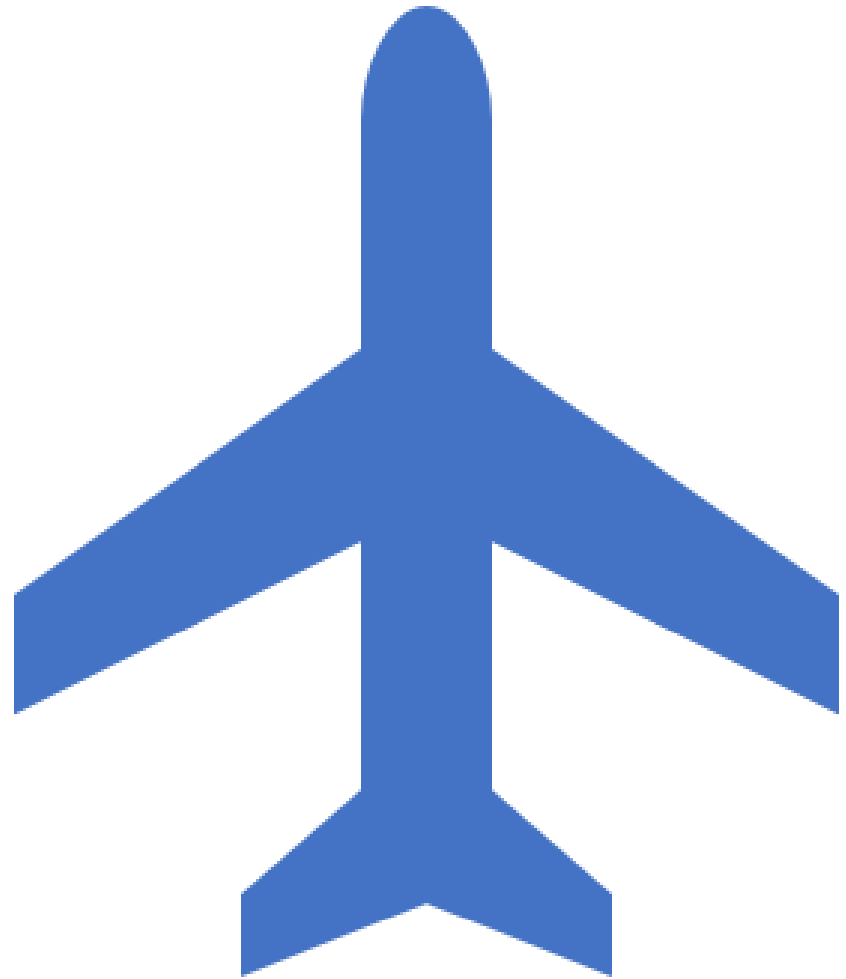


Research, Engineering and
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Committee

