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\(_3\)I)
  – 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
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

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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)
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Thank You