Halon Fire Extinguishing Agent Replacement for Engines/APUs

Industry Research Consortium Proposal

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INTERNATIONAL AIRCRAFT SYSTEMS FIRE PROTECTION WORKING GROUP MEETING
Koeln, Germany
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Alternatives to Halon for Aviation
Meeting sponsored by Halon Alternatives Research Corporation (HARC)
Chicago, Illinois, USA
11 June, 2013

Agenda

- Consortium Proposal
- Why is a Consortium Needed?
- Goal of the Consortium
- Statement of Work Outline
- Consortium Model – Starting Point
- Consortium Activities – Phased Timeline
- Questions / Actions / Contacts

Consortium Proposal

- Establish an Industry Consortium that will…
  - define a common non-halon fire extinguishing agent for use in engine/APU fire zones

Why is a Consortium needed?

- No widely-accepted alternate agent yet identified after years of effort
- Minimum concentration thresholds established on three agents via MPSHRe[1] testing, but…
  - Cold discharge testing setback on one (Novec™1230)
  - Toxicity concerns on a second (CF_3I)
  - Third is Kyoto Protocol greenhouse gas (HFC-125)
- Partial MPSHRe completion on one agent
  - Live-fire retest decision pending[2] (KSA™)

1. Minimum Performance Standard for Halon Replacement in Civil Aircraft Engine Nacelle & APU Compartments
2. Nov. 2012 IASFPWG Meeting, Federal Aviation Administration presentation, Full-scale Demonstration Testing with a Solid Aerosol Fire Extinguishing Agent, Discussion Transitioning…, 15 Nov. 2012

Why is a Consortium needed?

- Current approach likely not cost/time-efficient
  - Different agent solutions/systems a possibility
    - Higher agent costs for air framer OEMs and operators
    - Adds workload on regulators, consuming limited staff and facility resources
      - » Slows down alternate agent testing validation and certification
  - Significant resource expenditures still remain to bring an acceptable agent to the field
    - Common challenges faced by multiple OEM stakeholders
      - » Acceptable certification testing/validation standards, adverse trends compared to Halon 1301 (e.g. weight, toxicity, material compatibility)

Why is a Consortium needed?

- Expected Benefits of a Common Industry Solution
  - Development/Validation cost and resource sharing
    - MPSHRe validation, toxicity evaluation, and materials compatibility evaluations, among other tasks, are consolidated to some extent
  - Lower agent costs due to higher volume production
    - Lower production costs for airframe OEMs;
    - Lower maintenance costs for operators;
    - Higher investment return for selected agent/system supplier
  - Compressed schedule & reduced work
    - Allows airworthiness and environmental authorities to focus their limited resources
    - Minimizes materials compatibility evaluation work
      - Engine/Nacelle/APU/firezone components suppliers
  - Possible common airworthiness certification standards

Goal of the Consortium

- Primary Deliverable: To define a common non-halon fire extinguishing agent for use in engine/APU fire zones that…
  - is compliant to basic (i.e. not model specific) industry and regulatory requirements
    - Unique follow-on qualification/certification requirements for a given airplane model would be the responsibility of the air framer OEM
    - A sub-deliverable may be an associated novel distribution method for the given agent
  - meets multiple OEM (airframe, engine, APU, nacelle, etc.) requirements;
  - meets multiple governmental agency regulatory requirements;
  - provides a viable business solution for Consortium partners; and
  - is production-ready
- Develop Supporting Statement of Work
  - To conduct research, testing, and development of business agreements that will support provision of the Primary Deliverable

Statement of Work Outline

- Non-Technical Statement of Work
  - Terms & conditions, rights & responsibilities of participation, including financial contributions
  - Protection of Intellectual Property
    - Background, foreground, usage rights
  - Identification, engagement, and agreement on a Consortium facilitator
  - Etc.
- Technical Statement of Work
  - Agent/System Design & Validation Requirements
    - Firefighting effectiveness, weight targets, materials compatibility, toxicology targets, testing/validation/certification criteria, qualification criteria, etc.
  - Identification and Solicitation of Agent/System Proposals
    - Existing or new proposals from supplier partners for down selection evaluation
  - Define candidate agent/system evaluation plan and down selection criteria
  - Etc.

Consortium Model – Starting Point

- Existing Consortium Activity Template
  - Propose that National Institute for Aerospace Studies and Services (NIASS) serve as focal point, facilitator & fiscal/contracting agent
    - Not-for-profit corporation located in Arlington, Virginia, U.S.A. and affiliated with Aerospace Industries Association (AIA)
  - Initially model on NIASS *Consortium for the Study of High Altitude Ice Crystals*
    - Adapt approved Consortium working agreement terms as needed
  - Responsibilities of participation expected to include financial contributions to support:
    - material compatibility and other mutually beneficial testing (SNAP, toxicology, other?); Consortium management administrative costs
  - Membership
    - Primary Stakeholders = Airframer OEMs
      - Primary responsibility for overall fire extinguishing system design, integration and certification
    - Members = Firex Agents/System Suppliers, Airline Operators, engine companies, nacelle suppliers, airworthiness authorities, etc.

Consortium Activities - Phased Timeline

- Phase I – Initial Formal Engagement & Follow-Up
  - This meeting to…
    1. evaluate Industry's interest;
    2. identify potential members;
    3. obtain preliminary confirmation on acceptability of starting point for Consortium Model; and
    4. obtain preliminary confirmation of acceptability of NIASS as focal point, facilitator & fiscal/contracting agent
  - Follow-Up Telecon (Boeing to set up; late June 2013)
    1. Confirm sufficient interest exists to launch a viable Consortium;
    2. Consortium-Launch Membership List Defined
    3. Starting-point Consortium Model agreement
    4. Confirm NIASS as focal point

Consortium Activities - Phased Timeline

- Phase I - Follow-Up & Completion
  - Non-Technical Statement of Work Development & Agreement
    - NIASS Led
      - » Terms & conditions, rights & responsibilities of participation, including financial contributions
      - » Protection of Intellectual Property
      - » Etc.
    - Consortium Member Process Check - Agreement to proceed with Phase II of Consortium's development
    - Propose completion by end September 2013 (tentative)

Consortium Activities - Phased Timeline

- Phase II - Technical Statement of Work
  - Development of and agreement on…
    - Agent/System Design & Validation Requirements
    - Define candidate agent/system evaluation plans down selection criteria
    - Etc.
  - Consortium Member Process Check - Final agreement to proceed with Consortium
  - Propose completion by end 2013 (tentative)

Consortium Activities - Phased Timeline

- Phase III – Primary Deliverable Development/Validation
  - All activities required to produce the Primary Deliverable
    - Identification of potential candidate agents/systems
    - Solicitation of proposals from suppliers
    - Evaluation of proposals against Agent/System Design & Validation Requirements
    - Down selection to go-forward agent/system candidate(s)
    - Detail evaluation (as needed)
      - Testing & analysis
    - Final down selection to common agent/system candidate (as needed)
    - Follow-on evaluation (as needed)
      - Testing & analysis
    - Final agreement by members on Primary Deliverable
    - Documentation finalization
      - MPSHRe test results
      - Generic qualification (test plan, qualification test report)?
      - Toxicology test results
      - SNAP approval
      - Other?
  - Propose completion by end 2015 (tentative)

Questions / Actions / Contacts

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Thank You