



# **Aerial Refueling Systems Advisory Group (ARSAG) Joint Standardization Board**

**Informational Briefing  
October 2020**

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Naval Air Systems Command**

Unclassified



# USAF Boom-Receiptacle Refueling





# Navy Probe-Drogue Refueling







# USAF KC-46 Tanker





# ARSAG JSB

## Aerial Refueling Systems Advisory Group (ARSAG)

- **Founded in 1978**
- **Independent, not-for-profit**
- **Chartered as Joint Standardization Board (JSB) for Aerial Refueling Standardization in 2006**
- **Meetings:**
  - **Open-forum Annual Meeting each spring**
    - **20 + nations' government/military and industry representatives**
    - **High-level briefings, status reports, exhibits**
  - **Two ARSAG Workshop / JSB Meetings each year**
    - **September 3 day meeting**
    - **February 2 day meeting**
    - **Participation limited to NATO nations + Australia**
    - **Seven Working Groups**



# Joint Standardization Boards



ACQUISITION  
TECHNOLOGY  
AND LOGISTICS

OFFICE OF THE UNDER SECRETARY OF DEFENSE  
3000 DEFENSE PENTAGON  
WASHINGTON, DC 203 1-3000

MEMORANDUM FOR JOINT AERIAL REFUELING SYSTEMS ADVISORY

GROUP SUBJECT: Joint Standardization Board for Aerial Refueling Systems

The attached charter establishing the Aerial Refueling Systems Advisory Group (ARSAG) as a Joint Standardization Board (JSB) for Aerial Refueling Systems under the Defense Standardization Program (DSP) is approved. The objective of the JSB is to achieve common, mutually satisfactory solutions to shared requirements and problems. The JSB will:

- Develop and improve processes and procedures to facilitate aerial refueling initiatives
- Establish DOD standards (IAW DOD 4210.24-M, Defense Standardization Program (DSP) Policies & Procedures);
- Define joint doctrine, tactics, techniques and procedures, and recommend DOD policy for effective and efficient deployment of aerial refueling systems;
- Establish a comprehensive, integrated structure necessary to achieve interoperability, promote standardization, and conserve resources in support of Joint Service and Multinational Operations;
- Establish an effective, Department-wide forum for interoperability coordination, planning, and decision making.

Your participation in the DSP's efforts to achieve interoperability and standardization for aerial refueling systems is appreciated.

My focal point for JSBs is Mr. Mike Goy, \_\_\_\_\_ Defense Standardization Program Office, (703) 767-6882, [Mike.Goy@dla.mil](mailto:Mike.Goy@dla.mil).

JAMES D. HALL  
Defense Standardization Executive



# Joint Standardization Boards



- **ARSAG JSB:**

- Bring together all stakeholders, including Industry
- Develop collaborative solutions to Joint Service/DoD requirements
- Achieve DOD-wide and NATO standardization
- Promote Interoperability...among systems, equipment and technologies
- Influence & guide multi-Service standardization efforts
- Advocate the use of standards in the acquisition process
- Establish a prioritized list of targeted standardization opportunities



