RTCA SC-225: Rechargeable Lithium Batteries and Battery Systems

International Aircraft Systems Fire Protection Working Group
Atlantic City, NJ
October 29 - 30, 2014

Steve Summer
Federal Aviation Administration
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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</thead>
<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 with hopes of submitting final document to the Program Management Committee (PMC) end of 01/2015.
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
Questions?

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