

FEDERAL AVIATION ADMINISTRATION
Research, Engineering and Development Advisory Committee
Subcommittee on Aircraft Safety (SAS)
2023 Summer Meeting Minutes
August 8-9, 2023

The 2023 Summer Research, Engineering and Development Advisory Committee (REDAC) Subcommittee on Aircraft Safety (SAS) meeting was held at the FAA William J Hughes Technical Center on August 8-9, 2023. Attendee sign-in sheets are attached in Appendix I and the meeting agenda is attached in Appendix II. This document summarizes discussions and activities occurring during the meeting. The meeting resulted in three findings and three recommendations (F&Rs), which have been included as part of the official REDAC Chair's submission to the FAA. All presentation materials are available and can be downloaded through the FAA's REDAC website at <http://www.faa.gov/go/redac>.

Day 1 – August 8, 2022

Introduction/Opening

The SAS Designated Federal Official (DFO) Mike Paglione, FAA William J. Hughes Technical Center Deputy Director Eric Neiderman, and Subcommittee Chair Terry McVenes of RTCA, Inc jointly kicked off the meeting with brief opening remarks. Paglione described the purpose of the meeting, as well as an overview of the 2-day meeting agenda. Dr. Neiderman provided opening remarks, including an update on the FAA's reauthorization, the Advanced Air Mobility (AAM) conference held in Baltimore, R&D Landscapes, and the Strategic Research Outlook effort. SAS Chair McVenes provided his opening remarks, including directions on formulating Findings and Recommendations.

FAA Budget Update

Tom Kelly of the R, E&D Budget Formulation Branch, presented the President's FY24 budget request for FAA's R,E&D. The House Appropriations Mark is at \$196.050 Million, a reduction of \$64.080 Million. In summary, Environment and Energy as well as NextGen Environmental Research BLIs are not funded, two new BLIS – Women in Aviation and Pilot Shortage Study and Aviation Accessibility Research– are added, and both UAS BLI and Workforce grants have been increased. The Senate Appropriations Mark is at \$260 Million, an increase of \$4.9 Million. In summary, Advanced Materials and Structural Safety BLI increased \$12.2M, Aviation Grant Management BLI increased \$18M, and reductions to other BLI's have been applied. Kelly briefed attendees on the House and Senate language.

The established target levels for FY25, FY26, FY27, FY28, and FY29 are \$261M, \$267M, \$273M, \$279M, and \$286M, respectively. The FAA Reauthorization expires on September 30, 2023. A copy of presentation is available at <http://www.faa.gov/go/redac>.

Review of Draft FAA response to SAS F&Rs from the 2023 Spring Meeting

Paglione and Mark Orr of the Office of Aviation Safety (AVS) led the review of the draft FAA response to SAS F&Rs from the 2023 Spring Meeting. The FAA responses were acceptable to the SAS members.

Fatigue Working Group Briefing

Dr. Hannah Baumgartner of FAA's Civil Aerospace Medical Institute (CAMI) presented a summary of **Fatigue Working Group (FWG)** research activities and priorities. The briefing included summary recommendations on Air Traffic Controller (ATC) fatigue management, eVTOL fatigue management, Flight Attendants fatigue management, Maintenance crew fatigue management, Pilots fatigue management – including cargo, general aviation, rotorcraft as well as UAS - and finally potential cross-cutting issues regarding fatigue management. The FWG plans to expand membership to ensure representation of various operations. A copy of the presentation is available at <http://www.faa.gov/go/redac>.

RTCA 242 spectrum group briefing

Ed Hahn of the Air Line Pilots Association, International (ALPA) presented RTCA Special Committee 242 activities on spectrum compatibility. Hahn's presentation covered pilots' perspective on spectrum and inference, radar altimeter, spectrum impact on aviation regarding C-band 5G, inability of airlines to fully manage risk, RTCA SC-242, and the European Organization for Civil Aviation Equipment (EUROCAE) WG-124 approach for spectrum compatibility analysis and deliverables. The goal is to move toward a future where aviation's spectrum requirements are both technically sound and recognized by worldwide spectrum regulators. A copy of the presentation is available at <http://www.faa.gov/go/redac>.

Strategic Research Planning Approach

Bruce DeCleene, Director, Office of Senior Technical Experts, provided an update on AVS management of research, including FAA's role in research, FAA's role in funding research, and developing and maintaining a research strategy for aviation research. A copy of the presentation is available at <http://www.faa.gov/go/redac>.

