Cargo Compartment Halon Replacement Advisory Group (CCHRAG) Update

May 8, 2018
IASFPWG
EASA HQ, Cologne, Germany

By
Robin Bennett (Boeing, AIA), CCHRAG Chair
Andre Freiling (Airbus, ASD), CCHRAG Co-Chair

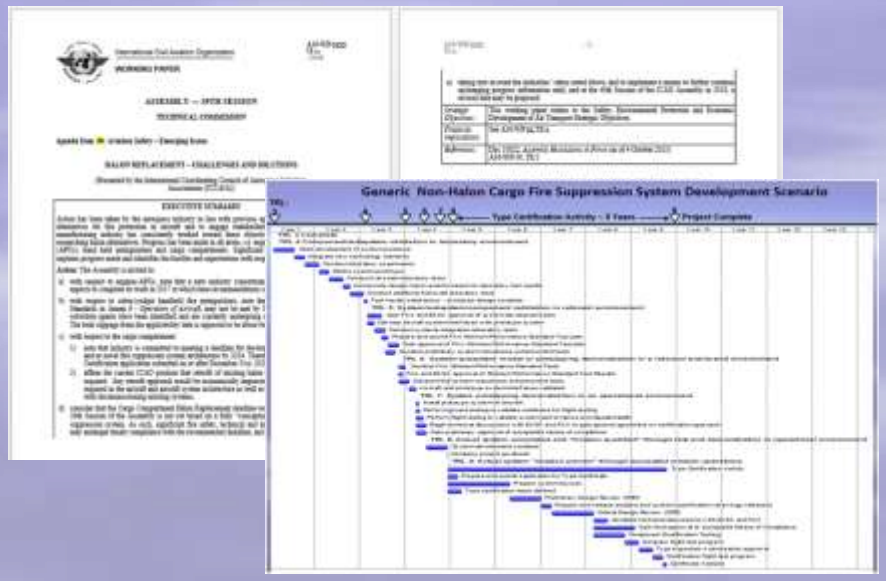
Agenda

- Background
- Recent CCHRAG Developments
- Cargo Compartment Technical Assessment Overview

Background:

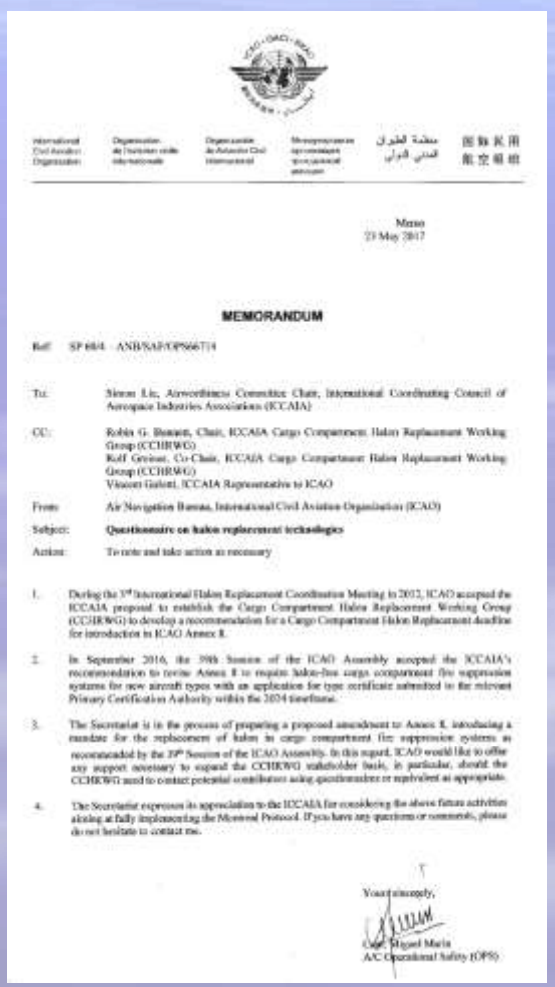
Solution requires stakeholder commitment

