

*Issues & Opportunities
for the Future:
Small Airplane Issues*



FAA Air Transportation
Centers of Excellence

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Small Airplane Issues



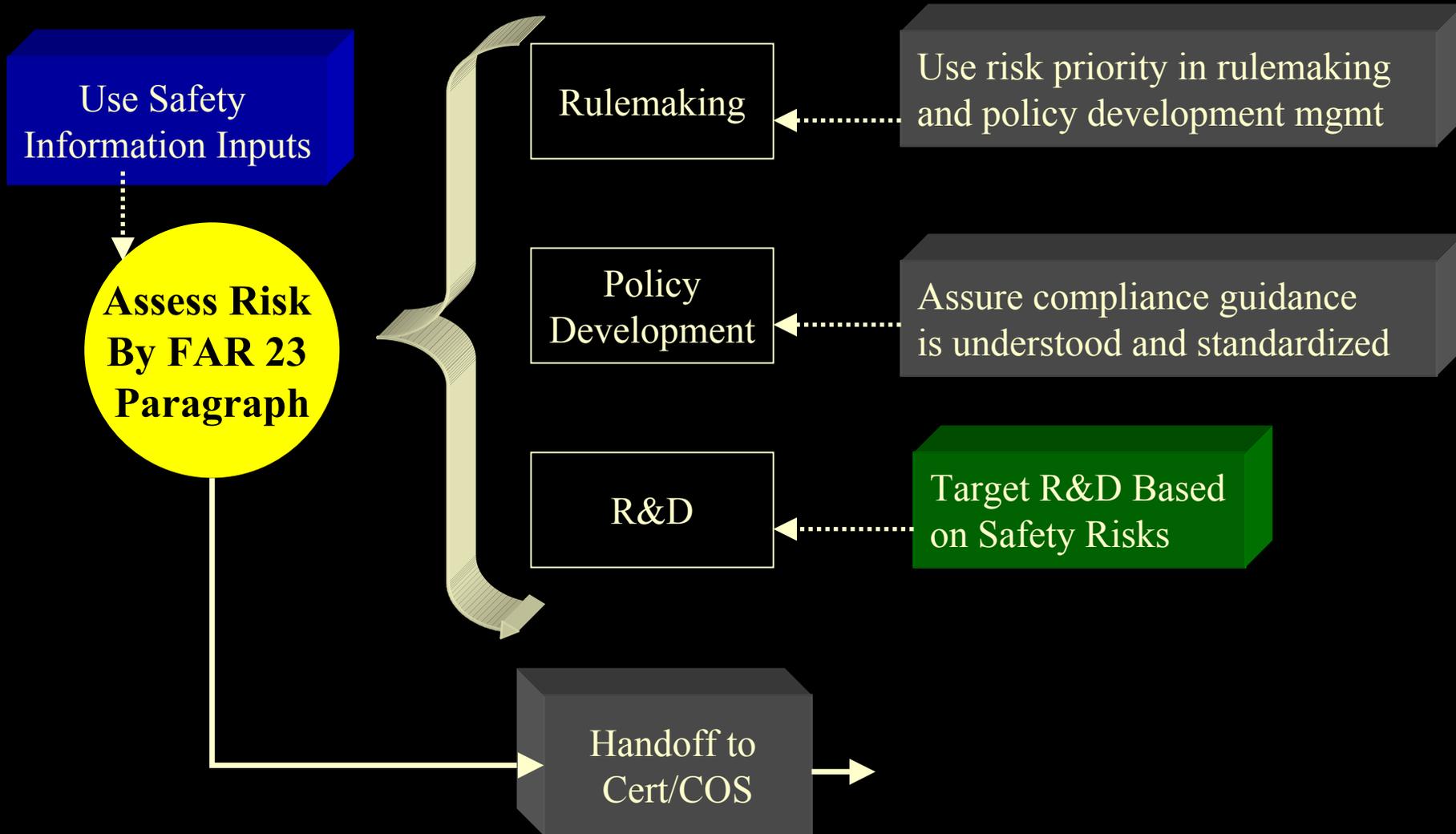
1. Aging Small Airplane Fleet
2. New or Maturing Technologies
3. Better Understanding of Accident Causes and Interventions

Safety Considerations for Small Airplanes



- FAA Flight Plan
- Need Low Cost Solutions
 - Streamline Certification
- Target Existing Fleet
- **Safety Management**
 - Risk Assessment for FAR 23
By Individual Paragraphs

Safety Management - Standards



CFR Risk Prioritization

By FAR Part

Paragraphs in FAR 23

RISK ASSESSMENT MATRIX					
	Severity of Non-Compliance				
Probability of Non-Compliance	Catastrophic	Severe	Serious	Minor	Administrative
Frequent	High	Serious	Medium	Low	
Probable					
Occasional					
Remote					
Improbable					

“Target R&D Based on Safety Risk”

