ARSAG INTERNATIONAL

Aerial Refueling Systems Advisory

From the Desk of the Chairman

World events have been focusing our attention on the need for awareness and preparedness. Aerial refueling is a vital element of defense preparedness. ARSAG's mission is to serve as a joint military-industry professional organization providing a single inter-service and international agency to advise on aerial refueling system matters. As we endeavor to fulfill that mission, we mark the continued growth in participation at our meetings. In Orlando this past April, thanks to you, we returned to pre-COVID attendance levels.

At the September 2023 ARSAG Workshop / Joint Standardization Board (JSB) for Aerial Refueling Systems meeting held in Dayton, Ohio, more than eighty participants. worked diligently in developing aerial refueling guidance and recommendation documents to ensure international interoperability and safety. As new airframes and systems continue to be brought online, the value of these Workshop /.JSB meetings is amplified. The next Workshop / JSB Meeting will be held in Dayton in February.

It is not too early to prepare for ARSAG 2024 to be held 23 – 25 April in Cleveland, Ohio. Interest is building for this Annual Meeting's briefings, guest speakers, exhibits and break-out meetings. An agenda is planned to provide opportunities for global military/government and industry representatives to gather in an event uniquely dedicated to aerial refueling. The downtown location of the meeting venue will allow attendees to experience this vibrant city on the banks of Lake Erie.

I'm pleased to announce that the venue for ARSAG 2025 will be Planet Hollywood in Las Vegas, Nevada. We will be returning to Las Vegas for the first time since 2009.

I look forward to seeing you at all the upcoming ARSAG meetings. My hat is off to each of you who makes them possible.

John B. Sams, Jr., Lieutenant General USAF, Ret.
ARSAG Chairman and Chief Executive Officer

A New Era:

U.S. Air Force's "Gateway to the Pacific" welcomes first KC-46A

As U.S. military joint forces push to stay ahead of near-peer threats, Boeing's KC-46A operates in parallel to meet the needs of the evolving aerial refueling mission and the 21st-century warfighter.

In July, Boeing delivered the first Pegasus to the 60th Air Mobility Wing at Travis Air Force Base in California. Travis is now the sixth main operating base for the world's most advanced multi-mission aerial refueler. Nicknamed the "Gateway to the Pacific," the base sits 50 miles northeast of San Francisco, making it a key mobility operation node.

In all, 24 KC-46A tankers will operate out of Travis. The Pegasus tanker is replacing Boeing-built KC-10 Extenders at the base, opening a new era of air mobility operations with multi-mission versatility and new technology integration that enables far more than refueling alone.

For example, during a celebration to commemorate the delivery, Major General Corey Martin, commander of the 18th Air Force, AMC's operational command, remarked to the crowd about the unprecedented capability that the "brains" of the Pegasus bring to the fleet.

“It's the connections. It's the sensors. It's the survivability. It's the Tactical Situational Awareness System," Martin said. "(The KC-46A) has radios that will link this mobility aircraft to bombers, fighters, intelligence, reconnaissance, surveillance, to space, to special operations. It has systems that will detect and avoid radar-guided surface-to-air threats; systems that will detect and defeat infrared-guided surface-to-air threats, all while maneuvering our joint force closer to contested airspace than any KC aircraft has done in the past."

The KC-46A Block 1 upgrade will add more advanced communications capabilities, enhancing the aircraft's data connectivity and situational awareness. In addition, Boeing is studying the integration of Advanced Battle Management System (ABMS) capabilities onto the KC-46A Pegasus tanker under a contract with the U.S. Air Force Rapid Capabilities Office.

The KC-46 program is also maturing and demonstrating Autonomous Air-to-Air Refueling (A3R) via the aerial refueling boom. The program's Model Based Engineering (MBE) approach used iterative high-fidelity flight-validated simulations, an end-to-end hardware-in-the-loop laboratory, and flight demonstrations in various aerial refueling scenes and environmental conditions to mature A3R technology. In addition to maturing the technology, Boeing team members are also focused on the concept of operations and the pathway to robust certification within the relevant regulatory framework for this rapidly emerging autonomous aerial refueling operational capability.