30-Minute Presentations

Six research topics were selected for 30-minute presentations based on SAS members' feedback and comments on ongoing FY23 research projects. The six research topics were: Existing and Advanced Inspection or Monitoring Technologies, Large Electric Energy Storage Systems, Complex Digital Systems, Urban Air Mobility (UAM) Icing, FAA Human Factors Research related to the Aircraft Certification Safety and Accountability Act (ACSAA), and Validation of Visual Operation Standards for sUAS.

Principal research personnel associated with each project briefed attendees and a Q&A session was held for each topic. Copies of the presentations are available at <http://www.faa.gov/go/redac>.

Day 2 – August 3, 2022

Artificial Intelligence (AI)/Machine Learning (ML) Roadmap update

Dr. Trung Pham, FAA's Chief Scientist and Technical Advisor for Artificial Intelligence (AI) and Machine Learning (ML), briefed attendees on the progress made toward developing a roadmap for certification of AI and ML products. The FAA plans to schedule a meeting with industry representatives to share the roadmap and, in turn, obtain their feedback in a few months. Dr. Pham presented the key concepts of AI

and ML in the context of safety assurance, followed by several research topics including: identify/prevent unexpected behavior of Learned artificial neural network (ANN) Model; Safety assurance using formal/numerical methods; Safety assurance using systems and testing methods; AI for data analytics in risk assessment; AI in runtime assurance AI for system verification; and AI for safety review. A copy of the presentation is available at <http://www.faa.gov/go/redac>.

Review of planned FY24 Research

Ahead of the SAS meeting, the FAA provided read-ahead materials, including the FY24 R&D portfolio at the project level with an executive summary for every project, to the SAS members for review and comments. SAS members returned their comments in writing before Day 1 of the SAS meeting. In this session, Paglione and Orr led the review of the SAS members' comments on the FY24 R&D portfolio. The FAA research teams addressed SAS comments during this session.

This session covered Fire and Safety Research; Propulsion and Fuel Systems (including Aircraft Catastrophic Failure); Advanced Materials/Structural Safety; Continued Airworthiness; Digital System Safety; Aircraft Icing; Alternative Fuels for General Aviation; Flightdeck/Maintenance/System Integration Human Factors; Aeromedical; System Safety Management/Terminal Area Safety; and Unmanned Aircraft Systems.

Wearable Sensors and Aircraft Automation Technology

In the Spring 2023 SAS meeting a Finding and Recommendation (F&R) on wearable sensors was submitted; however, the REDAC Chair had asked the SAS to make a stronger case on the safety aspects of the subject F&R and resubmit it in a future SAS meeting. Dr. John Crowley of the US Army Aeromedical Research Laboratory and Jim Mangie of Delta Air Lines jointly discussed the safety aspects of the wearable sensors and aircraft automation technologies. They suggested a new text for the F&R. A copy of the presentation is available at <http://www.faa.gov/go/redac>.

FY25 Research portfolio (Next Level NAS Oversight)

Bruce DeCleene, Director, Office of Senior Technical Experts, outlined safety oversight challenges due to a rapidly changing aviation ecosystem and provided several research topics to help overcome challenges. DeCleene asked for attendees' comments and feedback. A copy of the presentation is available at <http://www.faa.gov/go/redac>.

Closeout Discussion

Paglione and McVenes led the close-out discussion for the meeting. Attendees decided to hold the Winter/Spring meeting at to-be-determined location on March 12-13, 2024, and the Summer/Fall meeting on to-be-determined location and date.

After the meeting is adjourned, several SAS members participated in a tour of select Technical Center laboratories that support aircraft safety research.

Appendix 1

Attendee Sign-In Sheets (Day 1)

