GAMA HISTORY AND PURPOSE

• **Founded in 1970 to “foster and advance the general welfare, safety, interests and activities of general aviation.”**

• **Expanded to worldwide membership in 2001**

• **Expanded to include rotorcraft & MRO in 2011**

• **Created Associate Membership for Hybrid & Electric Propulsion in October 2015**

• **Office Locations:**
  - Washington, DC, USA (headquarters)
  - Brussels, Belgium

LOGO IS THE GREEK SYMBOL FOR THE LETTER “GAMMA”
GLOBAL CIVIL TC AIRCRAFT POPULATION ≈ 334,000

- Commercial Airliners ≈ 19,000
- Business Jets ≈ 17,000
- Turboprops ≈ 12,500
- Rotorcraft ≈ 20,500
- Mostly Certified Piston Aeroplanes but also Gliders, Lighter Than Air, Experimental, Etc. ≈ 265,000

(Jetnet LLC, Flight Global, IAOPA World Assembly)
CS-23 Piston Aeroplanes Manufactured Annually

Piston Aeroplanes

Turboprop Aeroplanes

Turbofan Aeroplanes

Average Aeroplane = 48 Years Old

GAMA Statistical Data
GA TOWER OPERATIONS
(FAA & CONTRACT ITINERANT)

GA Operations (Thousands)

13000 15000 17000 19000 21000 23000 25000 27000


- Actual Operations
- 2000 Forecast
- 2004 Forecast
GA TOWER OPERATIONS
(FAA & CONTRACT ITINERANT)
U.S. GENERAL AVIATION ACCIDENTS

Source: FAA GA Accident Data, U.S.
Controlled Flight Into Terrain

High/Low $\Delta = 0.17$
Linear Slope $= -0.0176$
Between 1994 and 1996, approximately 800 rule changes to part 23 were enacted. They made it more costly to certify a simple airplane. Essentially the regulatory scope of part 23 has been shifted to more directly address the complex airplanes to the detriment of simple airplanes.

SEPARATING SAFETY REQUIREMENTS FROM METHODS OF COMPLIANCE

**Authority**
- Current Part-23
- New Part-23

**International Aviation Community**
- Systems & Equipment
- Powerplant: Engine Installation
  - Technical Solutions that meet standards
  - Test specifications
  - Specific compliance methods
- Structures: Design
  - Loads & Conditions
  - Technical Solutions that meet standards
  - Test specifications
  - Specific compliance methods
- Structures General
  - Technical Solutions that meet standards
  - Test specifications
  - Specific compliance methods

**High-level requirements. (safety driven)**
NO technical solutions prescribed
No tiers or categories

**Auth. Acceptance**

**Detailed Design Standards**
- Tiered where it makes sense
- Contains detailed compliance requirements
- Current CS-23 used as a starting basis
FAA PART 23 NPRM

• **Significant Changes**
  • Enables Hybrid & Electric Propulsion
  • Loss of Control
    • Non-Aerobatic Airplanes: Must warn of inadvertent stall & must not inadvertently depart controlled flight
    • Aerobatic Airplanes: Must be spin recoverable from any spin
  • Icing: Implements new ability to fly beyond §25 Appendix C icing or detect & exit
  • New HIRF & Lightning Rules
FAA PART 23 NPRM

- **Significant Changes**
  - **Introduces Airworthiness Levels**
    - **Level 1:** 0 to 1 Pax
    - **Level 2:** 2 to 6 Pax
    - **Level 3:** 7 to 9 Pax
    - **Level 4:** 10 to 19 Pax
  - **Introduces Highspeed/Lowspeed**
    - **Low Speed:** $V_{MO} \leq 250$ KCAS (M0.6)
    - **High Speed:** $V_{MO} > 250$ KCAS (M0.6)
CS-23 / PART-23 PROGRESS

- Final ARC Report
- Draft Standards - Rev.0 Standards - Rev.1 Standards
- NPRM - Final Rule
- RMT.0498
- A-NPA
- NPA - Decision

EPIC: GOALS & CURRENT INITIATIVES

• Advocacy & Coordination for
  • Hybrid/Electric Propulsion Design & Operations
  • Simplified Vehicle Design & Operations
• Common Metrics for Hybrid/Electric Operations
• Simplified Vehicle Ad-Hoc Committee
• Hybrid/Electric Vehicle Energy Reserve Criteria
EXAMPLE: DRAFT VTOL MISSION METRIC

* Includes preflight checks, liftoff, transition/climb, cruise, transition/descent, land, balk liftoff, transition/climb, translate, land, normal shutdown & specified reserve.
GAMA PUBLICATION NO. 16
HYBRID & ELECTRIC PROPULSION PERFORMANCE MEASUREMENT

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INTEGRATE DON’T SEGREGATE...

Flying the crowded skies
Amazon proposes slicing U.S. airspace into different categories of unmanned aircraft

500 feet: No fly zone

400 feet: High-speed transit

200 feet: Localized traffic

Source: Amazon
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