

NATO UNCLASSIFIED

NATO STANDARD

ATP-3.3.4

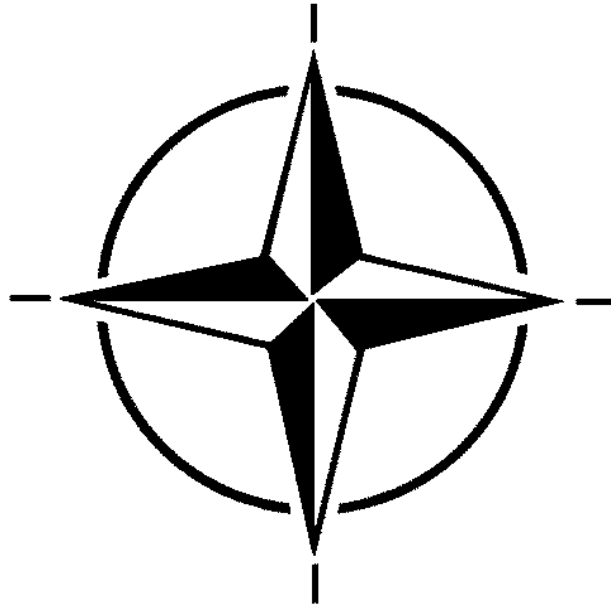
VOLUME II

AIR-TO-AIR REFUELLING (AAR)

DOCTRINE

Edition A Version 2

APRIL 2019



NORTH ATLANTIC TREATY ORGANIZATION

ALLIED TACTICAL PUBLICATION

Published by the
NATO STANDARDIZATION OFFICE (NSO)
© NATO/OTAN

NATO UNCLASSIFIED

NATO UNCLASSIFIED

INTENTIONALLY BLANK

NATO UNCLASSIFIED

NATO UNCLASSIFIED

NORTH ATLANTIC TREATY ORGANIZATION (NATO)

NATO STANDARDIZATION OFFICE (NSO)

NATO LETTER OF PROMULGATION

3 April 2019

1. The enclosed Allied Tactical Publication ATP-3.3.4, Volume II, Edition A, Version 2, AIR-TO-AIR REFUELLING (AAR) DOCTRINE, which has been approved by the nations in the Military Committee Air Standardization Board (MCASB), is promulgated herewith. The agreement of nations to use this publication is recorded in STANAG 7207.
2. ATP-3.3.4, Volume II, Edition A, Version 2, is effective upon receipt and supersedes ATP-3.3.4, Volume II, Edition A, Version 1, which shall be destroyed in accordance with the local procedure for the destruction of documents.
3. No part of this publication may be reproduced, stored in a retrieval system, used commercially, adapted, or transmitted in any form or by any means, electronic, mechanical, photo-copying, recording or otherwise, without the prior permission of the publisher. With the exception of commercial sales, this does not apply to member or partner nations, or NATO commands and bodies.
4. This publication shall be handled in accordance with C-M(2002)60.



Zoltán GULYÁS
Brigadier General, HUNAF
Director, NATO Standardization Office

NATO UNCLASSIFIED

NATO UNCLASSIFIED

INTENTIONALLY BLANK

NATO UNCLASSIFIED

RESERVED FOR NATIONAL LETTER OF PROMULGATION

INTENTIONALLY BLANK

INTENTIONALLY BLANK

RECORD OF SPECIFIC RESERVATIONS

[nation]	[detail of reservation]

Note: The reservations listed on this page include only those that were recorded at time of promulgation and may not be complete. Refer to the NATO Standardization Document Database for the complete list of existing reservations.

INTENTIONALLY BLANK

TABLE OF CONTENTS

	Page N°
CHAPTER 1 – INTRODUCTION	
1.1. GENERAL	1-1
1.2. AIM	1-1
1.3. SCOPE	1-1
CHAPTER 2 - CONCEPTS	
2.1. GENERAL	2-1
2.2. SYSTEMS	2-1
2.3. CONSTRAINTS	2-1
CHAPTER 3 - OPERATIONS	
3.1. GENERAL	3-1
3.2. TYPES OF AAR OPERATIONS	3-1
CHAPTER 4 – COMMAND AND CONTROL	
4.1. GENERAL	4-1
4.2. SPECIFIC AAR ROLES	4-1
4.3. C2 STRUCTURE	4-2
CHAPTER 5 – PLANNING AND SUPPORT CONSIDERATIONS	
5.1. GENERAL	5-1
5.2. PLANNING FACTORS	5-1
5.3. AIRSPACE REQUIREMENTS	5-2
5.4. FORCE APPORTIONMENT	5-2