In-Person Attendees		
Walter Desrosier (GAMA)	Elizabeth Zurek (ALPA)	Don Kauffman (Honeywell)
Bob Ireland (A4A)	Dave Polland (Boeing)	Jim Mangie (Delta Airline)
Chris Dyer (Pratt& Whitney)	Terry McVenes (RTCA/SAS Chair)	Hosseini Eghbali
Mike Paglione	Eric Neiderman	Bruce DeCleene
Mark Orr	Jon Schleifer	Jorge Fernandez
Barbara Mollo	Steve Summer	Dave Atwood
Hannah Baumgartner	Kenneth Allendoerfer	Chinita Roundtree-Coleman
Attendees via Zoom		
Isidore Venetos	Victor Quach	Douglas Rodzon
Frank Wondolowski	Carla Hackworth	Todd Lewis
Hank Marek	Ken Alexander FAA	Paul Pellicano
Deborah M Shaibe	Trung Pham	Bob McGuire
Steve Poiani	Jeff Warner	Scott LeMay
Mike Paglione	Thomas Flournoy	Jimmy Bruno
Rany Azzi	Burak	Huasheng Li
Joseph Pellettiere	Edward Weinstein	Thomas Maloney
Kevin Siragusa	Reshma Kumar	Robert Ellis
Sohrob Mottaghi	Michael Bartron	Stephen Cook
Ezgi Oztekin	Dave Stanley	Lynn Pham
Dave Galella	Sabrina Saunders-Hodge	Eddie Austrian
Gaurav Verma	Daniel Cordasco	Paul C Jaramillo
Patrick Kong	Rob Steinle	Jeff Gardlin
Akbar Sultan – NASA SAS Member	Tara Gibson	Vasudeva Kolli
Marlo Allen	John Crowley	William Oehlschlager
Yongzhe Tian	Andrew Tasso	Thomas Kelly
Timothy G Smith	Tong Vu	Andrew Cheng
Dr. Heidi Kim	Tennille Blackwell	Ed Hahn / ALPA SAS Member
Edward Johnson	Colleen Donovan	Vicki Ahlstrom
Edward Johnson	Dan Dellmyer	Matthew Hollomon
Chuck Perala	Warren Underwood	Carleen Houston
Danielle Stephens	Michael Welch	Isidore Venetos
Cynthia Mayer-Gonzales	John Peace	George romanski
Kathy Mauroff	Vidyut Patel	Paul Strande
Kamruz Zaman	Kathy Abbott	Michael Gorelik
Daniel Diessner	Bill Kaliardos	Traci Stadtmueller
Tim Marker	Lisa Thomas	Jolea Russotto
Hannah Baumgartner	Angela Campbell	Walt Sippel
Stafford Duncan	Cliff Johnson	Tara (Holmes) Gibson
Katrina Avers	Mark Hale	Paul E-CTR Swindell
Dr. Heidi Kim	Kathy Abbott	Larry Ilcewicz
Kylie N Key	Greg Bowles SAS Member	Andrea Stevenson
Chris Dumont	Norman Pereira	Steve Cook (Northrop Grumman)
Sabreena Azam	Paul Tan	Joseph Pastore
Richard E Lyon	David Mills	Joshua Lamb
Steven Rehn	Brianna Bach	Ed Sica
Dhaval Dadia	Jolea Russotto	Matthew Karp
Edward Johnson	Dan Diessner SAS Member	Tom Dolan

John Mixon	Surendra Singh	Lauren J. Thomas
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Attendee Sign-In Sheets (Day 2)

In-Person Attendees		
Walter Desrosier (GAMA)	Elizabeth Zurek (ALPA)	Don Kauffman (Honeywell)
Bob Ireland (A4A)	Dave Polland (Boeing)	Jim Mangie (Delta Airline)
Chris Dyer (Pratt& Whitney)	Terry McVenes (RTCA/SAS Chair)	Greg Bowles (Joby Aviation)
Mike Paglione	Eric Neiderman	Bruce DeCleene
Mark Orr	Jon Schleifer	Jorge Fernandez
Barbara Mollo	Steve Summer	Dave Atwood
Hannah Baumgartner	Kenneth Allendoerfer	Chinita Roundtree-Coleman
Hossein Eghbali	Cliff Johnson	Andrew Tasso
Attendees via Zoom		
Hank Marek	Thomas Flournoy	April Horner
Gaurav Verma	Tong Vu	Robert Ellis
Kevin Siragusa	Rany Azzi	Tara Gibson
Frank Wondolowski	Isidore Venetos	Warren Underwood
Reshma Kumar	Chuck Perala	Joshua Lamb
Michael Welch	Kathy Abbott	Marlo Allen
Joseph Pastore	Todd Lewis	Bob McGuire
Timothy G Smith	Yongzhe Tian	Paul C Jaramillo
Douglas Rodzon	Rob Steinle	Jeff Gardlin
Steve Poiani	Dan Dellmyer	Walt Sippel
Jimmy Bruno	Chris Dumont	Sohrob Mottaghi
Danielle Stephens	Victor Quach	Eddie Austrian
Trung Pham	Edward Johnson	Dr. Heidi Kim
Vidyut Patel	Dave Galella	Brianna Bach
Daniel Cordasco	George Romanski	Paul Strande
Mike Vukas	Colleen Donovan	John Crowley SAS Member
John Peace	Vicki Ahlstrom	Chris Dyer SAS Member
Jeff Warner	Huasheng Li	Daniel Diessner SAS Member
Stephen Cook	Angela Campbell	Paul Pellicano
Michael Bartron	Lynn Pham	Matthew Hollomon
Akbar Sultan – NASA SAS Member	Dhaval Dadia	Tim Marker
Mark Hale	Vasudeva Kolli	Carleen Houston
Ezgi Oztekin	Kevin Stonaker	Thomas Maloney
Jonathan M Doyle	Somil Shah	Cynthia Mayer-Gonzales
Patrick Kong	Alan Teyssier	Richard E Lyon
Dave Stanley	Tennille Blackwell	Bill Kaliardos
jolea russotto	Ken Alexander	Edward Weinstein
Joseph Pellettiere	Paul Swindell	Dave Atwood
Douglas A Ingerson	Okoineme Giwa-Agbomeirele	Kamruz Zaman
Kathy Mauroff	Martin Crane	Steven Rehn
Traci Stadtmueller	Deepak Kamath	Matthew Karp
Timoleon Mouzakis	Andrew Cheng	Elisabeth Davis
Tara (Holmes) Gibson	Lisa Thomas	Andrew Tasso
Michael Gorelik	Timothy G Smith	Ashley Awwad
Dr. Heidi Kim	Tom Dolan	Steve Cook (Northrop Grumman) SAS Member
Paul Tan	Deborah M Shaibe	Larry Ilcewicz