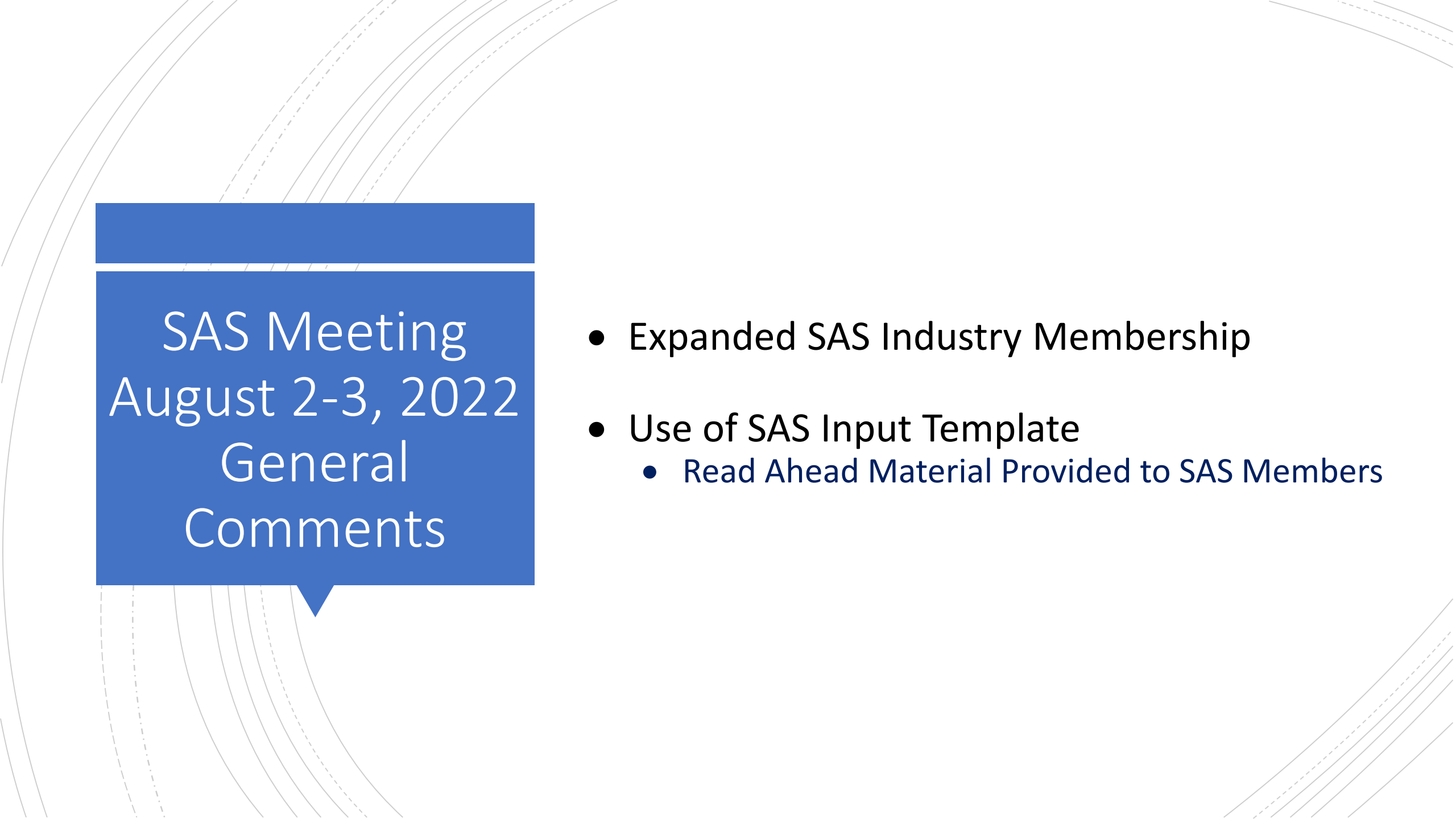
Subcommittee Report - Aircraft Safety (SAS)

Terry McVenes, SAS Chair
October 5, 2022



SAS Meeting August 2-3, 2022 Agenda

- Virtual w/In-Person at RTCA HQ
- FAA Budget Update – Beth Delarosby
- Review of FAA Responses to Spring 2022 F&Rs
- Follow-Up from Spring SAS Meeting
 - Address SAS comments on FY2023 portfolio
 - FY2024 BLI plans discussion
- FY2022 Research Output – Presentations
 - Advanced Damage Tolerance and Risk Assessment Methods for Engine Life-Limited Parts
 - Improved Non-Destructive Evaluation (NDE) to Prevent Uncontained Engine Failures
 - Additive Manufacturing – Related to Future NDE
 - UAS Automation and Intelligent Systems
 - UAS Cyber Security and Safety
 - Complex Digital Systems
 - Adapting a NAS-Wide, Top-Down Safety Risk Model to Accommodate Bottom-Up Safety Assessments

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SAS Meeting August 2-3, 2022 General Comments

- Expanded SAS Industry Membership
- Use of SAS Input Template
 - Read Ahead Material Provided to SAS Members

Finding #1 – UAS Cybersecurity Oversight and Risk Management

- Clarity needed – Oversight & Risk Management Process vs. Risk Assessment Process
- Implied intent to research “risk assessment” process application to UAS
- Examples of oversight/risk Management Process
 - Safety Management Systems (SMS)
 - Information Security Management System (ISMS)
- Clarification is needed if the intent is to address operational risk assessment considerations applicable to UAS – as defined in JARUS SORA

Recommendation # 1

The SAS recommends FAA state the clear research intent of A11L.UAS.95.A58 as to the objective being the development of an “oversight & risk management” process, a “risk assessment” process, or something else.