Aging Small Airplane Fleet Challenges



- Numerous Potential Failure Locations
- Sensitivity to Differences in Usage
- Existing Fleet with Non-Damage Tolerant Designs
- Exponential Onset of Fatigue Problems
- **R&D:**
 - Data & Methods for Structural Life Evaluations
 - Destructive Evaluations of High-Time Small Airplanes
 - Low Cost Analysis Tools

New or Maturing Technologies



- Composites
 - Benefits Across all Product Lines
 - R&D: Damage Tolerance, Adhesive Joints, Environmental Effects, Bonded Repairs, Specifications for Material Control and Test Standards, Composite Materials & Processes
- Avionics Technologies
 - Essential Cockpit Display Functions
 - R&D: Design and Certification of PFD's

Better Understanding of Accident Causes and Interventions

- GADIT
- Human Factors Analysis and Classification System (HFACS)
 - Shappell and Wiegmann
 - R&D, next steps:
 - Refine Analysis
 - Map Intervention Strategies
 - Objective, Data-Driven Evaluation of Intervention Programs

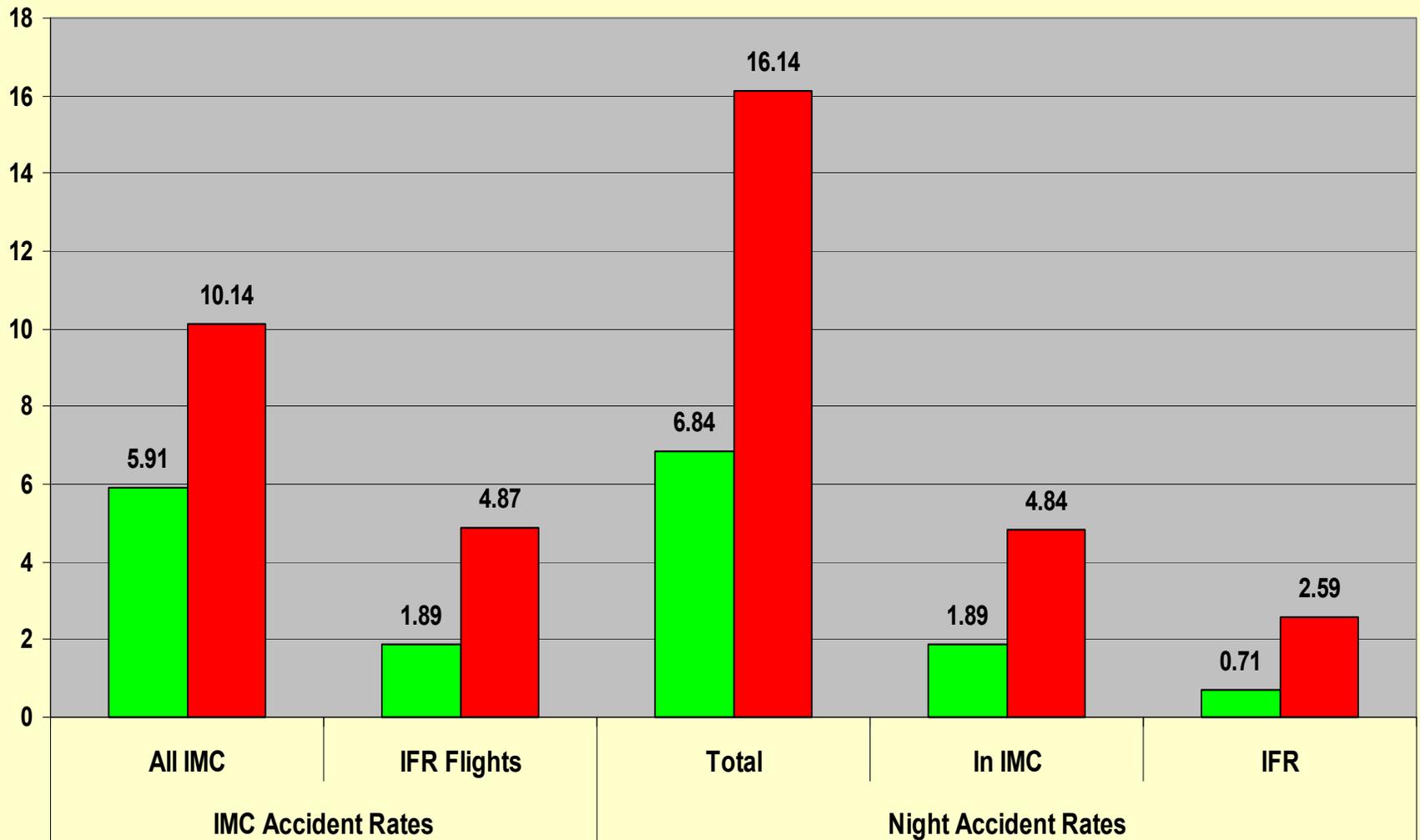
Effectiveness of Safety Interventions



- Safety and Financial Benefits
- Methods to Assess Effectiveness of:
 - Training
 - Safety Enhancing Technologies
- Consider Equipage:
 - Mooney M20
 - CAPSTONE

