Federal Aviation Administration

# FAA / CAAs “Composite Meeting”

## Forward Looking: FAA AVS Composite Plan

### - Composite Safety & Certification Initiatives -

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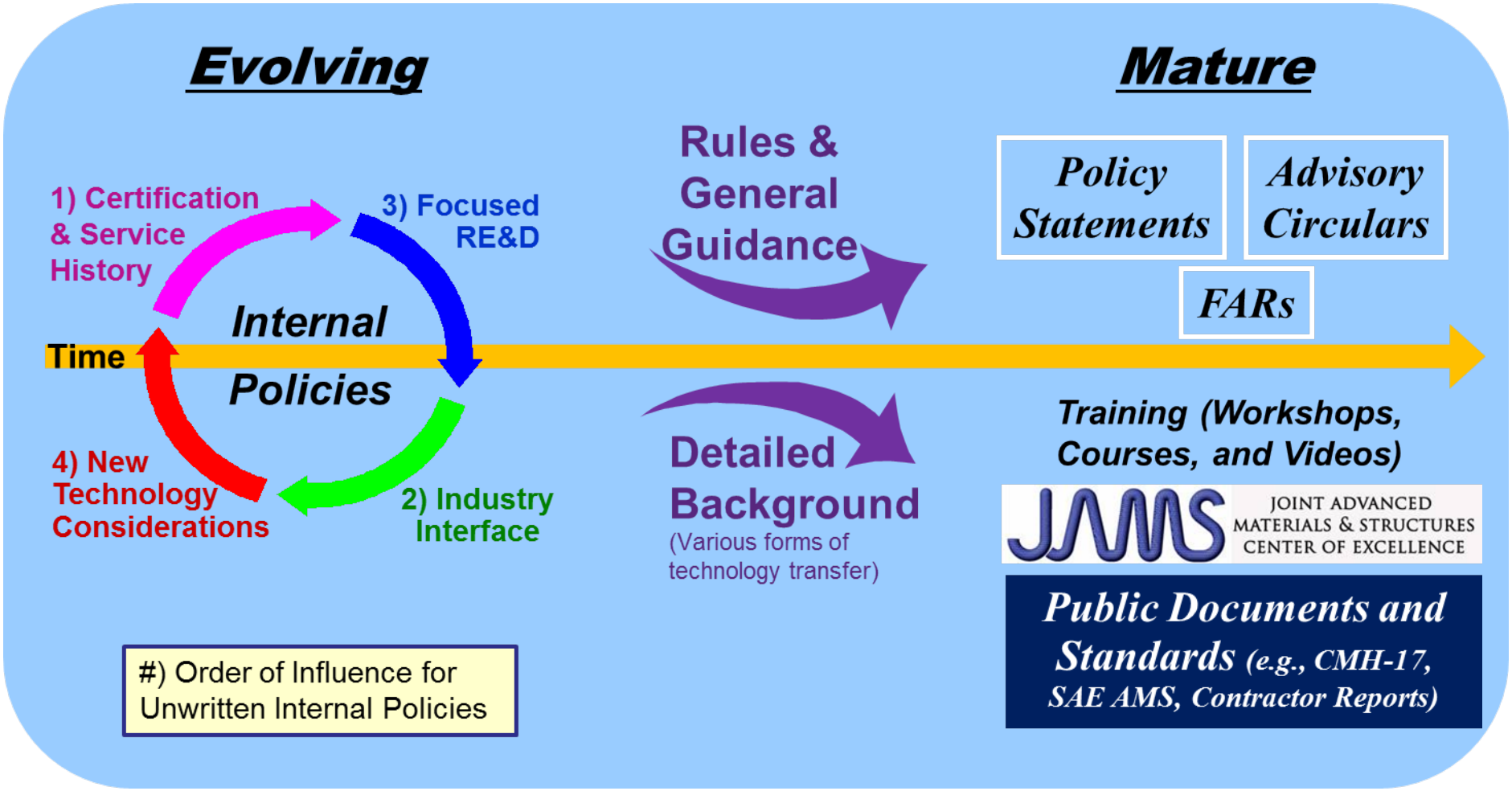
# Composite Safety & Certification Initiatives
# - AVS Composite Plan -