INTENTIONALLY BLANK

PREFACE**AIR-TO-AIR REFUELLING (AAR) DOCTRINE****References:**

- A. MCM-217 - ALLIANCE AIR-TO-AIR REFUELLING (AAR) CONCEPT
- B. AJP-3.3 (STANAG 3700) - ALLIED JOINT DOCTRINE FOR AIR AND SPACE OPERATIONS
- C. ATP-3.3.4.2 (STANAG 3971, ATP-56) - AIR-TO-AIR REFUELLING
- D. AAP-06. (STANAG 3680) - NATO GLOSSARY OF TERMS AND DEFINITIONS (ENGLISH AND FRENCH)
- E. AAP-15 - NATO GLOSSARY OF ABBREVIATIONS USED IN NATO DOCUMENTS AND PUBLICATIONS
- F. AAP-47 - ALLIED JOINT DOCTRINE DEVELOPMENT

1. Of all air power force-multipliers, Air-to-Air Refuelling (AAR) is amongst the most significant. It provides an essential capability that increases the range, endurance, payload and flexibility of all capable receiver aircraft, and is especially important when forward basing is limited or unavailable, or air base operations limitations impose constraints.

2. AAR contributes to air operations as a force multiplier by extending the range, and/or time on task and flexibility of aircraft, as well as enabling a trade off between fuel-load and weapon or payload. AAR increases a receiver's flight time, releasing aircraft for reassignment to other tasks, allowing aircraft to be based beyond the effective range of enemy weapons and reducing intermediate fuel stops during deployment, redeployment or sustainment flights.

3. The planning, execution and support of military operations requires clearly understood and widely accepted doctrine. This is especially important when operations are conducted by allied and coalition forces. As NATO continues to transform its capabilities to meet the security challenges of the evolving environment, it is necessary for the Alliance to adapt its doctrine accordingly.

INTENTIONALLY BLANK

CHAPTER 1	INTRODUCTION
------------------	---------------------

1.1. GENERAL

1. AAR is an air support operation consisting of the in-flight transfer of fuel between tanker and suitable receiver aircraft. It contributes to air operations as a force multiplier by extending the range and/or time on task of aircraft, as well as enabling a trade off between fuel-load and weapon or payload. These provide the Commander the ability to manoeuvre and concentrate forces using surprise and economy of force, at a time and location where the situation demands.

2. AAR allows air power to be projected over greater distances or concentrated where and when it is most needed.

1.2. AIM

The aim of this publication is to provide NATO AAR doctrine. It gives guidance to commanders and their staffs on the planning, coordination and execution of AAR operations¹.

1.3. SCOPE

This ATP defines the general principles of AAR, introduces the AAR concept, discusses different types of AAR operations, addresses Command and Control (C2) as well as planning and support considerations.

¹ AAR Doctrine develops AJP-3.3 and provides a link to the current ATP-3.3.4.2 to provide an understanding of AAR operations conducted by a coalition within a NATO framework.

INTENTIONALLY BLANK

2.1. GENERAL

AAR allows air power to increase levels of versatility, surprise, flexibility, and mobility, and can concentrate more assets for operations. The overall effect of these applications is a force enabler and force multiplier in air power employment.

2.2. SYSTEMS

There are two different AAR systems in use: “boom and receptacle” and “probe and drogue”. Both systems are not interchangeable. However, some tankers are equipped with both boom and probe/drogue systems and either may be used on the same flight. Furthermore, some booms can be fitted on the ground with a Boom Drogue Adapter (BDA) and this makes the boom system compatible with certain probe equipped receivers. However, with a BDA attached, you cannot conduct boom refuelling. Either system can only be used to perform AAR on an aircraft that is fitted with the same system. Planning considerations must consider the type of system which the receiver aircraft requires.

