

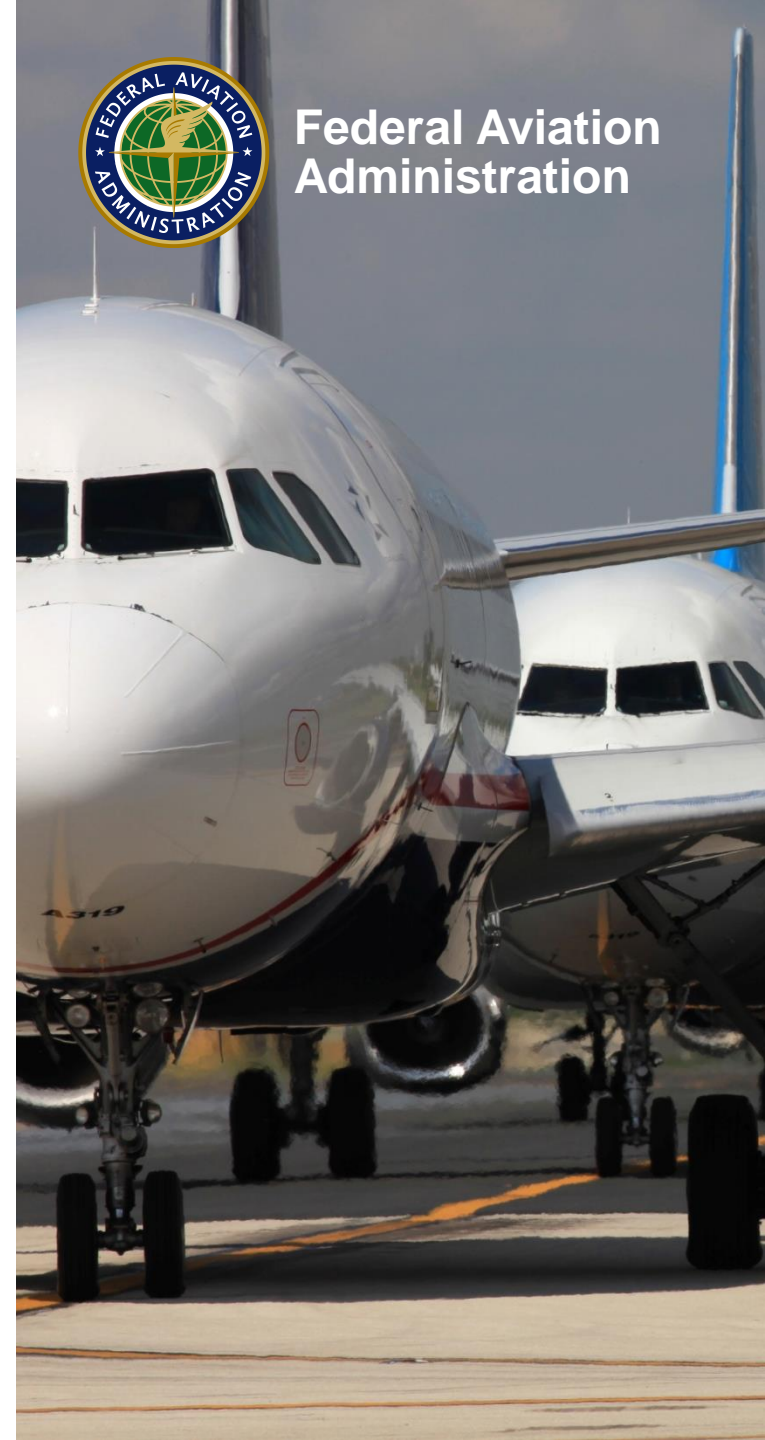
# RTCA SC-225: Rechargeable Lithium Batteries and Battery Systems

International Aircraft Systems Fire  
Protection Working Group  
Dresden, Germany  
May 12 - 13, 2015

Steve Summer  
Federal Aviation Administration  
Fire Safety Branch  
<http://www.fire.tc.faa.gov>



