RTCA SC-225: Rechargeable Lithium Batteries and Battery Systems

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

Steve Summer
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Fire Safety Branch
http://www.fire.tc.faa.gov
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.

<table>
<thead>
<tr>
<th>Battery Size</th>
<th>Single Cell Battery</th>
<th>Multi Cell Battery</th>
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<tbody>
<tr>
<td>Very Small</td>
<td>&lt; 2 Wh</td>
<td>&lt; 2 Wh</td>
</tr>
<tr>
<td>Small</td>
<td>2 ≤ Wh &lt; 10</td>
<td>2 ≤ Wh &lt; 50</td>
</tr>
<tr>
<td>Medium</td>
<td>10 ≤ Wh &lt; 60</td>
<td>50 ≤ Wh &lt; 300</td>
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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 H₂ fuel cell system
  – H₂ 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
Questions?

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