- ICCAIA Cargo Compartment Halon Replacement Advisory Group (CCHRAG) continues to support Terms of Reference (ToR)
  - Established in 2013 with representatives from Airbus, Boeing, Bombardier, Embraer, Mitsubishi
  - By 2015, developed a recommendation for cargo compartment halon replacement deadline for new TC applications after 2024
    - Based on timeline to develop, implement and certify new technology
    - Working Paper submitted to ICAO 39th General Assembly
    - Ongoing stakeholder coordination to support the deadline



ICAO & ICCAIA moving forward together

- ICAO May 23, 2017 memo
  - ICAO offer of support for questionnaire on halon replacement technologies
  - "The Secretariat expresses its appreciation to the ICCAIA for considering the above future activities aiming at fully implementing the Montreal Protocol."
- CCHRAG questionnaire sent to all stakeholders for interest in participating in Technical Assessment of potential solutions
  - By July 2017, 8 organizations responded
  - Representing chemical manufacturers, system suppliers and others
  - Next step → Technical Assessment



Memo
23 May 2017

MEMORANDUM

Ref: SP 88/8 ANB/SAF/OPS66714

To: Simon Liu, Airworthiness Committee Chair, International Coordinating Council of Aerospace Industries Associations (ICCAIA)

CC: Robin G. Bonam, Chair, ICCAIA Cargo Compartment Halon Replacement Working Group (CCHRWG)
Rolf Greiner, Co-Chair, ICCAIA Cargo Compartment Halon Replacement Working Group (CCHRWG)
Vincent Galotti, ICCAIA Representative to ICAO

From: Air Navigation Bureau, International Civil Aviation Organization (ICAO)

Subject: **Questionnaire on halon replacement technologies**

Action: To note and take action as necessary

1. During the 3rd International Halon Replacement Coordination Meeting in 2012, ICAO accepted the ICCAIA proposal to establish the Cargo Compartment Halon Replacement Working Group (CCHRWG) to develop a recommendation for a Cargo Compartment Halon Replacement deadline for introduction in ICAO Annex 8.

2. In September 2016, the 39th Session of the ICAO Assembly accepted the ICCAIA's recommendation to revise Annex 8 to require halon-free cargo compartment fire suppression systems for new aircraft types with an application for type certificate submitted to the relevant Primary Certification Authority within the 2024 timeframe.

3. The Secretariat is in the process of preparing a proposed amendment to Annex 8, introducing a mandate for the replacement of halon in cargo compartment fire suppression systems as recommended by the 39th Session of the ICAO Assembly. In this regard, ICAO would like to offer any support necessary to expand the CCHRWG stakeholder basis, in particular, should the CCHRWG need to contact potential contributors using questionnaires or equivalent as appropriate.

4. The Secretariat expresses its appreciation to the ICCAIA for considering the above future activities aiming at fully implementing the Montreal Protocol. If you have any questions or comments, please do not hesitate to contact me.

Yours sincerely,

Capt. Miguel Marín
A/C Operational Safety (OPS)

Technical Assessment will identify potential solutions

- Technical Assessment supports CCHRAG Work Plan key deliverable to report status of cargo halon replacement solutions to ICAO
- Responses received from 7 Participants with 8 potential halon replacement solutions
  - System suppliers, chemical manufacturers, new and novel equipment
  - Technologies include hybrid inerting systems and chemical agents
  - Varied stages of development, e.g. most not yet tested to FAA MPS, US EPA SNAP approvals pending
  - Integration requirements still undetermined, e.g. weight, size, operational impacts
- Key criteria identified to evaluate status and potential

