Gust Lock Design and Certification

Airworthiness presentation

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G-IV Gust Lock System

Gust lock handle
G-IV Gust Lock System

Elevators (full down position)

Rudder (neutral position)

Aileron—one per wing (neutral position)
Gust Lock Certification Requirements

• **14 CFR 25.679**: Gust lock system must limit operation of airplane so that pilot receives “unmistakable warning” at start of takeoff if gust lock system engaged

• FAA considers unmistakable warning to be a warning that physically limits operation of airplane to prevent unsafe takeoff

• Gulfstream intended to comply by limiting throttle lever angle (TLA) to 6° with gust lock engaged
Gust Lock/Throttle Lever Interlock

Throttle levers

Gust lock handle

Interlock
Gust Lock/Throttle Lever Interlock

- Accident airplane achieved 22° TLA with exemplar gust lock handle installed
- Analysis found that design could allow for TLA up to 23°
- Inspection of nine in-service G-IVs found achievable TLA 3 to 4 times design intent
- Achievable TLA does not limit operation to provide unmistakable warning
Actions Taken by Gulfstream

• Released two maintenance and operations letters to G-IV operators
  - Check flight controls for freedom of movement before taxi/takeoff
  - Throttle lever movement is not absolute indicator of gust lock status

• Currently developing modification to interlock to meet gust lock certification requirements
Certification Drawing Review

- Compliance with gust lock requirement demonstrated by G-IV engineering drawing review
- Drawing review alone did not ensure compliance
- Verification testing would have identified problem