# ARSAG JSB



## Group # 1

### **Boom/Receptacle Components & Verification Methods**

**Group Lead:**

**Dillon Jones, AFLCMC/WLC**

**Co-Lead**

**Abby Perraut, AFLCMC/EZFA**

**In-Work Documents / Document Managers:**

**- Boom Nozzle Specification: ARSAG Doc 44-15-20WD:  
With Independent Disconnect**

**Dillon Jones, AFLCMC/WLC  
Abby Perraut, AFLCMC/EZFA**

**- Receiver A/C Refueling Receptacle PRF**

## Group # 2

### **Probe/Drogue Components & Verification Methods**

**Group Lead:**

**Tom Cavallaro, NAVAIR**

**Co-Lead**

**Kathy Kyle, ARCA**

**Documents / Document Managers:**

**- Probe Nozzle Specification, MIL-N-25161:  
ARSAG Doc 51-16-20WD**

**Tom Cavallaro, NAVAIR**

**- MA-2 Coupling Spec. MIL-25162**

**Jim Turner, Products Support**

**- MA-3 Coupling Spec., MIL-PRF-81975**

**Tom Cavallaro, NAVAIR**

**- MA-4 Coupling Spec. ARSAG Doc. # 58-20-20WD**

**Jim Reinholdt, Cobham  
Steve Sipprell, Eaton**





# ARSAG JSB



## Group # 3

### **Formation Aids, Markings and Lighting**

**Group Lead:**

**Larry Mitchell, Omega Air**

**Co-Lead**

**Derek Ferwerda, NAVAIR**

**In-Work Documents / Document Managers:**

**- Hose Markings Guide Document:**

**Derek Ferwerda, NAVAIR**

**ARSAG Doc. 05-05-20WD**

**- Signal Lights for Drogue Aerial Refueling Systems**

**Sqn Ldr Gordon Parry, RAF**

**ARSAG 05A-06-11R (Ref ATP 3.3.4.7)**

**- Formation Aids Guide Document ARSAG 06-06-20WD**

**Olivia McCormick, USAF**

**- Remote Vision System Design Guide**

**Sean Martin, Boeing**

**ARSAG 56-18-20WD**

## Group # 4

### **Maintenance and Ground Support Equipment**

**Group Lead:**

**Greg Twyford, Boeing**

**Co-Lead:**

**Ken McCain, Northrop Grumman**

**Wes Durant, AFLCMC/WKDAE**

**In-Work Documents / Document Managers:**

**- Aerial Refueling Equipment Reference Guide**

**Ken McCain, Northrop Grumman**

**ARSAG Doc. 12-06-20WD**

**- Ground Support Equipment (GSE) for AR Guide**

**Greg Twyford, Boeing**

**ARSAG Doc 45-14-20WD**



# ARSAG JSB



## Group # 5

### **Clearance Processes and Procedures**

**Group Lead:**

**Richard Simms, USTRANSCOM**

**Co-Leads:**

**Jacob Benscoter, CASS**

**Maj Jason Robinson, JAPCC/NATO AARWG**

**In-Work Documents / Document Managers:**

**- Aerial Refueling Technical Interface Data Acquisition**

**Guide ARSAG 53-18-20WD**

**Larry Strong, ARCA**

**- Aerial Refueling Planner Software Guide**

**ARSAG 55-18-20WD**

**Maj Jason Robinson, JAPCC/NATO AARWG**

**- Aerial Refueling Clearance Process Guide & Checklist**

**ARSAG 43-08-14R**

**Kees Verburg, RNLAF**



# ARSAG JSB



## Group # 6

### **Systems Requirements and Verification Methods**

**Group Lead:**

**Rob Tipton, Lockheed Martin**

**Co-Leads:**

**Harry Slusher, Boeing**

**Ian Fialho, Boeing**

**In-Work Documents / Document Managers:**

- Revision Aerial Refueling Boom/Receptacle Systems and Interface Recommended Requirements  
ARSAG Doc 02-88-12R  
**Harry Slusher, Boeing**
- Revision Boom Receptacle Guide ARSAG 20-08-17R  
**Harry Slusher, Boeing**
- Aerial Refueling Equipment Probe / Drogue Interface & System Requirements,  
ARSAG 57-18-19 WD  
(Reference ATP 3.3.4.6, STANAG 3447)  
**Derek Ferwerda, NAVAIR**  
**Pablo Martinez Arnal, Airbus**
- Aerial Refueling Modeling and Simulation Guide  
ARSAG 54-18-20WD  
**Elizabeth Knoblauch, NAVAIR**
- Aerial Refueling Documents Reference Guide  
ARSAG 52-18-20WD  
**T. J. Pitsor, AFLCMC/EZFA**
- Standardized Technical Data Survey (STDS)  
ARSAG Doc 17-81-03R2  
**Rob Tipton, Lockheed Martin**  
**Dex Kalt, ARSAG Exec. Dir.**



# ARSAG JSB



## **Group # 7 (5A) Automated Aerial Refueling**

**Group Lead:**

**Steve McLaughlin, NAVAIR**

**Co-Leads:**

**Dan Schreiter, AFRL/ROQC**

**Steve Stecko, Boeing**

**In-Work Documents / Document Managers:**

- **Revise Automated Aerial Refueling Procedures Guide (Con Ops Document) ARSAG Doc. 42-13-17** **Dan Schreiter, AFR/RQQC**