Technical Assessment Criteria Categories

Fire Fighting Performance

Physical Agent Properties

Production/Availability

Environmental, Health & Safety

Schedule, Technology Readiness

Fire Fighting Performance	Cup burner fire extinction/suppression concentration established (ISO, NFPA)
	Other Industry Standards met (UL, ANSI, NFPA, etc.)
	FAA MPS testing concentration determined
	Test method determined to demonstrate compliance with paragraph
Physical	Agent & System Weight is less than or equal to Halon system
	Agent & Systems Size is less than or equal to Halon system
	Long & short range applicability
	Clean agent (gaseous) - no clean up required
	Boiling Point
	No damage to aircraft materials after agent discharge
	Freezing point is less than normal operating conditions
	Freezing point is less than minimum operating/storage conditions
	Decomposition temperature is greater than fire conditions (or HF formation
	Not thermally conductive
	Not electrically conductive
	No aircraft hydromechanical interfaces required (e.g. bleed air, fuel tank inert
Production	Currently used in other industries and/or applications
	Supply chain established
	Agent readily available
	Agent modification not needed for aircraft application
	Risks for system adaptation is mitigated or low
Environmental, Health & Safety	Not a Montreal Protocol listed ODS
	Not a Kyoto Protocol listed GHG
	Not GHS-listed Hazardous material
	US EPA SNAP approved
	US EPA TSCA Inventory listed
	EU REACH Registered, Authorised, and/or Restricted
	Not a PBT, POP, or endocrine disrupter
	Present on other regulatory lists
	US OSHA Regulated
	Not a Carcinogenic, mutagenic, repro-tox substance (CMR)
	Cardiac sensitization: LOAEL, NOAEL compared to Halon 1301
	Oral, inhalation, dermal toxicity is less than or equal to Halon 1301
Schedule	Current TRL is greater than 3
	Level TRL6 to meet 29 Nov 2019
	Standards established
	Aviation Authority Certification experience

Next Steps

- CCHRAG will continue evaluation and coordination with Technical Assessment Participants
- Final report to be provided at ICAO 40th General Assembly

DATE	DELIVERABLE	ASSIGNED TO:
17 April 2017	Confirm Technical Work Stream Plan Schedule	CCHRWG Core Group
5 May 2017	Finalize questionnaire format and ICAO coordination	CCHRWG Core Group
11 May 2017	Stakeholder meeting to invite halon replacement suppliers to participate in an assessment by CCHRWG to identify potential candidates in support of the ICAO 2024 deadline.	CCHRWG Core Group & Stakeholders
June - Sept 2017	CCHRWG finalizes and distributes questionnaire, confirms participants, develop plan for information management, establishment of assessment criteria, and participant coordination schedule.	CCHRWG Core Group
Nov 2017	Stakeholder meeting to confirm plan and commitment with participants.	CCHRAG Core Group & Stakeholders
Dec 2017 – April 2018	CCHRAG executes assessment plan including participant input and coordination.	CCHRAG Core Group & Stakeholders
March 2018	CCHRAG status report to ICAO	CCHRAG Core group
May 2018	Update at FAA Systems Mtg; core team meeting to continue evaluation	CCHRAG Core Group
June - Sept 2018	CCHRAG to complete assessment	CCHRAG Core Group
Oct 2018	Stakeholder meeting to review final assessment and conclusions.	CCHRAG Core Group & Stakeholders
Nov 2018 – April 2019	CCHRAG to prepare final report (ICCAIA WP) for ICAO General Assembly	CCHRAG Core Group
May 2019	Stakeholder meeting to share final report and discuss next steps (if any).	CCHRAG Core Group & Stakeholders
June – Sept 2019	CCHRAG to prepare for ICAO General Assembly	CCHRAG Core Group
Oct 2019	ICAO General Assembly accepts ICCAIA WP & recommendation (if any).	CCHRAG Core Group
Oct 2019	Stakeholder meeting to share ICAO General Assembly outcome and potential next steps, if appropriate	CCHRAG Core Group & Stakeholders

Questions & Answers

Thank you!

Contact:
Robin Bennett (robin.g.bennett@boeing.com)
Andre Freiling (ANDRE.FREILING@airbus.com)