2.3. CONSTRAINTS

1. While AAR offers greatly enhanced flexibility and capability to air forces, there are certain important considerations which may restrict AAR operations, such as the number of tankers available, basing options, the volume and location of the airspace and time required to complete AAR procedures.
2. The multi-role capabilities of tanker aircraft may require them to be tasked for higher priority non-AAR missions.
3. Tankers are considered High Value Air Assets (HVAA) and are vulnerable to air and ground threat. Consideration should be given to tanker aircraft protection in a threat environment.
4. National political and technical caveats must be known when formulating an AAR plan. Initial caveats and updates to them should be briefed to leadership, applied to plans and available to affected crews. Additionally, whereas tanker aircraft are a limited resource, it is suggested nations keep caveats to a minimum to ensure maximum effectiveness of assets in a coalition operation.
5. JFAC training. It is highly suggested AAR planners and executors attend either Initial Joint Force Air Component Training (IFJT) or Specialized Heavy Air Refuelling Course (SHARC) with emphasis on the latter before manning a NATO JFAC. This training familiarizes personnel with the JFAC and SHARC readies graduates to be interoperable with any of its graduates. These specific course registrations are managed by the AIRCOM registrar.

INTENTIONALLY BLANK

CHAPTER 3 OPERATIONS

3.1. GENERAL

AAR enables aircraft to operate beyond their unrefuelled ranges. It is a crucial part of the overall NATO strategy and operational doctrine of airpower forces supported in a wide spectrum of expeditionary operations. Positioning forces outside the enemy's reach permits a greater portion of combat assets to concentrate on offensive rather than defensive action, thereby enhancing initiative and force protection and again enhancing economy of force. It is also a force multiplier, permitting larger takeoff payloads for receivers and added endurance by reducing takeoff fuel required. Dedicated airspace must be allocated for AAR operations.

3.2. TYPES OF AAR OPERATIONS

1. **Air Bridge Support.** AAR makes accelerated air bridge operations possible since en route refuelling stops are reduced or eliminated. It reduces the number of aircraft on the ground at forward staging bases, minimises potential en route maintenance delays, and enables NATO expeditionary air transport assets to maximise their payloads. This significantly increases the efficiency and effectiveness of air transport operations by making possible the direct delivery of personnel and materiel. It is an effective method for deploying expeditionary forces in the initial days of a conflict.
2. **Aircraft Deployment Support.** AAR assets extend the range of deploying combat and combat support aircraft, often allowing them to fly with few or no stops en route to an Area of Operation (AO). The capability of aircraft to fly non-stop to a theatre may eliminate the need to overfly and/or obtain landing clearances from countries remaining neutral in a conflict. Normally, this operation is associated with the movement of fighter aircraft between theatres. Deployments of heavy aircraft (bombers, airlifters) normally use an air bridge operation to support the deployment.
3. **Alert Tanker.** Some operational contingencies require the use of an alert tanker. Scenarios include a Quick Reaction Alert (QRA) launch, missed refuelling, adverse weather, battle damage, excessive time engaged with enemy aircraft or targets, or emergency carrier operations. Alert status can be held either on the ground or in the air.
4. A Carrier Alert Tanker is a carrier-based aircraft tasked to provide contingency support to carrier-based receivers using the Buddy-Buddy equipment.
5. **Global Strike Support.** AAR assets are employed to give strike platforms the capability to reach any target globally without relying on intermediate basing locations, thereby enabling them to rapidly strike targets in distant locations and recover to safe areas.

6. **Reliability Tankers.** Ground spares might not be able to reach an area in a timely manner should tasked tankers not be able to provide adequate offload or receivers miss scheduled refuelling. Reliability tankers operate in a given area with no scheduled receivers and act as flying spares. Because of the cascading effects of the loss of air refuelling, reliability tankers should be used when assets are available. If a reliability tanker can also accept fuel the capability is leveraged through extended endurance.
7. **Special Operations Support.** AAR enables Special Operations Forces (SOF) to increase their operating capabilities. Some operations may require specialised equipment, training, and operational procedures.
8. **Theatre Support.** During a combat operation, the role of theatre AAR is to support air assets executing the air campaign.

CHAPTER 4	COMMAND AND CONTROL
------------------	----------------------------

4.1. GENERAL

1. Inter-theatre and intra-theatre AAR capabilities depend upon Command and Control (C2) relationships which can only be achieved through the integration of knowledgeable airmen within the command structure. The manner in which Joint Force Commanders (JFC) organise their forces directly affects the responsiveness and versatility of joint force operations, particularly AAR operations.

2. The main principle in joint force organization is to accomplish the mission based on the JFC vision and concept of operations which must be in accordance with overarching political objectives, efforts and the desired end state. AAR operations are part of the air component commander's (ACC) air operation plan as an integral part of the JFC's campaign plan.