# ARSAG JSB Process



## ARSAG Workshop / JSB Document Workflow

1	<b>Military or Industry Aerial Refueling Entity</b> → Suggest New Project / Document or Revision of an Existing Document
2	<b>Requesting Agency</b> → Complete Project Initiation Form (PIF) and Forward to Executive Director, JSB Chair and Deputy Chair for Review and Consideration
3	<b>ARSAG Executive Director, JSB Chair and Deputy Chair</b> → Align with ARSAG Workshop Executive Committee vision and assure parallel with PIF → Review PIF and Accept as ARSAG Workshop Project, Consult with Appropriate Working Group Lead(s), Assign to Working Group → Track Progress of Document from Initiation through all Phases to Completion and Release in Public Domain
4	<b>Working Group Lead</b> → Accept Project → Manage and Prioritize Projects in Working Group Schedule → Assign a Document Manager in Coordination with Exec Dir, JSB Chair and Deputy Chair





# ARSAG JSB Process



5	<p><b>Working Group Participants, Guided by Group Lead and Document Manager</b></p> <ul style="list-style-type: none"><li>→ Originate / Develop an ARSAG Recommendation or Guide Document IAW PIF</li><li>→ Development of Document May Continue over the Course of Several Workshop / JSB Meetings and Require Work/Coordination Between Meetings, use “track change” Word feature</li><li>→ Adherence to ARSAG Style Guide Ensures Consistency of ARSAG Documents</li></ul>
6	<p><b>Working Group</b></p> <ul style="list-style-type: none"><li>→ Submit Completed Draft Document to Executive Director, JSB Chair, and JSB Deputy Chair for Review</li></ul>
7	<p><b>Executive Director, JSB Chair, Deputy Chair</b></p> <ul style="list-style-type: none"><li>→ Review Document and Forward with Combined Inputs to Document Review Team (DRT)</li></ul>
8	<p><b>Document Review Team (DRT)</b></p> <ul style="list-style-type: none"><li>→ Review Document and Forward to Working Group Lead / Document Manager with Any Suggested Edits</li></ul>



# ARSAG JSB Process



9	<b>Working Group</b>
	<ul style="list-style-type: none"><li>→ Resolve DRT Edits in Coordination with DRT</li><li>→ Sign Completed Document (Working Group Lead and Document Manager)</li><li>→ Forward Document to Executive Director</li></ul>
10	<b>Executive Director</b>
	<ul style="list-style-type: none"><li>→ Review Document, Sign</li><li>→ Forward Along with Completed DTIC Form to JSB Chair, JSB Deputy Chair for Review and Signatures</li></ul>
11	<b>JSB Chair and Deputy Chair</b>
	<ul style="list-style-type: none"><li>→ Review Document and Sign</li><li>→ Submit to Appropriate USAF or USN Office for Clearance for Release in Public Domain</li></ul>
12	<b>JSB Chair or Deputy Chair</b>
	<ul style="list-style-type: none"><li>→ Return Copy of Final, Cleared Document to Executive Director with Notice of All Actions Taken</li><li>→ Submit Final, Cleared Document to DTIC for Posting on DTIC Website</li><li>→ ARSAG Working Draft Documents and Final Documents Are Not Released to the Public Until released by DTIC or Other Authorized Trusted Agents</li><li>→ Submit Copy of Document to Originator of Project Initiation Form (PIF)</li><li>→ Submit to USAF or NAVAIR Office for Adoption as MIL-SPEC When Appropriate</li><li>→ Submit to NATO JAPCC for their Use When Appropriate</li></ul>



# ARSAG JSB Documents



## ARSAG WORKSHOP JSB IN-WORK DOCUMENTS

	Document Number	Document Name	Working Group	Working Group Lead	Working Group Co-Lead(s)	Document Manager(s)	Current Workflow Status (Number, Action Agent, Progress)	Document % Completed	Projected Document Completion Date
1	44-15-20WD	Boom-Nozzle Spec	1	Andrew Ferguson	Dillon Jones	Andrew Ferguson, Dillon Jones	5, WG, NLM,NP	40%	Sept. 2020
2	51-16-20WD	Probe Nozzle Spec. MIL-N-25161 Revision	2	Tom Cavallaro	Steve Sipprell	Tom Cavallaro	5, WG, P	90%	APRIL. 20
3	06-06-20WD	AR Formation Aids Guide	3	Larry Mitchell	Derek Ferwerda	Olivia McCormick	5, WG;P?	65%	Sept. 2020
4	56-18-20-WD	Remote Vision Systems Guide	3	Larry Mitchell	Derek Ferwerda	Sean Martin	5, WG;P?	5%	Dec. 2020
5	05A-06-20WD	Signal Lights for Drogue AR Systems Recommended Requirements	3	Larry Mitchell	Derek Ferwerda	Sqn Ldr Gordon Parry	5, WG, NLM,NP	5%	Feb. 2023
6	05-05-20WD	Hose Color & Markings for Drogue AR Systems Guide	3	Larry Mitchell	Derek Ferwerda	Derek Ferwerda	5, WG; NP	75%	Sept. 2020
7	45-14-20WD	Ground Support Equipment (GSE) for AR Guide	4	Greg Twyford	Ken McCain, Wes Durant	Greg Twyford, Jim Turner	5, WG; P	75%	Sept. 2020
8	12-06-20WD	Maintenance Sustainment & Support Reference Guide	4	Greg Twyford	Ken McCain, Wes Durant	Ken McCain, Steven Browne	5, WG; P	75%	Sept. 2020
9	53-18-20WD	AR Technical Interface Data Acquisition Guide	5	Richard Simms	Jacob Bencoter, Maj Jason Robinson	Larry Strong	5, WG; NLM,NP	75%	Feb. 2020
KEY: WG + Working Group; Progress since last meeting: P = Progress, NP = No Progress, NLM = No Last Meeting							version: 30 January 2020		



