Federal Aviation Administration

FAA NDE R and D

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By:    Alfred L. Broz

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Research Charter

• **Title 49 USC requires FAA to:**
  – Develop, modify, test, and evaluate systems, procedures, facilities, and devices to meet the needs of safe and efficient aviation.
  – Set minimum safety standards and means of compliance for rules governing design, maintenance, and operations.

• **FAA research mission was expanded by the Aviation Safety Research Act of 1988.**
FAA Inspection Research Program History

- Initiated in 1989 in response to Aloha Airlines Flight 243
- Part of the National Aging Aircraft Research Program
- Managed by the FAA’s Technical Center, Atlantic City, NJ
- Inspection activates occurred at 2 major research centers:
  - Center for Aviation Systems Reliability, Iowa State University with Wayne State and Northwestern University
    - Charged with developing improved inspection methods
    - Developing simulation and modeling tools
    - Inspection training materials
  - Airworthiness Assurance NDI Validation Center, Sandia National Labs
    - Charged with validation of new technologies & reliability studies
    - Establishing a realistic maintenance test environment
    - Full scale test specimen library
    - Facilitating tech transfer of improved equipment, procedures, & practices
FAA Research Process

- Sponsor-generated research requirements
- Internal sponsors from the FAA’s Office of Aviation Safety (AVS) Comprising the Aircraft Certification Service and Flight Standards Service identify and define research requirements
- Sponsors work in teams called TCRGs organized by technical discipline. TCRG = Technical Community Representatives Group
- All research requirements are ranked and prioritized by AVS (POC: Robert Pappas)
- Funds distributed by priority until gone.
- Typically, a 3-year process: A requirement approved in FYXX will receive funding in FYXX+3
- Process allows for “Pop-up” requirements to be funded quicker
Applicable TCRGs

- Maintenance & Inspection (M&I) TCRG
- Structural Integrity of Metallics (SIM) TCRG
Aging Aircraft to Continued Airworthiness

• Historically, Inspection Issues Focused on Aluminum Structures
  – Detection of cracks & WFD from fastener holes in multiple layers
  – Disbonding of tear straps and bonded doublers
  – Lap joint corrosion

• Recent Shift Toward Inspection for Continued Airworthiness of Advanced Materials and Processes
  – Research to consider:
    • Large Area, Rapid Inspection of Composites for Impacts
    • Ability to Characterize Composite Damage and Repairs
    • Detection and Characterization of Environmental Damage
    • Ability to Characterize Adhesive Bond Conditions
    • Ensure integrity of new manufacturing methods
    • Remote and Embedded Sensors for Structural Monitoring
Industry and Inter-Agency Coordination

- Aging Aircraft Nondestructive Inspection Working Group (AANWG)
- ATA NDT Network
- National Science and Technology Council (NSTC) Nondestructive Evaluation (NDE) Communication Group
- Joint Council on Aging Aircraft (JCAA)
- SAE Commercial Aircraft Composite Repair Committee (CACRC)
- Annual Joint FAA/NASA/DOD Conference on Aging Aircraft (now known as the Airworthiness Assurance and Sustainment Conference)
Inspection Research Management

Dave Galella, AJP-6361
COTR, Inspection Systems Research
William J. Hughes Technical Center
Atlantic City Int’l Airport, NJ 08731
david.galella@faa.gov
Phone: 609 485 5784
Fax: 609 485 4569

Paul Swindell, AJP-6361
COTR, Inspection Systems Research
William J. Hughes Technical Center
Atlantic City Int’l Airport, NJ 08731
paul.swindell@faa.gov
Phone: 609 485 8973
Fax: 609 485 4569

Rusty Jones, AFS-320
Chair, Maintenance & Inspection TCRG
Special Programs Branch
FAA National Headquarters
950 L'Enfant Plaza North, S.W.
Washington, DC 20024
rusty.jones@faa.gov
Phone: 202 385 6399

Alfred Broz, ANE 105N
CSTA for NDE
FAA New England Regional Office
12 New England Executive Park
Burlington, MA 01803
Alfred.L.Broz@faa.gov
Phone: 781 238 7105
Questions?