Sandia National Laboratories

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FAA Airworthiness Assurance NDI Validation Center

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- Following Aloha accident in 1988, FAA initiated the Aging Aircraft Program
- In 1990, Sandia was tasked to open the Center and operate for the FAA
- Operate under an Interagency Agreement that covers virtually all aspects of *continued airworthiness assurance*
- Expertise: Metallic structures, advanced non-destructive inspection (NDI), advanced materials (composites) both as stand-alone and to repair metals, formal process development and validation, aircraft ops and maintenance
- Immediate access to the entire Sandia technology base
- Develop, evaluate, validate, & bring new technologies to market
- Formal test & validation process accepted by FAA for rule-making and fully supported by international aviation community
- Nearly 100% work-for-others (not DOE-funded)
- Partner with industry, academia, and government, foreign and domestic
- Support all US Armed Forces, Coast Guard, Forrest Service, major airlines, major manufacturers, and others

Advanced Non-Destructive Inspection (NDI) Techniques Can Monitor System Health and Find System Flaws Early

- Deploy them
  - Hand-held
  - Automated
  - Robotically
  - In-situ: the future of NDI, first approved use for transport aircraft approved by Boeing in March 2007 following AANC test/validation
- Properly implemented, these techniques have a proven record of creating knowledge to allow safely operating critical systems
  - Sandia has extensive experience developing and implementing for civil and military aircraft
  - Moving those technologies to other critical infrastructure
- Create knowledge of system condition to allow Predictive Health Monitoring models to be optimally useful
- Opportunity to increase operational availability and lower logistics support costs – lower life-cycle cost if system properly designed and implemented

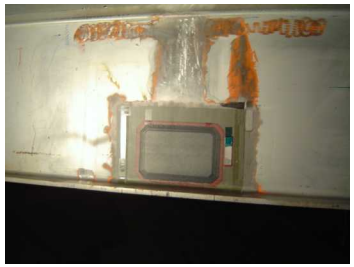
Advanced Materials (Composites) As Stand-Alone and to Repair Metal Structures

- Sandia pioneered composite doubler repairs for transport aircraft; installed the first after getting FAA approval

L-1011 Composite Doubler

- Sandia has extensive experience in material strength of composites and repairs

- We've migrated composite technologies to mining, highway bridges; investigating pipelines, reactors. Ships next?



NNSA National Nuclear Security Administration

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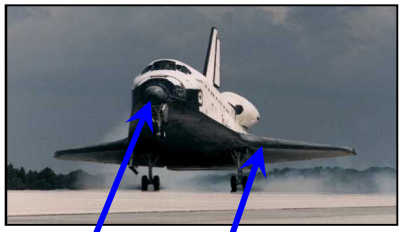
Sandia-AANC Processes and Procedures Accepted by FAA and Industry

- Sandia's formal, approved test and validation procedures support FAA rule-making
  - Address technical, operational, and human factors considerations, in the lab and in the field
  - Industry strongly supports and accepts, e.g. Boeing, Airbus
- Sandia develops some technologies and also tests and provides reports on others' technologies
- Sandia has no profit motive in any particular technology or process; industry accepts us as an *honest broker*
- Examples:



Wing Leading Edge & Nose Cap RCC Panels

Sandia developed only non-NASA NDI technique for inspecting critical reinforced carbon-carbon orbiter leading edges. Used for all mission-ready certifications

Sandia developed & validated processes and procedures that reduced critical inspection time from 800 to 80 hours with higher probability of detection

National Nuclear Security Administration

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Sandia Airworthiness Assurance Center: Record of Innovation and Versatility

- Center was founded at Sandia because of our legacy of world-class material science, Sandia's system-approach to high-consequence systems, and our ability to function as an accepted honest broker
- 17 years of leadership in Continued Airworthiness Assurance
- Forward-looking: leader in composites and metals
- Migrated to composite repairs for metal aircraft and massive infrastructure systems
- Ready to support NAVAIR systems, airborne and seaborne
- As part of a Sandia system-focused team