Federal Aviation  
Administration



# Background

- **RTCA SC-225 was formed to provide certification guidance for lithium batteries and battery systems that are permanently installed in aircraft**
- **Group has been meeting regularly since March, 2011.**
- **Points of contact are:**
  - Chairperson: Richard Nguyen (Boeing)
  - Secretary: Stephen Diehl (Boeing)
  - DFO: Norm Pereira (FAA)



# Background

- **Members of SC-225 include representatives from:**
  - Battery and cell manufacturers
  - Avionics manufacturers
  - Aircraft operators
  - Pilot and flight attendant associations
  - Regulatory and other government agencies
  - Other related industry associations



# Previous Documents

- **RTCA/DO-311: “Minimum Operational Performance Standards for Rechargeable Lithium Battery Systems”**
  - Published in March, 2008. Prepared by SC-211.
  - Intended for batteries being used as power sources for equipment devices, emergency lighting, and engine/APU starting.
- **RTCA/DO-347: “Certification Test Guidance for Small and Medium Sized Rechargeable Lithium Batteries and Battery Systems”**
  - Published in December, 2013. Prepared by SC-225.
  - Intended for small and medium sized batteries that are permanently installed on aircraft.
  - Defines test requirements based on battery size.

Battery Size	Single Cell Battery	Multi Cell Battery
Very Small	$< 2 \text{ Wh}$	$< 2 \text{ Wh}$
Small	$2 \leq \text{Wh} < 10$	$2 \leq \text{Wh} < 50$
Medium	$10 \leq \text{Wh} < 60$	$50 \leq \text{Wh} < 300$



# Current Status

- **Committee is currently working on document RTCA/DO-311A**
  - This is an update to the current DO-311.
  - Will integrate coverage for all sizes of batteries.
  - Will incorporate the latest understanding of lithium battery technology, battery testing and installation guidance including recommendations from NTSB.
  - Currently dispositioning comments from draft document and incorporating recommendations from NTSB with hopes of submitting final document to the Program Management Committee (PMC) end of 06/2015.



# Current Status

- **FAA has requested RTCA to form a committee to update DO-227, “Minimum Operation Performance Standards for Lithium Batteries” (Primary)**
- **Once formed, information will be published in the Federal Register**



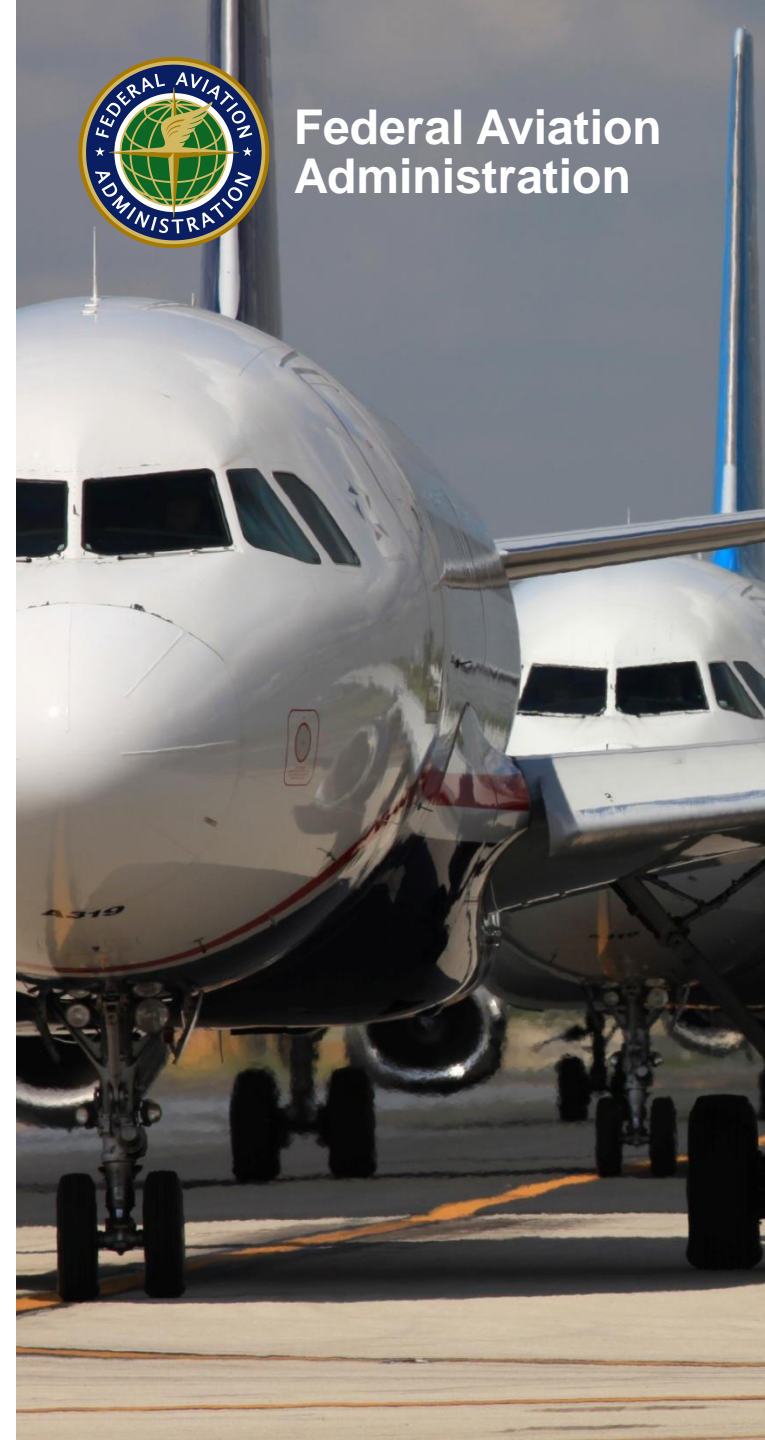
# EUROCAE/SAE WG80/AE-7AFC Hydrogen Fuel Cells - Aircraft Safety Guidelines

