

Safety Vaccination For A Small Test Program



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A First Look At The Program

- Test of a newly developed engine in the 11,500 lb thrust range
 - Developed and managed by a European company
 - Flight test operations began from scratch

Twin-engine airplane used as a Flying Test Bed (FTB)

- Modified in the US by a specialized engineering company
 - Aircraft is maintained by a hand-picked team
 - Test engine is maintained by the European company
 - Dividing line is the pylon firewall
- Site manager had no test experience
 - Organization structure written from scratch
 - No pre-existing safety culture

Areas Requiring Safety Attention

- Flight test organization
- Aircraft and modifications
- Fire/Crash/Rescue
- Flight test operations

Flight Test Organization

- Organization Chart did not include safety responsibility
 - Safety responsibility verbally assigned to the Conformity, Airworthiness, and Quality manager
- Process Management vs SMS
 - Outside contractor hired to create a “5S” environment
 - No knowledge of SMS
 - Excellent processes now in place in a “clean, lean” environment !!

Aircraft and Modifications

- Gulfstream II chosen as the twin-engine FTB
- Several modifications required:
 - Start batteries for the test engine
 - Back-up batteries to cover Spey generator failure
 - Power Distribution System to recharge batteries
 - Dual hydraulic pumps provide redundant hydraulics
 - Test engine supplies non-conditioned bleed air for pressurization, when selected
 - Typical FTE station in mid-cabin
- Modern avionics allowed an FTI screen in the cockpit



FTSC Response to NTSB

Recommendation A-12-61

“Encourage members to provide notice of, and coordinate high-risk flight tests with airport operations and aircraft rescue and firefighting personnel.”

FTSC Action:

Several manufacturer test organizations have produced quick reference guides for airport first-responders that detail normal and emergency aircraft entry, critical component location, and unique test aircraft cabin configurations. Prior to the commencement of test, many organizations stipulate a briefing be provided to rescue crews to identify key safety features and abnormal access methods (such as external “cut here” markings). As with the other NTSB recommendation actions herewith, the Committee intends to provide sample guides on the FTSD and recommend notification to test site operations officials and rescue personnel as part of test execution pre-deployment checklist. The Committee considers this action OPEN pending the posting of recommended aircraft familiarization and rescue guides to the FTSD (estimated completion: Mar 2015).

Fire/Crash/Rescue Aspects

- It's complicated.....
- For a fire on the Ground Side: call **911**
 - The call goes to San Antonio Dispatch
 - The responding fire company may NOT be the one located very close by
 - Their zone of responsibility stops at the airfield fence
 - They still need aircraft training due to fuel on board and for rescue purposes

Fire/Crash/Rescue Aspects

There are two specific cases on the Air Side:

- Ramp operations, engines NOT RUNNING: Call **911**
 - Central Dispatch will dispatch nearest fire company and contact Lackland Fire
 - The dispatched fire company contacts Lackland Fire by radio
- Ramp Operations, engines RUNNING (contact with Kelly Ground is mandatory):
 - Declare an emergency with Kelly Ground
 - Kelly Ground activates the crash network
- Runway operations: crash network activated by the ATC tower

Fire/Crash/Rescue Aspects

- The FTB is well thought-out from a systems standpoint, but not so well for emergency crew egress

Emergency Exits – Left Side



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Cabin View Looking Forward



Cabin View Looking Aft



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Cut Markings Used By Gulfstream



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Right Side - No Good Cut Locations



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Best Space Just Aft of Cabin Door