## Objectives

1) Work with industry, other govt. agencies and academia to ensure safe and efficient deployment of composite technologies used in existing & future aircraft
2) Update policies, advisory circulars, training, and detailed background used to support standardized composite industry practices

# FAA Approach to Composite Safety & Certification Initiatives



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# Overview

- **The purpose of the AVS Composite plan is to ensure safe and efficient use of composite materials in aircraft products**
  - This plan allows the FAA to retain proactive leadership of international safety and certification initiatives for composite airplane structures
- **FAA created an AVS Strategic Composite Plan (August 2013) that identifies three focus areas**
  - Continued Operational Safety (COS)
  - Certification Efficiency (CE)
  - Workforce Education (WE)

# Overview

- **Updated annually**
  - Focus is structural engineering issues, as well as related manufacturing procedures and maintenance practices as a result of service experience and industry input
  - Priority is assigned to tasks based on issues that pose the greatest safety threats
- **Complemented by a Working Plan**
  - Depends on industry deliverables (e.g. CMH-17 and SAE publications) that are then referenced by FAA documentation
  - Includes FAA research

# Overview

- **Composite Plan required because:**
  - Composite technology is not standardized and is often proprietary. Lack of standardization creates certification challenges in regulatory compliance for each application.
  - The primary goal is to standardize composite guidance such that regulatory expectations are evident to the industry.
  - Educational initiatives will ensure the FAA workforce has a common understanding of the safety risks associated with composites throughout the lifecycle of the aircraft.

# Overview

- **Composite Plan implemented by the FAA Composite Team**
  - Comprised of the Advanced Composite Material Chief Scientific and Technical Advisor (CSTA), Senior Technical Specialists (STS), and other AVS technical specialists

# Overview

| Continuous Operational Safety (COS) | Certification Efficiency (CE) | Workforce Education (WE) |
|---|---|---|
| *COS A:* Bonded Structure | *CE A:* Hybrid F&DT Substantiation | *WE A:* Composite Manufacturing Technology |
| *COS B:* HEWABI (High-Energy, Wide-Area Blunt Impact) | *CE B:* Advanced Composite Maintenance | *WE B:* Composite Structures Technology |
| *COS C:* Failure Analysis of Composites Subjected to Fire | *CE C:* Composite Structural Modifications | *WE C:* Composite Maintenance Technology |
| | *CE D:* Composite Quality Assurance | |
| | *CE E:* Bonded Structure Guidance | |
| | *CE F:* General Composite Structure Guidance | |

# COS Initiatives

- **Continued operational safety (COS) depends upon the use of approved designs, materials, and methods. Use of alternatives requires additional qualification data and further proof of structural substantiation.**
- **Three COS items identified as posing the greatest safety risk**

# COS Initiatives

- **Three COS items in the Composite Plan:**
  - A. Bonded Structure
    - Bonded repairs
    - Bond quality control
    - Sandwich disbond growth
  - B. HEWABI (high-energy, wide-area, blunt impacts)
  - C. Failure analysis of composites subject to fire

# Certification Efficiency Initiatives

- **Certification Efficiency (CE) initiatives capture best industry practices via regulatory guidance and industry standards documents.**
- **Goal is to standardize methods to certify composite structures and repairs which will address the current industry practice of using proprietary databases and advanced procedures.**

# Certification Efficiency Initiatives

- **Six CE initiatives**
  A. Hybrid Metallic/Composite Structure Fatigue and Damage Tolerance Substantiation
  B. Advanced Composite Maintenance
  C. Composite Structural Modification
  D. Composite Quality Control
  E. Bonded Structure Guidance
  F. General Composite Structures Guidance
- **Additional standardization activities in the area of transport crashworthiness, fuel tank lightning protection, and composite flammability**
  – These FAA initiatives have some components specific to composites