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# Background

- **Joint EUROCAE/SAE group was formed to provide design, integration and certification guidance for hydrogen supplied fuel cell systems on board transport category aircraft**
- **Group has been meeting regularly since December, 2008.**
- **Points of contact are:**
  - Co-Chairperson: Hans-Dieter Hansen (Airbus)
  - Co-Chairperson: Giday Gimmay (Boeing)
  - Secretary: Tony Fallon (Parker Aerospace)





# Background

- **Members of group include representatives from:**
  - Fuel cell manufacturers
  - Engine/power system manufacturers and integrators
  - Aircraft manufacturers
  - Regulatory and other government agencies
  - Other related industry associations



# Approach

- **Short-term:** Development of safety guidelines related to the issues around installation of fuel cells on board aircraft and storage in the airport environment; consolidation of existing power system requirements and review of fuel cell performance against baseline requirements.
- **Medium Term:** Review of fuel cell technology maturity related to aviation requirements; definition of future on board electrical applications, which could be supported by fuel cells.
- **Long-Term:** Development of detailed specifications for safety assessment and certification of fuel cells on board aircraft.



# Previous Documents

- **SAE AIR-6464 – Aircraft Fuel Cell Safety Guidelines**
  - Provides comprehensive reference and background information pertaining to the installation of Proton Exchange Membrane (PEM) hydrogen fuel cells on-board aircraft for the purposes of supplying auxiliary power rather than using separate ground power systems.



# Current Status

- **Currently working on a MASPS/AS Document to more generally cover installation of any PEM H<sub>2</sub> fuel cell system**
  - H<sub>2</sub> storage and distribution
  - Oxidant sources, storage and distribution
  - Fuel cell module
  - Balance of plant
  - Thermal management
  - Controller system
  - Sensors
  - Electrical power conditioning and storage