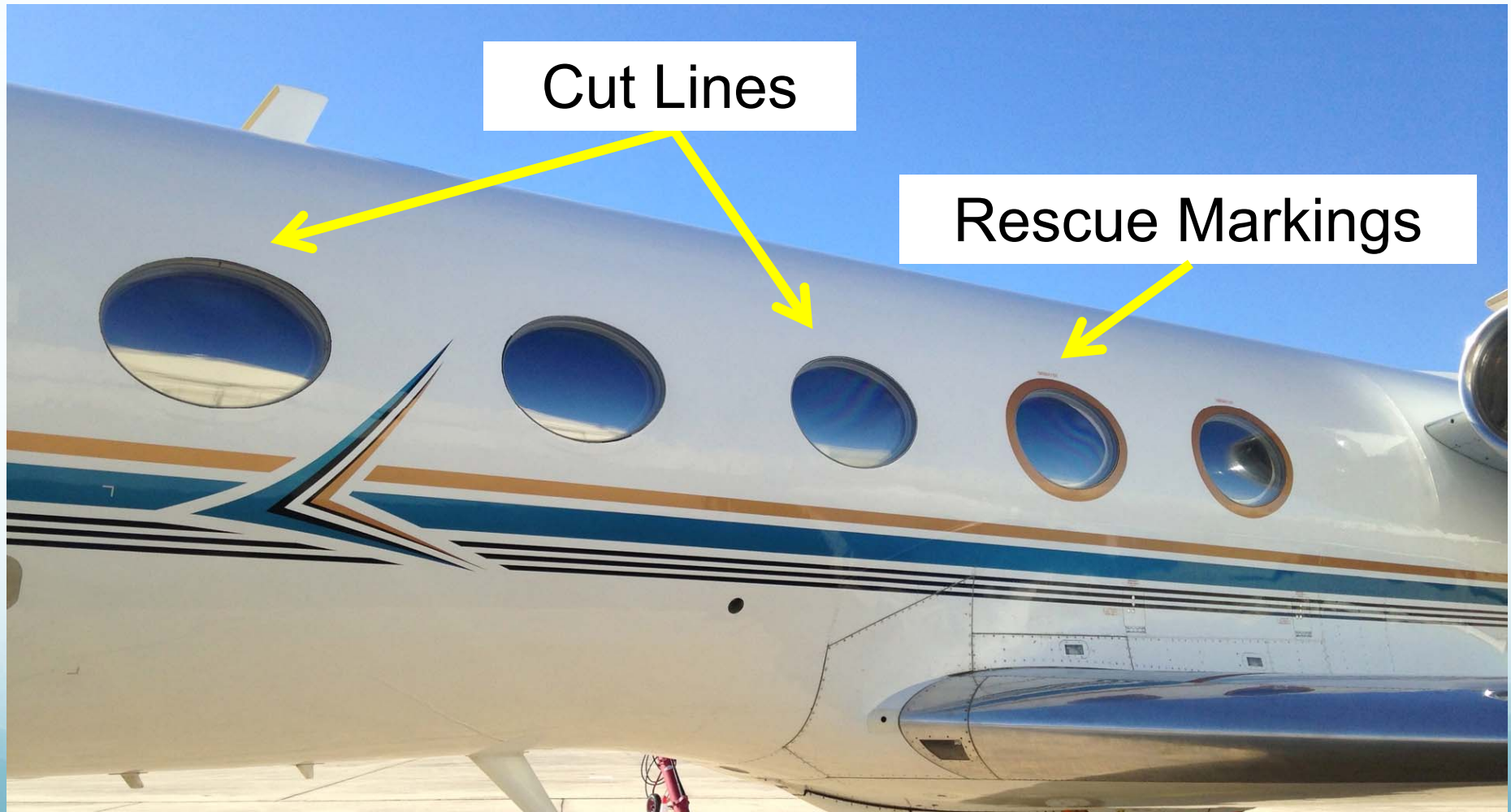
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Emergency Exit Controls

External Controls
Are Not Well-Marked



Proposed Markings – Left Side



Proposed Markings – Right Side



Flight Test Operations

- Aircraft mod manuals, engine operating instructions and limitations, and checklists – GOOD
- No typical Operations Manual or Flight Test Guide
- Examples of operational problems:
 - RVSM capability
 - Altitude alerting system
 - Guidance for engine out situations
 - Pressurization loss at low Spay power settings

Cabin Vertical Speed



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 - Flight suits

Incident Investigation

- Bleed air line at the pylon interface found uncapped during engine change
 - Fortunately no evidence of damage was found



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Incident Investigation

- Findings:
 - Engine records maintained by the engine Quality inspector at the hangar
 - Aircraft records maintained by the aircraft Quality inspector in the program building
 - Engine records on paper, Aircraft records electronic
 - Chief of Maintenance had no direct access
 - No active parts control
- Recommendations:
 - All records should be electronic, with network access
 - Establish a parts control program

Lessons Learned

- We're all trained to be leaders and for small programs you have to take the lead for flight test safety
- While safety is always a top management objective, they may not have, or be receptive to the tools appropriate to flight test safety
 - Start with the basics, build from there
- Consistent, professional discussion is necessary to keep moving the bar
 - Safety impacts everyone, so make everyone a part of the effort

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Transfusion



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- Questions?