Unlike many existing and legacy strategic tankers, the KC-46A can also receive fuel, which significantly extends the range and flexibility of global mobility and power projection maneuvers. The KC-46A tanker can access more small bases and austere airfields, facilitating 'more booms in the air,' ensuring warfighters have quicker, closer access to fuel so they can stay in the fight.

The KC-46 continues to demonstrate these capabilities, including in crucial U.S. Air Force exercises such as Red Flag 23 support in INDOPACOM. Globally, operators are also proving the platform's interoperability with Joint and allied forces, including war-fighting training scenarios jointly conducted with the Royal Australian Air Force as part of Talisman Sabre 23.

In addition, as more KC-46As enter service, operators share knowledge of employing and maintaining the KC-46. In September, Japan Air Self-Defense members visited McConnell Air Force Base, learning more about the modernized tactical system and equipment for sustainment.

As Boeing develops new technologies and mission capabilities for U.S. and allied forces, the KC-46A's in-line production system on the 767 line in Everett, Washington—along with more than 650 suppliers nationwide—integrates those emergent mission systems directly into the aircraft, ensuring the Pegasus is combat ready today.

Submitted by The Boeing Company

Eaton Advances Aerial Refueling with Actively Stabilized Drogue Prototype

Aerial refueling technology continues to reach new heights at Eaton. The industry-leading power management company, which acquired Cobham Mission Systems in June 2021, successfully demonstrated a new, actively stabilized drogue prototype (Kestrel) in Buffalo, New York on September 13. The demonstration was completed during a flight test with Naval Air Systems Command (NAVAIR) and Calspan Aerospace Test Services.

During the demonstration, Kestrel was attached to the hose end of an aerial refueling store installed on a Gulfstream III testbed aircraft. The flight assessed the active and passive stability of Kestrel across a range of typical inflight refueling conditions, including aircraft turbulence and maneuvers. The flight test also showcased how Kestrel independently counteracts perturbations through the actuation of its control surfaces.

What does this mean for AAR? The successful stabilization of the hose end further elevates the safety and effectiveness of aerial refueling, even when aircraft platforms encounter turbulence. Kestrel Mk1, the program's initial phase, is visioned as a step change in enhancing AAR capabilities whereas Kestrel Mk2 will target the probe-seeking feature.

Another key benefit of Kestrel is the overall system design. It is self-contained and easily retrofittable onto AAR tankers, meaning there is no need for additional power or communication cables.

With more than 80 years of experience across five generations of aerial refueling systems, Eaton's technologies, gained through the acquisition of Cobham, are part of every major refueling platform in service. The company developed the "probe and drogue" method of AAR in 1949 and it was adopted by many international operators including the U.S. Navy, Royal Air Force, and so on. Eaton continues to maintain an unrivaled position on key aircraft in service across the globe.

Beyond aerial refueling capabilities, Eaton offers comprehensive aerospace solutions that enhance aircraft efficiency, availability and performance. With engineering and manufacturing capabilities across the globe, Eaton takes tremendous pride in supporting the ARSAG community.

Submitted by The Eaton Corporation

Successful A330 MRTT flight test campaign for F-15 fighters automatic refuelling

Airbus and the Republic of Singapore Air Force (RSAF) worked together to successfully complete the automatic air-to-air refuelling (A3R) flight test campaign with the Airbus A330 Multi Role Tanker Transport (MRTT) and F-15 fighter, ahead of its certification in the first half of 2024.

Over the course of three weeks in August, a RSAF A330 MRTT made more than 500 automated wet and dry contacts with the air force's full fleet of receiver aircraft, including the F-15SG aircraft, a customised variant of the US-built F-15E Strike Eagle air-to-ground fighter jet.