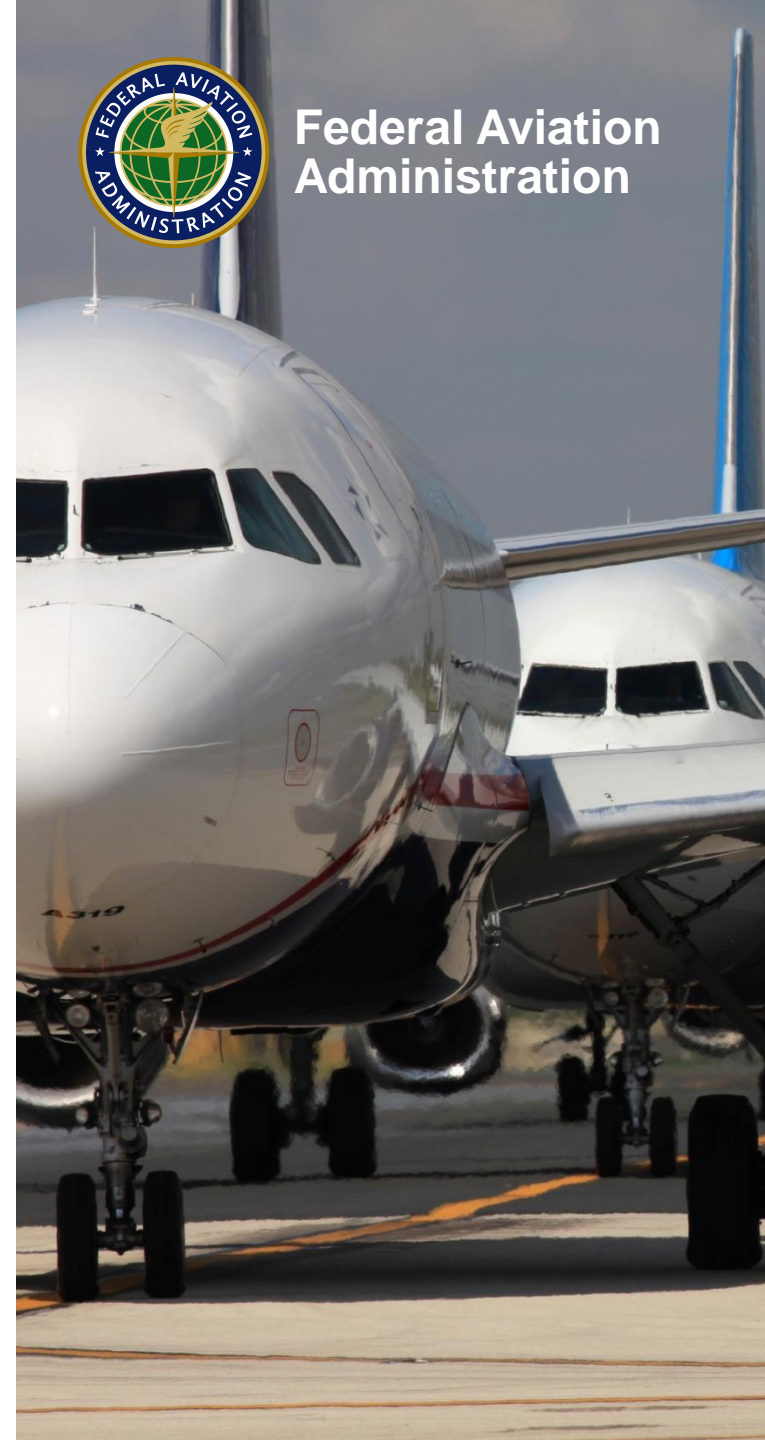
# Energy Supply Device ARC

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# Background

- **Aviation Rulemaking Committee formed by FAA to provide a forum for aviation community to provide recommendations to the FAA**
  - Determine appropriate airworthiness standards and guidance, identify hazards and determine design and operational principals to safeguard against these hazards
  - ARC covers all energy supply devices but is heavily focused on Hydrogen Fuel Cells
- **Group will likely work closely with the Eurocae/SAE Committee**
- **Interested individuals can contact Massoud Sadeghi (massoud.sadeghi@faa.gov)**

[http://www.faa.gov/regulations\\_policies/rulemaking/committees/documents/index.cfm/committee/browse/committeeID/457](http://www.faa.gov/regulations_policies/rulemaking/committees/documents/index.cfm/committee/browse/committeeID/457)



# Questions?

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