Finding #2 – Cyber Safety Risk Assessments

- Briefing on A11L.UAS.95.A58
 - Only non-aviation cyber sources were referenced
- No recognition of previous efforts to address cyber safety risk assessments across the global aviation community
 - RTCA DO-356A/EUROCAE ED-203A – FAA approved cyber safety means of compliance
 - RTCA DO-377A – UAS Command and Control MASPS (AC 20-187 in May 2023 and TSO-C213A in February 2023)
 - FAA Information Security and Privacy Program and Policy (FAA Order 1370.121B)
 - Other FAA research conducted by FAA WJH Tech Center w/ Cyber Safety Commercial Aviation Team

Recommendation # 2

The REDAC SAS recommends that the FAA (1) revise the scope of A11L.UAS.95.A58 to avoid duplication of past research that resulted in the development of the documents identified in the above Finding #2. The subcommittee further recommends that the FAA offices responsible for the documents identified in Finding #2 be advised of any impact to these existing FAA documents resulting from the A11L.UAS.95.A58 research.

Finding #3 – Non-Destructive Evaluation (NDE) for Uncontained Engine Failures

- Potential research gap may exist.
- Significant research is ongoing as it pertains to the nickel and titanium components of the rotor contained in the hot section of the aircraft engine, however, the fan area is a research gap.

Recommendation # 3

The REDAC SAS recommends that the FAA The FAA should expand the research landscape to include that of fam blade integrity for blades that are a novel concept and material(s).

Finding #4 – Innovative Technologies Incorporating Additive Manufacturing of Composite Fan/Rotor Blades

- Innovative technologies exist that may incorporate additive manufacturing and composite fan and/or rotor blades, particularly for eVTOL aircraft.
- Modeling for scatter patterns for these innovative technologies must evolve as technology evolves.
- Locations of rotor blades in proximity to the cabin are varied amount entrants and should be evaluated.

Recommendation # 4

The REDAC SAS recommends that the FAA to include fan and/or rotor blade integrity for blades that are of a novel concept and material(s).

The SAS recommends that the FAA add research into eVTOL aircraft fan blades to A11B or the appropriate budget line item. As a life limited part based on a novel design, research should be directed toward fan blade structural integrity for new potential designs and material.

Potential materials should be examined for strength, integrity as well as detailed modeling of failure modes and dispersion. Current regulations include blade out testing. However, research should be directed as to failure modes and scatter patterns for a blade failure to protect the aircraft.

Finding #5 – FAA Response to SAS Recommendation for AI/ML Roadmap

- SAS views AI/ML as a different portfolio of technologies than autonomy technologies. While AI/ML technologies can be used for autonomous operations, it is also possible to use more traditional technologies such as deterministic systems for autonomous operations.
- AI/ML can be used for applications other than autonomy, such as providing advisory information to a flight crew, which is unrelated to autonomous operation of the air vehicle. Industry is reluctant to introduce AI/ML technologies into new products due to the current certification uncertainties.
- The subcommittee re-emphasizes the importance of developing this roadmap with enough details to ensure it adequately informs industry on the sequence in which the FAA plans to release regulatory guidance on methods and procedures to (1) certify systems of various safety criticalities, (2) certify AI/ML based on various types and sources of AI/ML training and testing data, and (3) procedures for updating AI/ML models in previously certified systems based on updated training and test data sets.
- Other regulators have issued such a roadmap. However, they have been vague, ambiguous, and not useful to the industry in supporting their business models.

Recommendation #5

Given the speed at which demands for AI/ML technologies are being developed, the REDAC SAS reiterates its previous recommendation for the FAA to expeditiously prepare and published a detailed phased roadmap for AI/ML research and development required to formulate AI/ML regulatory guidance, taking into account the FAA safety continuum and use case to accelerate deployment for lower risk aviation applications.

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SAS Meeting August 2-3, 2022 Final Comments

- Expanded SAS Industry Membership is Yielding Results
 - Broader technical expertise
 - Enhanced quality of our F&Rs
 - Additional members forthcoming
- Input Template
 - Positively received by the SAS

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SAS Meeting

Next Meeting:

February 28-March 1, 2023

RTCA Headquarters

Questions?