# ARSAG JSB Documents



ARSAG WORKSHOP JSB IN-WORK DOCUMENTS									
	Document Number	Document Name	Working Group	Working Group Lead	Working Group Co-Lead(s)	Document Manager(s)	Current Workflow Status (Number, Action Agent, Progress)	Document % Completed	Projected Document Completion Date
10	43-08-14R1; R20	AR Clearance Process Guide and AR Compatibility Assessment Checklist	5	Richard Simms	Jacob Bencoter, Maj. Jason Robinson	Kees Verburgh, Lt. Col. Ed Schierberl	5, WG; UNKNOWN P	50 %, 4WG	Sept. 2020
11	55-18-20WD	AR Computer Planning Software Design Guide	5	Richard Simms	Jacob Bencoter, MAJ. Jason Robison	Maj. Jason Robison	9 Exec. Dir.; P	95%	Sept. 2021
12	42-13-17R1; R20	Automated AR Guide (Con Ops)	5A	Steve McGlaughlin, Dan Schreiter	Dan Schreiter, Steve Stecko	Steve McGlaughlin, Dan Schreiter	10, Ex Dir. :P JSBChair Sig.	95%	Sept. 2020
13	02-88-12R2	AR Boom-Receptacle Systems & Interface Recommended Requirements	6	Rob Tipton	Harry Slusher	Harry Slusher	11, Submitted to DTIC & JAPCC ?	100%	Oct.. 2020
14	20-08-17R1; R20	AR Boom-Receptacle Guide	6	Rob Tipton	Harry Slusher	Harry Slusher	5, WG; P	85%	Sept. 2020
15	57-18-20WD	AR Probe / Drogue Systems & Interface Recommended Requirements	6	Rob Tipton	Harry Slusher	Derek Ferwerda, Pablo Martinez Arnal	5, WG; P?	75%	Sept. 2021
16	52-18-20WD	AR Documents Reference Guide	6	Rob Tipton	Harry Slusher	T.J. Pitsor	5, WG; P?	20%	Apr. 2020
17	54-18-20WD	AR Modeling & Simulation Guide	6	Rob Tipton	Henry Clarke	Elizabeth Knoblauch	5, WG; P?	50%	Apr. 2020
18	03-00-03R2; R20	AR Pressure Definitions & Terms, Design & Verification Guide	6	Rob Tipton	Harry Slusher	Rob Tipton	9, Executive Director Review, NP	95%	Apr. 2020
KEY: WG + Working Group; Progress since last meeting: P = Progress, NP = No Progress, NLM = No Last Meeting							version: 30 January 2020		



# USN / USMC Receiver Aircraft







# Italian Air Force KC-767





# Australian KC-30 Tanker







# MQ-25 Unmanned Aerial Refueling





# Opportunities



- “Coalition of the willing” that sees value in standardizing
- Standardization (i.e. STANAG compliance) ensures Interoperability between new receiver and tanker aircraft being procured by many nations
- Provide participants to have direct inputs in the development of guidance documents
- Facilitate cooperative work among military, civilian, industry and academia in resolving technical issues
- Lack of standardization is very costly - to all involved
- ARSAG JSB held the very first Fall Workshop meeting overseas in conjunction with NATO and EU Air To Air Refueling Conference in Brussels 10-12 Sep 2018



# Questions/Comments?



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