

SAE INTERNATIONAL

**SAE ELECTRIC AIRCRAFT
STEERING GROUP**

**Transformative Vertical Flight Concepts
Workshop**

30th September 2016

**Pascal Thalin
Thales Avionics Electrical Systems
Chair, SAE Electric Aircraft Steering
Group**



AGENDA

- OBJECTIVES
- PROGRESS TO DATE
- STEERING GROUP MEMBERSHIP UPDATE
- COMMITTEE LIAISON MAP
- SCOPING EXERCISE
- STANDARDIZATION LANDSCAPE
- NEXT STEPS

Electric Aircraft Steering Group Objectives

- **Strategically identify, landscape, and coordinate standardization activities to support full-electric and more-electric aircraft applications at the top level system, subsystem, and component levels**
- **Define standardization landscape to support electric aircraft development, certification, and operations**
- **Establish liaison with pertinent technical committees**

Progress to Date

September 2015: Initial meeting at AeroTech

- Validated need for Electric Aircraft Steering Group
- Initial scoping activity

December 2015: First virtual meeting

- Confirmed Chair (Pascal Thalin, Thales) and Vice Chair (Todd Spierling, UTAS)

Progress to Date

May 2016: Face-to-face meeting in Paris

- Initiated Standardization Landscape Exercise

September 2016: Face-to-face meeting in at SAE ASTC

- Completed Scoping Exercise
- Conducted Standardization Landscape Exercise
- Reports from several SAE technical committee chairs

EASG Membership Update

SAE Electric Aircraft Steering Group Roster		
Category	Organization	Name
Civil Transport Aircraft OEM	Airbus, Airbus Group	Severin Drogoul, Michel Todeschi
Civil Transport Aircraft OEM	Boeing	David Paisley
Civil Transport Aircraft OEM	Embraer	Luiz Nerosky
Civil Transport Aircraft OEM	COMAC	Kathy Kang
Military Aircraft OEM	Lockheed Martin	Roger Brewer
Military Aircraft OEM	Dassault/BAE	
General Aviation OEM	GAMA	Greg Bowles
Rotorcraft OEM	Sikorsky	Jonathan Hartman
Engine OEM	Rolls-Royce	Mike Armstrong, Mark Husband
Engine OEM	GE	Neil Garrigan
Power Systems	Honeywell	Wayne Pearson
Power Systems	Thales	Pascal Thalin
Power Systems	Siemens	Heintje Wyczisk
Civil Regulator	EASA	Carlos Munoz, Fernando Menendez
Civil Regulator	FAA	Norm Pereira
Tier 1 Systems Supplier	UTAS	Todd Spierling
Tier 1 Systems Supplier	SAFRAN	Jérôme Mora
Tier 1 Systems Supplier	Liebherr	Frank Kronburger
Civil User (MRO)	Lufthansa Technik	Sven Taubert
Civil User (Operator)	Delta Air Lines	Loren Bolstridge
Airport	Aeroports de Paris	
Military User	US DoD - AFRL	Travis Michelak
Tier 2-3	Meggitt	Mike Boost
Research Institute	NASA	Jim Heidmann
Research Institute	CEA	Florence Fusalba
AE-7 Liaison	Astronics	Jon Fifield
Automotive Liaison		

EASG Committee Liaison Map

EASG Liaisons

Electrical Power & Equipment, AE-7

- Electrical Distribution Systems, AE-8
- Lightning, AE-2
- Electromagnetic Environmental Effects, AE-4
- Aerospace Fuel, Inerting & Lubrication Systems, AE-5A
- Aircraft & Systems Development and Safety Assessment, S-18

Flight Control & Actuation Systems, A-6

Landing Gears, A-5

- Aircraft Instruments, A-4
- Aircraft Environmental Systems, AC-9
- Aircraft Icing Technology, AC-9C
- Aircraft Lighting, A-20
- ARINC AEEC, Airlines Electronic Engineering Committees

Electronic Engine Controls, E-36

- Aerospace Propulsion Systems Health Management, E-32
- Aircraft Systems & Systems Integration, AS-1
- Embedded Computing Systems, AS-2
- Fiber Optics and Applied Photonics, AS-3
- Integrated Vehicle Health Management, HM-1
- Vehicle Maintenance & Aircraft Servicing, AGE-3

Electric Aircraft Steering Group Scoping Exercise

Scope Topics

- **Type of vehicle**
- **Subsystems**
- **Propulsion (Hybrid/electric, More electric)**
- **Compliance**
- **Supporting infrastructure**
- **Degree of electrification**
- **Power generation & distribution**
- **Power Electronics & Modular Open Architectures**
- **Energy Storage**
- **Operations**
- **Maintenance**
- **Safety**
- **Testing, V&V (Systems Engineering)**
- **Power Source**
- **Controls**
- **Partial discharge**
- **Electromagnetic Compatibility (EMI/RFI/Lightning)**

Electric Aircraft Steering Group Standardization Landscape

SAE Electric Aircraft Steering Group - Standardisation Matrix										
Topic	Sub-topic	Element	No	Standard Needed?					Additional Notes	
				Existing	In-Process	Yes			Gap	Comments explaining context
Standard		Committee								
Power Generation & Distribution				SDO Number Title Published	SDO Number Title Target Date					
	General			SAE ARP4754A Guidelines for Development of Civil Aircraft and Systems Dec 2010 SAE ARP4761 Guidelines and Methods for Conducting the Safety Assessment Process on Civil Airborne Systems and Equipment Dec 1996 RTCA DO-178C Software Considerations in Airborne Systems and Equipment Certification Dec 2011 RTCA DO-254 Design Assurance Guidance for Airborne Electronic Hardware Apr 2000	SAE ARP4754B Guidelines for Development of Civil Aircraft and Systems SAE ARP4761A Guidelines and Methods for Conducting the Safety Assessment Process on Civil Airborne Systems and Equipment					

EASG – Recent Accomplishments & Next Steps

Accomplishments

- Approved Charter
- Finalized Scoping Exercise

Next Steps

- Outreach to committee liaisons
- Complete Standardization Landscape exercise

EASG Future Meeting

Next Meetings

- Virtual
- More Electric Aircraft Conference, Bordeaux, France
February 3, 2017

Thank You

Questions?