3. Unity of effort, centralized planning and decentralized execution are key considerations. Unity of effort is necessary for effectiveness and efficiency. Centralized planning is essential for controlling and coordinating the efforts of all available forces, especially high demand, low density assets. Decentralized execution is essential to generate the tempo of operations required to cope with the uncertainty, disorder, and fluidity of combat. The ability to task forces is situation dependent and normally tailored by the JFC to enable effective spans of control, responsiveness, tactical flexibility, and protection.

4.2. SPECIFIC AAR ROLES

1. **Air Component Commander (ACC).** Normally, the ACC is the component commander having the preponderance of AAR assets and the capability to plan, task, and control allied air operations. The need for an ACC is based on the JFC's overall mission, concept of operations, missions and tasks assigned to subordinate commanders, forces available, duration and nature of allied air operations desired, and the degree of unity of command and control of allied air operations required.

2. **Air Operations Centre (AOC).** An AOC functions as the ACC's operations centre that translates the Air Operations Directive (AOD) into an Air Tasking Order (ATO). It is the principle organisation from which air operations are scheduled, directed, controlled and co-ordinated with other components and organizations. It disseminates and executes the ATO and monitors the resulting mission flow. The AOC links with all air C2 assets including theatre sensors, intelligence sources, and airborne C2 assets. Co-ordination and liaison with other component commands are provided by integrated land and maritime liaison elements to the AOC and by integrating air element liaisons to the other component commands.

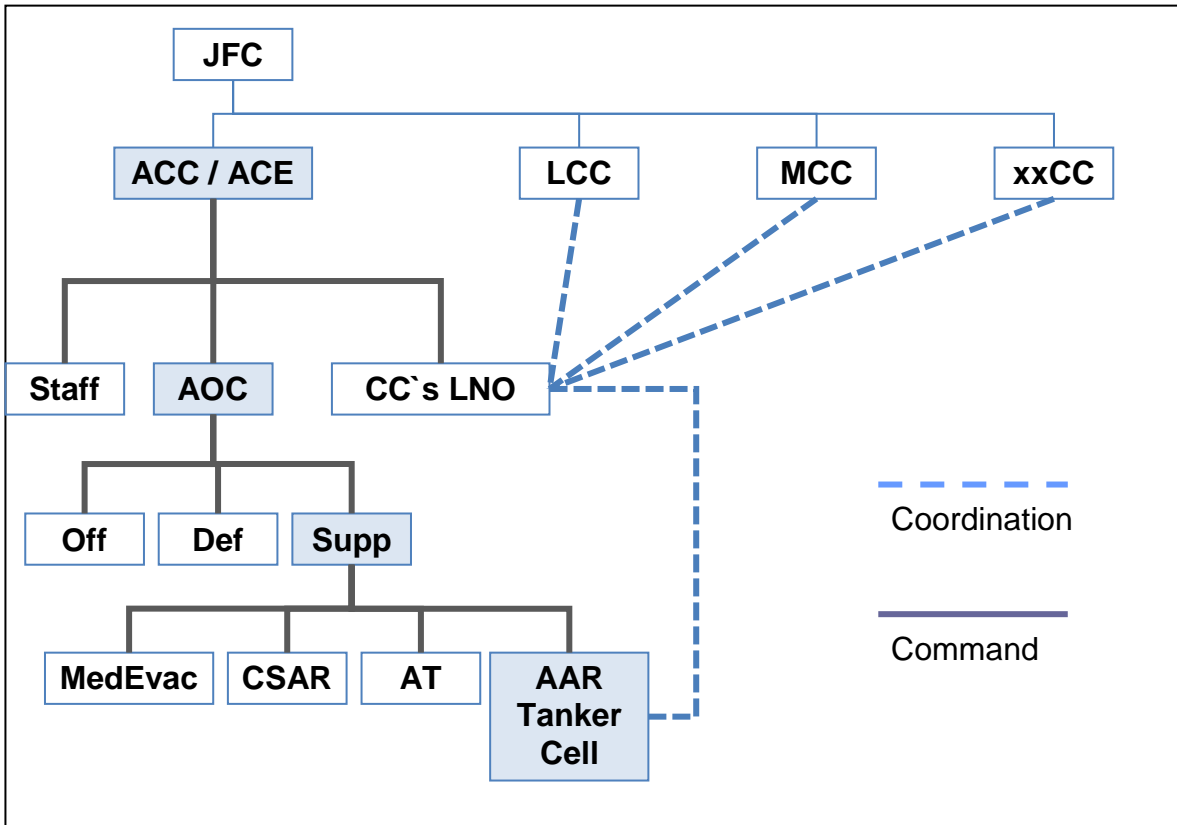
3. **Air Operations Centre (AOC) Tanker Cell.** The tanker cell is an element within the AOC and has representatives within the planning and current operations sections. AAR missions are planned according to the AOD from the ACC. Primary responsibilities of the tanker cell are as follows:

- a. Providing AAR subject matter expertise to the ACC.
- b. Developing the AAR plan according to receiver requirements and availability of tanker assets.
- c. Coordinating the AAR airspace requirements for incorporation into the ACO (Air Coordination Order).
- d. Managing AAR execution.
- e. Conducting an assessment of the AAR plan.
- f. Assessing long-term AAR and tanker requirements.

4. **Tanker Unit Representative** When required, the tanker unit representative will co-ordinate with the AOC tanker cell to maximise tanker efficiency from the unit in order to support AAR operations.

4.3. C2 STRUCTURE

The size and disposition of the organization will depend upon the operation being conducted.



INTENTIONALLY BLANK

CHAPTER 5	PLANNING AND SUPPORT CONSIDERATIONS
------------------	--

5.1. GENERAL

To optimise the use of AAR assets, several fundamental planning factors should be considered to enable efficient and effective operations.²

5.2. PLANNING FACTORS

1. **Tanker Basing Considerations.** When selecting a tanker base, it is advantageous to position tankers close to the AO in order to maximise fuel offload. However, there are certain factors which must be considered such as suitable runway, adequate supply of fuel and force protection.

2. **Receiver Requirements.** Receiver requirements dictate the AAR system, quantity and type of fuel, and the location and time of AAR operation. Furthermore, the receiver aircraft's performance characteristics determine air-to-air refuelling speed, altitude, rendezvous type, and allowable manoeuvring during the refuelling. The operation may also require special tactics, emission control (EMCON), or specialised equipment to achieve desired effects.

3. **Formation Refuelling.** Planners should consider tanker formation as a way to minimise AAR operation duration and maximise fuel delivered while compressing the force package when dictated by mission requirements and/or airspace constraints. Consideration should be given to employment of multi-point tankers in order to maximise AAR capability.

4. **Consolidation.** Consolidation is the transfer of fuel from a tanker at a low fuel state, until it reaches its minimum fuel for return to base, to another on-station tanker with the capacity to receive such fuel. This process can then release tankers off-station to return to base and refuel, without reducing the amount of fuel in the operating area.

5. **Force Extension Tanker.** Certain tankers have the capability of receiving fuel in-flight and therefore can be force extended. This capability can be used whenever the fuel requirements of the escorting tanker and its receivers exceed the tanker's takeoff fuel capacity. Force extension provides the benefit of extending the deployment range of receiver packages by ensuring the supporting tankers do not have to make en route fuel stops.

6. **Clearances.** Apart from the boom and drogue differences, the tanker and receiver have to be technically compatible and an agreement must exist between the nations involved which consider legal, diplomatic, financial, training and other issues.

² Planning factors can come from multiple sources, i.e. National Standards Related Documents, appropriate C2 agencies, national LNOs, etc.

5.3. AIRSPACE REQUIREMENTS

1. AAR operations are usually conducted in airspace specifically designated for AAR. During a contingency operation, AAR airspace close to the enemy changes frequently to avoid predictability as well as to respond to the changing tactical situation. Additionally, routing to and from the AAR airspace may change in response to air operations and enemy threats.
2. AAR operations can be co-ordinated in controlled airspace or designated corridors for forces to and from theatre.

5.4. FORCE APPORTIONMENT

The multi-role capabilities of tanker aircraft may require it to be tasked for non-AAR missions. This can significantly limit the amount of AAR support available. Apportionment provides general guidance to planners in the form of number or percentage of sorties that should be dedicated to specific functions. Apportionment of AAR sorties should roughly follow the apportionment of combat and support sorties.

NATO UNCLASSIFIED

INTENTIONALLY BLANK

NATO UNCLASSIFIED

NATO UNCLASSIFIED

ATP-3.3.4(A)(2)

VOLUME II

NATO UNCLASSIFIED