Accidents per 100,000 Hours

Ref: AOPA Air Safety Foundation, Safety Review, Mooney M20 Series



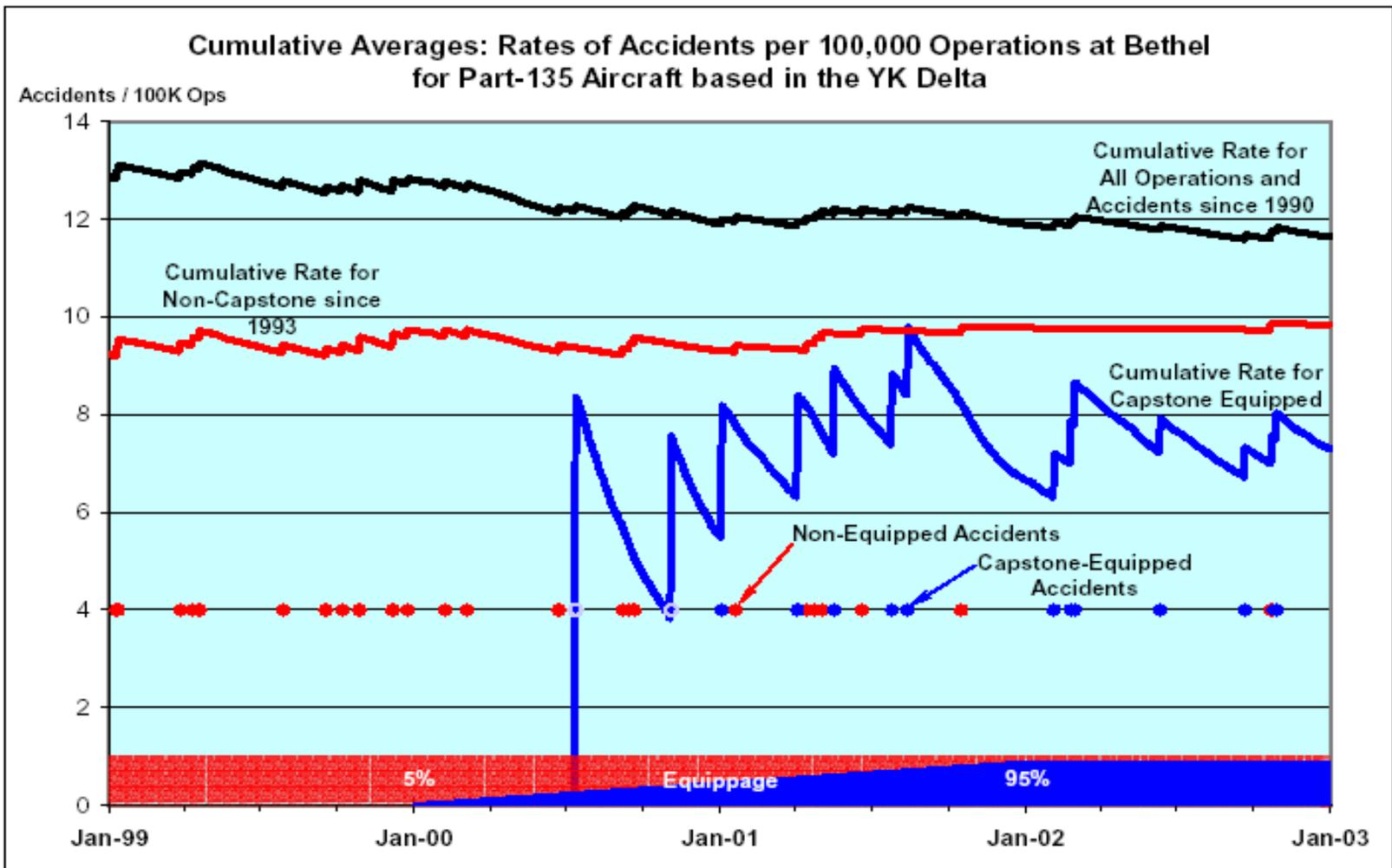


Figure 9 Relative accident rates for YK delta part-135 aircraft without and with Capstone avionics

From “Safety Impact of CAPSTONE Phase I Quick-Look Assessment: 2002”,
W. Worth Kirkman, MITRE, Aug 2003

Small Airplane Issues Summary



- Target Regulation, Policy, and R&D Based on Safety Risk
 - Consider FAR 23 Risk Matrix
 - Low Cost Solutions - Target Existing Fleet
 - Be Proactive on Aging Small Airplane Issues
 - New/Maturing Technologies
 - Better Understanding of Accident Causes and Interventions