHT (LB) vs CENTER OF GRAVITY (INCHES)

- Ramp WT
- Zero Fuel
Some techniques to mitigate risks

- Limit GW/CG
- Limt Mmo / Vmo
Drag is good !!
Some techniques to mitigate risks

- Limit GW/CG
- Limit Mmo / Vmo
- Baseline testing
Some techniques to mitigate risks

• Limit GW/CG
• Limit Mmo / Vmo
• Baseline testing
• Buildup
Some techniques to mitigate risks

- Limit GW/CG
- Limit Mmo / Vmo
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- Analysis
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- Evaluate margins WRT baseline (e.g. icing)
Some techniques to mitigate risks

- Limit GW/CG
- Limit Mmo / Vmo
- Baseline testing
- Buildup
- Analysis
- Evaluate margins WRT baseline (e.g. icing)
- Instrumentation (e.g. nose boom)
Some techniques to mitigate risks

- Limit GW/CG
- Limit Mmo / Vmo
- Baseline testing
- Buildup
- Analysis
- Evaluate margins WRT baseline (e.g. icing)
- Instrumentation (e.g. nose boom)
- Emergency egress
Case Study