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NextGen: Possible Sandia National Laboratories Support

Discussion with Mr John Hickey
Director, Aircraft Certification Service (AIR-1)

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FAA-Airworthiness Assurance Center

Sandia is a multiprogram laboratory operated by Sandia Corporation, a Lockheed Martin Company, for the United States Department of Energy's National Nuclear Security Administration under contract DE-AC04-94AL85000.

Sandia National Laboratories 101

- Sandia is a DOE national security lab
- Roots in nuclear weapons
- Focus is science-based systems engineering and fielded systems support, not just science
- Regularly supports US gov't need for high-consequence issues (USS Iowa, post-Columbia return to flight, several projects supporting FAA)
- FFRDC rules/regulations apply
- No profit motive for any staff in advancing any technology or solution has earned Sandia a reputation as an honest broker

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Sandia – FAA Airworthiness Assurance NDI Validation Center (AANC)

- Initiated in 1988 under the Aviation Safety Act
- Provides a mechanism to develop, evaluate, and bring new aircraft technologies to market
- Partnerships with industry, academia, and government

AANC Objectives

- Enhance aircraft safety and reliability
- Aid developing advanced aircraft designs & maintenance techniques
- Provide our customers with comprehensive, independent, quantitative and qualitative evaluations of new and enhanced inspection, maintenance, and repair techniques
- Facilitate transferring effective technologies into the aviation industry
- Support FAA rulemaking process by providing guidance on content & necessary tools to meet requirements or recommendations of FARs, ADs, ACs, SBs, SSIDs, CPCP, and WFD
- Coordinate with and respond to Airworthiness Assurance Working Group (AAWG) in support of FAA Aviation Rulemaking Advisory Committee (ARAC)

Past Sandia Involvement with FAA (Other than the AANC)

Air Transportation Oversight System

- Asked by Secretary Peña to assist AFS with what was believed to be a data issue after ValuJet and Fine Air
- Sandia formed and co-led the Surveillance Improvement Process team; developed the Improved Surveillance Process (ISP), a system-safety-based approach to scheduled carrier oversight. Issue was more than a data problem
- ISP became ATOS – fundamental change in philosophy from compliance-focus to system-based oversight
- Sandia participated on the ATOS implementation working group and supported ATOS development with both operations- and R&D-funded projects
- ATOS participation included involvement with CSET, CMOs, carriers, and the new data system development

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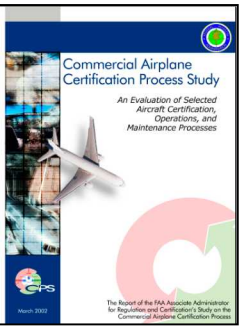
Past Sandia Involvement with FAA (Other than the AANC)

Commercial Airplane Certification Process Study

- Supported the Propulsion Directorate in Seattle
- Team consisted of AANC, FAA, OEMs, airlines, pilot organizations, DoD, and NASA
- Evaluated safety-critical processes associated with commercial airplane certification, maintenance, and operations
- Produced process improvements to enhance air transportation safety
- Final report submitted to FAA Administrator, praised by airline industry critics and government officials as being “hard-hitting” and “unprecedented in government.”
- Supports 14 CFR Advisory Material



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Past Sandia Involvement with FAA (Other than the AANC)

- **Safety Performance Assessment System (SPAS) independent verification and validation**
  - Requested to help Flight Standards understand SPAS capabilities and limitations
  - Issues with getting full access to source code eventually led to disengagement

Sandia Core Expertise: Vulnerability Analysis and Risk Assessment

- **Developed for nuclear weapons, applied regularly to high-value, high-consequence national assets**
  - Weapons themselves and storage/transportation
  - Mints, prisons, schools, infrastructure (water, transportation/electrical systems), …
  - FAA ARTCC
  - Deal with risk & vulnerability in a largely quantitative manner
- **National Infrastructure Surety Center (NISAC), developed/operated by Sandia for DHS**
  - National asset for pressing national issues. Unique tools to address risks to and vulnerabilities of critical national infrastructure systems
  - Compliments other Sandia risk and vulnerability assessment capabilities
- **Combining VA and RA at the system level early allows identifying and implementing cost-effective system improvements**

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Thoughts on NextGen

- **Extremely high-consequence system, directly impacting national security (physical & economic)**
- **Complexity -- system of systems on an almost unprecedented large scale**
  - Air traffic, world-wide maintenance, training, communications, multi-agency interfaces, labor issues…
  - Rapidly advancing technology: information and aircraft
  - Multiple key players and stakeholders, some with conflicting issues (e.g. safety vs security)
  - Defining, then reaching an optimum solution is essential
- **System engineering explicitly considering risk and vulnerability to will be essential to success**

Can Sandia Help the FAA?

- We have before
- Neither of us is a stranger to the other
- Together, we bring world-class expertise and long experience in
  - System engineering
  - Risk and vulnerability analysis, and
  - Aviation regulation/oversight

  to the table

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