

Engine/APU Halon Replacement Industry Consortium – Halon Alternatives for Aircraft Propulsion Systems (HAAPS)

October 31, 2018

INTERNATIONAL AIRCRAFT SYSTEMS FIRE PROTECTION FORUM MEETING
Atlantic City, New Jersey, USA

By

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HAAPS Charter and Statement of Work

- Define common non-halon fire extinguishing solution(s) for use in engine/APU fire zones that...
 - is compliant to basic industry and regulatory requirements
 - 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
- Engage...
 - Primary Stakeholders = Airframer OEMs
 - Firex Agents/System Suppliers, Airlines, engine companies, nacelle suppliers, airworthiness authorities, etc.
 - A focal point, facilitator & fiscal/contracting “Managing Entity” (ME)

HAAPS Charter and Statement of Work

- **Phase I – Joint Collaboration Agreement (JCA)**

- Primary working together agreement signed June 2018

- Airbus, Boeing, Bombardier, Embraer, Textron, and Ohio Aerospace Institute

COMPLETED

- **Phase II – Development of Technical Statement of Work**

- Define high level solution(s) strategy, design requirements, performance validation, down selection criteria, compile regulatory requirements, certification path proposals, initial engagement with airworthiness authorities, etc.
- Mature drafts for technical requirements document and RFI – **COMPLETE**
- Includes Non-Technical Task Team to develop supplier engagement documentation
- Initial FAA Engagement – **COMPLETE**

IN PROGRESS

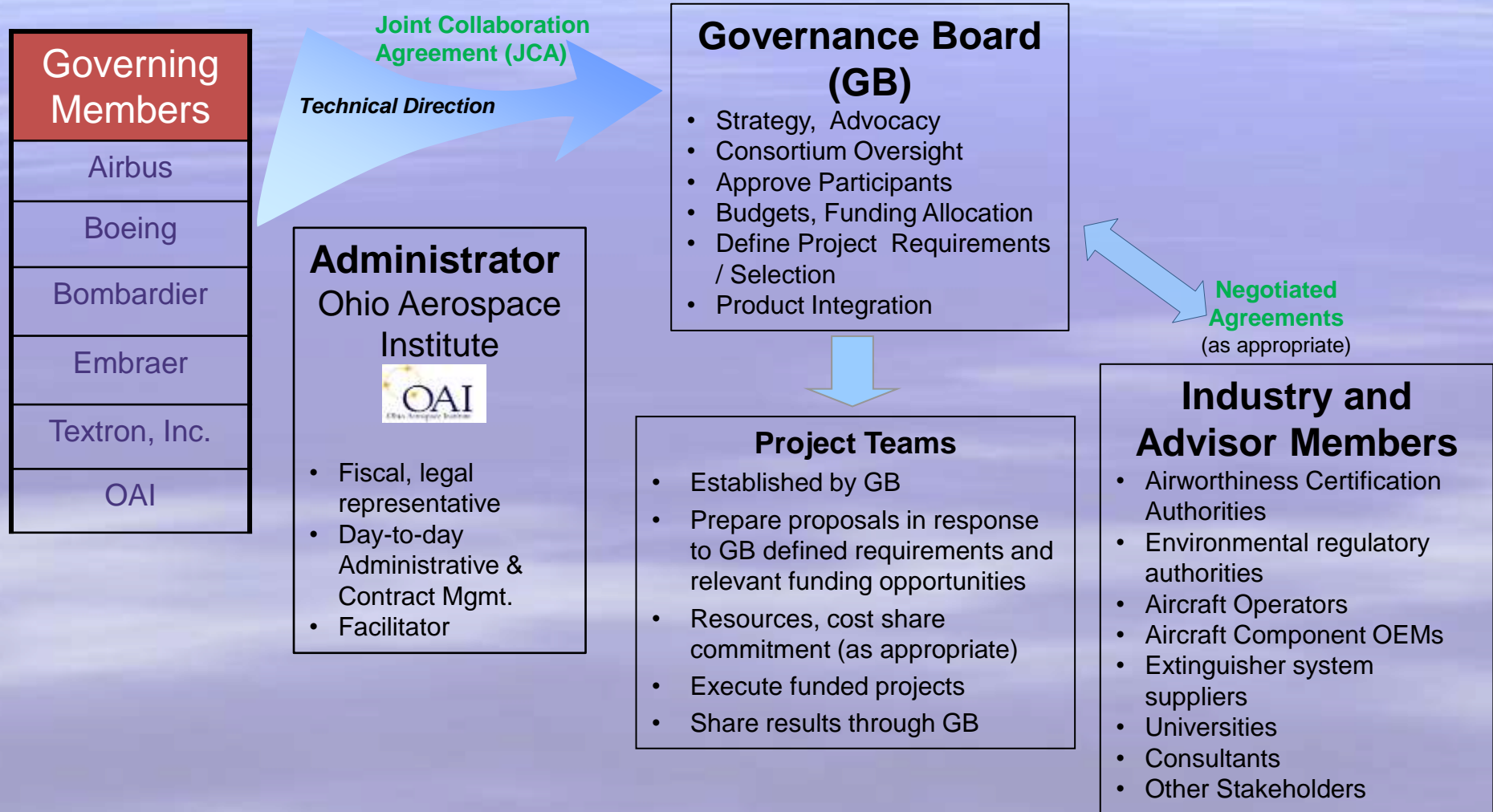
- **Phase III – execute activities required to produce the solution(s)**