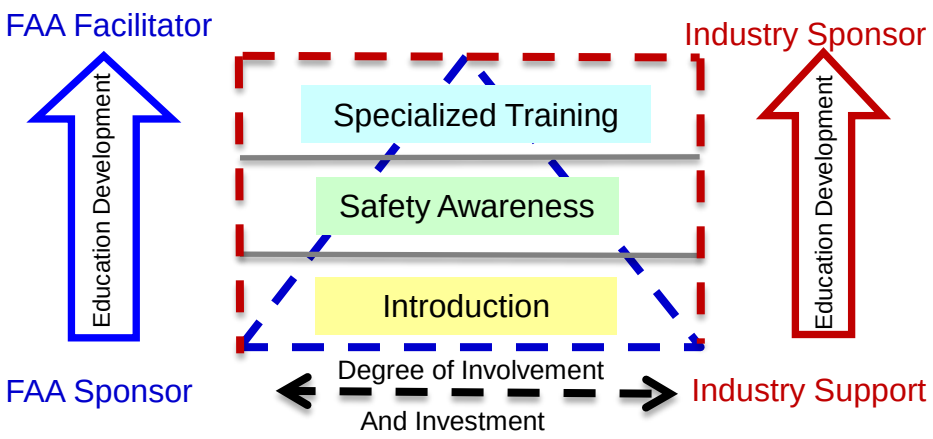
# Workforce Education Initiatives

- **An essential component for COS and CE is a comprehensive educational development program**
- **Successful composite safety and certification oversight is dependent upon our workforce being knowledgeable of both basic and advanced composite technologies and terminologies**
- **FAA will also continue to reach out to foreign authorities and industry by making WE courses available internationally**

# Workforce Education Initiatives

**FAA composite training strategy using existing courses, FAA Centers of Excellence & industry support**

Courses to support airframe engineering, manufacturing and maintenance functional disciplines




**Incl. three levels of competency:**

- **Introduction** (“Composites 101”)
- **Safety Awareness** (courses for each functional discipline)
  - Skills needed for FAA workforce supporting composite applications
- **Specific Skills Building** (most courses developed by the industry)
  - Specialized skills needed in the industry and some FAA experts

# Workforce Education Initiatives

- **Maintenance Safety Awareness (CMT) [International Standard: CACRC AIR5719]**
  - AFS-500 classroom version available to FAA since 2009
  - Online version available to the industry through Wichita State University (WSU)
- **Structural Engineering Safety Awareness (CSET)**
  - Online course with optional 2 day lab, totaling 80 hours of study
  - First course offered April 2013
  - Available to the industry through WSU
- **Manufacturing Safety Awareness (CMfgT)**
  - Online course with 2 day lab, totaling approximately 60 hours of study
  - First public course offering FY15

# Workforce Education Initiatives

- **Three initiatives – developed by the FAA but available to industry as well**
  A. Composite Manufacturing Technology
  B. Composite Structures Technology
  C. Composite Maintenance Technology
- **Additional activities supporting "composites 101" training and Composite DER designations**

# Summary

- **The FAA is proactively identifying and attempting to mitigate risks associated with the use of composite materials in aviation products**
- **Outcomes contained in the Plan include rulemaking, policy, and guidance to:**
  - ensure continued operational safety,
  - promote certification efficiency, and
  - provide workforce education

# Summary

- **The FAA Composite Team will continue to support composite industry by collaborating with FAA offices, research institutions, and international standards organizations to certify new aircraft, engines, and components; however, our primary objective is to support the continued airworthiness of products currently in use.**
- **We encourage the support of international CAA for harmonization purposes**
- **Further details in a Working Plan**

# Composite Safety & Certification Meeting
## Forward Looking: FAA AVS Composite Plan

- **Thanks for Opportunity.**
- **Questions and/or Thoughts?**
- **Further Discussion.**