Larry McDonald	Kendall Laster	Jennifer Lamont
Tricia Gilbert		

**2023 Summer/Fall REDAC SAS Meeting
Agenda
Aug. 8 – 9, 2023**

Location: William J Hughes Technical Center (WJHTC) located at Atlantic City International Airport (ACY)
WJHTC B-300-4-2 (K35) Director's Conference Room 4S019

Zoom Meeting: <https://faavideo.zoomgov.com/j/1601075675>

Password: 111397

Phone Dial-In: Call 1-888-924-3239; enter Meeting ID: 160 107 5675

Passcode: 111397

Aug. 8, 2023 (Tuesday)

0800 - 0830	Arrival	
0830 - 0840	Opening Remarks/Purpose of the Meeting	Mike Paglione
0840 - 0850	Opening remarks	WJHTC Deputy Director
0850 - 0900	SAS Chair Opening & Report on REDAC Meeting	Terry McVenes
0900 - 0930	FAA Budget Update	Tom Kelly
0930 - 1000	Review of FAA response to SAS F&Rs from Spring 2023 Meeting	Mike Paglione/ Mark Orr
1000 - 1015	Comfort Break	
1015 - 1045	Fatigue Working Group briefing	Katrina Avers
1045 - 1115	RTCA 242 spectrum group briefing	Ed Hahn
1115 - 1200	Strategic Research Planning Approach	Bruce DeCleene
1200 - 1300	Lunch Break	
Requested 30-Minute Presentations		
1300 - 1330	Existing and Advanced Inspection or Monitoring Technologies	Danielle Stephens
1330 - 1400	Large Electric Energy Storage Systems	Tom Maloney
1400 - 1430	Complex Digital Systems	George Romanski
1430 - 1445	Comfort Break	
1445 - 1515	Urban Air Mobility (UAM) Icing	Chris Dumont
1515 - 1545	Improved Integration of Human Factors into Aviation Safety Regulatory Policy and Processes for Aircraft Certification and Flight Standards	Kathy Abbott
1545 - 1615	Validation of Visual Operation Standards for sUAS	Phil Maloney
1615 - 1630	First Day Review – Homework Assignments	Terry McVenes/Mike Paglione
1630	Adjourn	

August 9, 2023 (Wednesday)

0800 - 0830	Arrival	
0830 - 0845	Review Day1: Homework, Feedback, etc.	Terry McVenes/ Mike Paglione/Mark Orr
0845 - 0930	AI/ML Roadmap update	Trung Pham
0930 - 1015	Review of planned FY24 research	Mark Orr/Mike Paglione
1015 - 1030	Comfort Break	
1030 - 1200	Continue review of planned FY24 research	Mark Orr/Mike Paglione
1200 - 1300	Lunch	
1300 - 1330	Wearable Sensors and Aircraft Automation Technology	Dr. Crowley/Jim Mangie
1330 - 1400	FY25 Research portfolio (Next Level NAS Oversight)	Mark Orr/Bruce DeCleene
1400 - 1430	SAS Summer/Fall 2023 F&R discussions and feedback/Closing remarks	Terry McVenes/ Mike Paglione /Mark Orr
1430 - 1445	Comfort Break	
1445 - 1500	Transport from Bld 300 to R&D area	
1500 - 1545	Advanced Materials and POWER Lab includes SML, FASTER, POWER-Fuels, POWER-EPU's	
1545 - 1615	Full Scale Fire Safety lab	
1615 - 1630	Transport from R&D area to Hanger	
1630 - 1700	Vertical Flight Aviation Simulation Technologies (VFAST) laboratory in Hanger Building	
1700	Adjourn back to SOC	