"The A330 MRTT has made the future of air-to-air refuelling a reality as a result of the joint efforts of Airbus and the Republic of Air Force," said Jean-Brice Dumont, Head of Military Air Systems at Airbus Defence and Space. "This new milestone will enable the RSAF to become the first Air Force in the world to have a boom automatic refuelling capability with all of its receivers, a capability that can be extended to refuelling receivers from other nations".

The flight tests with F-15SG were conducted in Singapore, covering the whole operational AAR envelope in different weather conditions under the supervision of the Spanish certifying authority, called INTA (National Institute for Aerospace Technology).

During the test campaign, further flights were carried out in night conditions, not only with F-15s but also with the RSAF's A330 MRTT and F-16s as receivers for data collection, to complete the development and enable night capabilities with the automated system.

In July 2022, the A330 MRTT became the world's first tanker certified for automatic air-to-air refuelling operations in daylight conditions with F-16s and A330 MRTTs as receivers.

The Republic of Singapore Air Force (RSAF) showcased the automatic air-to-air refuelling (A3R) capability in the US.

Exercise Forging Sabre, conducted from 11 to 30 September at Mountain Home Air Force Base, Idaho, US, marked the first time that an A330 MRTT from RSAF has shown the Airbus A3R capacity at a military exercise in the United States.

At present, A3R can be carried out on F-16s and other MRTTs. Trials are underway to increase the types of aircraft it can refuel, including the RSAF's suite of F-15SG fighters.

Although the process is automatic, Air Refuelling Operators (AROs) still keep their hands on the control and their eyes on the display screens, ready to take over in situations such as turbulence.

The MRTT's Boom Enhanced Vision System allows AROs to work from a console in the flight deck while viewing the refuelling via 3D cameras and with their 3D glasses for enhanced realism.

In the past, AROs operating on board the RSAF's old KC-135R tanker had to control refuelling operations while laying prone and looking out the back of the aircraft from a small window.

Now on the MRTT, refuelling is much less physically taxing, and AROs can carry out operations for a longer period of time.

"The A3R system has not only reduced physical strain, but also freed up AROs to focus on other areas pertaining to safety," said 2SG Vikneshvar s/o Vijayandhran.

"The A3R reduces manual labour so we have more capacity for other essential tasks during tanking, such as time management and receiver formation management, where we facilitate the flow of receivers moving from the wings (of the MRTT) to the aft to take gas," explained the 25-year-old ARO.

"It's definitely made air-to-air refuelling more efficient."

Submitted by Airbus Defence & Space

ARSAG INTERNATIONAL
Calendar of Events

2024

ARSAG Workshop / (JSB)
&
Panel Chairs / Steering Group Planning Meeting
6 – 8 February
Dayton, Ohio

ARSAG 2024

23 – 25 April
Renaissance Hotel
Cleveland, Ohio

ARSAG Workshop / Joint Standardization Board (JSB) Meeting
TBD

2025

ARSAG Workshop / (JSB)
&
Panel Chairs / Steering Group Planning Meeting
TBD

ARSAG 2025

29 April – 1 May
Planet Hollywood
Las Vegas, Nevada

ARSAG Workshop / Joint Standardization Board (JSB) Meeting
TBD

From the desk of the Executive Director

ARSAG WORKSHOPS / JSB REPORTS PROGRESS

The ARSAG Workshop / Joint Standardization Board (JSB) for Aerial Refueling Standardization can report an outstandingly productive year in its work on aerial refueling documents. It is anticipated that in addition to recently published aerial refueling documents, several more may be completed by the end of the year.

ARSAG documents offer up-to-date aerial refueling technical, operational and procedural guidance and recommendations. Documents are compiled by dedicated military/government and industry representatives of NATO nations and Australia, experts in their aerial refueling disciplines. The seven dedicated Working Groups follow workflow, review and clearance procedures intended to assure accuracy and timeliness.

