Intermixing of Cells in Nickel-Cadmium Batteries for Aircraft Usage

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Background

- RTCA SC-211 committee addresses the design, performance, operational and testing issues for Ni-Cd, Lead Acid and rechargeable Lithium batteries

- Issues have been raised at RTCA SC-211 meetings regarding the intermixing of cells within Ni-Cd batteries used in aircraft

- It is typical practice to replace individual cells within the battery as they reach their end of life, and there are aftermarket PMA cells approved for direct replacement

- Manufacturers claim that this intermixing of cells from different producers results in a safety of flight issue in the form of reduced battery performance, increased maintenance, and an increase in thermal runaway potential

Planned Work

- FAA has purchased two battery testing systems from Arbin Instruments for use in this and other battery related projects
  - 100 V, 400 A battery analyzer for full battery system tests
  - 10 V, 50 A battery analyzer for cell-level tests

- Equipment is expected to be delivered December 2009.

- Planned tests include:
  - Capacity tests under various conditions
  - Discharge tests under various conditions
  - Duty cycle performance tests
  - Cyclic endurance tests
  - Induced destructive overcharge tests

Planned Work (cont.)

- Tests will be carried out following the specifications set forth in RTCA document DO-293

- Tests will be conducted using three Saft 4078-7 batteries configured
  1. Fully with OEM cells
  2. ½ OEM cells, ½ PMA cells, and
  3. Fully with PMA cells