- Solicitation of supplier proposals
- Proposal evaluation and down selection
- MOC/MeOC agreement
- Testing & analyses
- Selected solution(s) agreement

Start 2019
or earlier

HAAPS Organization

Halon Alternatives for Aircraft Propulsion Systems (HAAPS)



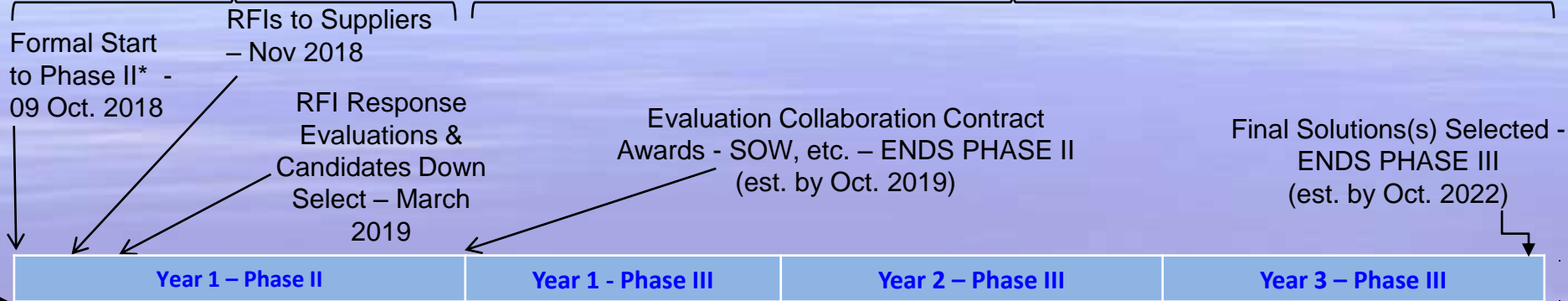
Prioritization of Potential Halon 1301 Replacement(s) Evaluations

- Preliminary Evaluations Underway by HAAPS
 - Multi-Faceted Trade Studies
 - How Similar to Halon 1301?
 - Development & Certification Risks
 - Anticipated Relative Costs
 - Zero to Minimal Impact on Airplane Weight
 - Availability Schedule
 - Commonality of OEM Installations
 - Relative Environmental Friendliness
 - Environmental Authority Approvals

HAAPS Critical Milestones

Phase II (1 Year Maximum)

Phase III (est. 2-3 Years)



HAAPS/FAA Familiarization Meeting (Sept. 26 2018)

- Certification Path Proposals Development
- Solutions(s) Requirements Definition
- Requests for Information
- Down Select Finalists for In-Depth Evaluation in Phase III
- Phase III Statement of Work Definition
- Technical Readiness Level (TRL) Defined
- Agreements with Supplier(s)

* Advance technical work started in 2017

- In-Depth Evaluations of Down Selected Candidates
 - Extinguishing performance, qualification requirements, weight/volume impact, Material compatibility, certification path refinement, certification documentation development, environmental & health acceptability, new/restarted testing, etc.

Post-HAAPS – Solution(s) Incorporation (TRL 9) →

- Air framer member's independent certification activities
- Utilize HAAPS Certification Path, MOCs agreements, test and qualification data, etc. and other to support airplane integration

Contacts, Announcements & History

- Ohio Aerospace Institute (OAI) <http://www.oai.org/>
 - Ann Heyward, HAAPS Project Manager AnnHeyward@oai.org, Phone: 440-962-3030
- OAI's HAAPS Press Release
 - <http://web1.oai.org/oaiweb.nsf/wnews/B16B96B2AFB1763D85257DD9004F0B28?OpenDocument&sc=2>
- ICCAIA Support of HAAPS Consortium
 - <http://www.aia-aerospace.org/news/iccaia-supports-international-consortium-seeking-alternatives-to-halon-fire-suppressant/>
- IASFPWG Meeting, Cologne, Germany, May 22-23, 2013 – Consortium Proposal
 - <https://www.fire.tc.faa.gov/pdf/systems/May13Meeting/BennettMacias-0513-ICInterestEgineAPU.pdf>
- Halon Alternatives Research Corporation (HARC) sponsored Aviation Stakeholder's Meeting Chicago, Illinois, U.S.A., 11 June, 2013 – Consortium Proposal
- 2013 ICAO Assembly recognized consortium commitment , Resolution 31/1: Halon replacement ([link](#))

Thank you!