ARSAG Documents are cleared for release in the public domain by USAF or USN offices and are submitted to the United States Defense Technical Information Center (DTIC) for posting on their website. They are provided to NATO for their use and potential adoption as NATO documents.

Working Groups currently have twenty--four documents in work. Recently published documents included: “Ground Support Equipment (GSE) for Aerial Refueling Systems”, ARSAG Doc. No. 45-14-2023. DTIC No., AD1203370. Dated 7 June ’23; and Aerial Refueling Tanker and Receiver Similarity Criteria”, ARSAG Doc. No. 66-21-23, DTIC No. AD1211535, Dated 6 June ’23.

ARSAG Workshop/JSB meet twice each year for three-day, table-top sessions. The meetings offer opportunities for the exchanges of ideas and information that are vital to aerial refueling interoperability. Progress on documents continues throughout the year in virtual meetings.

The breadth of knowledge and experience of the producers has resulted in ARSAG Documents being cited as uniquely valuable resources for the international aerial refueling community. Congratulations and appreciation are due all contributors as ARSAG continues its service to the world of aerial refueling through its Annual Meetings and its Workshops/JSB.

Dexter H. Kalt
ARSAG Executive Director

First Embraer KC-390 Millennium in NATO configuration enters into service with the Portuguese Air Force

Beja, Portugal, October 19, 2023 – The first KC-390 Millennium of the Portuguese Air Force (FAP) has entered into service at the Beja Air Base. The aircraft meets the requirements set by the National Aeronautical Authority (AAN) of Portugal and includes standard NATO (North Atlantic Treaty Organization) equipment already integrated into the aircraft. This integration results from an extensive flight tests campaign carried out in Portugal, in a joint effort between Embraer, OGMA, and FAP. In 2019, FAP ordered five KC-390 aircraft, a comprehensive services and support agreement and a flight simulator. The entry into service took place following a ceremony held Monday October 16, at the Embraer plant in Gavião Peixoto, Brazil.

“This is a wonderful time for us, as we witness the first KC-390 Millennium enter into service outside Brazil. The Portuguese Air Force is an Embraer's strategic partner, having supported us since the beginning of the KC-390 Millenium’s internationalization. Embraer and the Portuguese Air Force will continue working together to advance our long-term projects for years to come,” says Walter Pinto Junior, COO of Embraer Defense & Security.

"The entry into service of this aircraft is significant for the Portuguese Air Force and Portugal, as it completes the development and production of a multi-value aircraft capable of the most demanding operational scenarios. The requirements set by the Portuguese Air Force have taken this aircraft to an even higher technological and capability level," says Brigadier-General João Nogueira, President of the KC-390 Program Supervision and Monitoring Mission.

The multi-mission military tactical transport aircraft offers unparalleled mobility, combining high productivity and operational flexibility with low operating costs, which is an unbeatable combination. The C-390 can carry more payload (26 tons) compared to other military transport aircraft in its class, and it flies faster and farther. The multi-mission platform is capable of performing a wide range of missions such as transport and launch of cargo and troops, aeromedical evacuation, search and rescue, firefighting and humanitarian missions, operating on temporary or unpaved runways (i.e., including compacted earth, soil and gravel).

The air-to-air refueling (AAR) configuration, designated the KC-390, has demonstrated its capabilities during operations with the Brazilian Air Force. It is cleared to refuel several different fighter aircraft and is also able to refuel other KC-390s using the underwing pods. This is a unique feature for this type of aircraft.

Portugal is the largest international partner of the C-390 program, and its participation in the development and production of the aircraft is recognized for having a positive economic impact on the generation of jobs, new investments, increased exports, and technological advances. In addition to Portugal, the multi-mission platform has orders from Brazil and Hungary and has been selected by the Netherlands, Austria and the Czech Republic.