# NATO STANDARD

# AJP-3.11

## ALLIED JOINT DOCTRINE FOR METEOROLOGICAL AND OCEANOGRAPHIC SUPPORT

**Edition A Version 2**

**APRIL 2023**

**NORTH ATLANTIC TREATY ORGANIZATION**

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**NATO LETTER OF PROMULGATION**

20 April 2023

1. The enclosed Allied Joint Publication AJP-3.11 Edition A, Version 2, ALLIED JOINT DOCTRINE FOR METEOROLOGICAL AND OCEANOGRAPHIC SUPPORT has been approved by the nations in the Military Committee Joint Standardization Board, and is promulgated herewith. The agreement of nations to use this publication is recorded in STANAG 2507.

2. AJP-3.11, Edition A, Version 2 is effective upon receipt and supersedes AJP-3.11, Edition A, Version 1 which shall be destroyed in accordance with local procedures for the destruction of documents.

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Lieutenant General, GRC (A)
Director, NATO Standardization Office

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# RECORD OF NATIONAL RESERVATIONS

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| 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. | |

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# RECORD OF SPECIFIC RESERVATIONS

| [nation] | [detail of reservation] |
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| CZE | The Czech Armed Forces have limited capabilities of METOC Support in the area of oceanography.<br>Pertinent tasks will be performed for operations abroad or NATO exercises only on request. |
| GRC | At the present time Hellenic National Meteorological Service (HNMS) is not capable of providing Space Weather information for Space Operations. |
| LVA | Latvian National Armed Forces have limited capabilities (equipment, trained personnel, systems) to provide METOC support in accordance with the STANAG requirements. |
| SVN | Meteorological support for Slovenian Armed Forces is presently not completely arranged nor operational at national level. Slovenia has limited capabilities (personnel, equipment, systems) to provide METOC support as envisaged by the STANAG (limited capabilities in the oceanographic area, limited support to maritime operations, no space weather capability). Slovenia has limited coordination/communication with the NATO meteorological organization and is not a part of ACOMEX circuit therefore only partial interoperability is possible. Slovenia presently provides only limited METOC support within national military contingents. METOC personnel are presently not trained through METOC training courses and seminars offered by NATO. As a consequence, there is only limited possibility to comply with IMETOC principle. |
| USA | The US ratifies AJP-3.11 with the following reservations:<br>The USA disagrees with the statement: "The current provision of support by the NATO METOC organization to space weather is a temporary solution until the permanent establishment of a dedicated specific support based on Nations own space weather organization." The USA does not consider this a temporary solution nor a capability each Ally will establish independently, whereas the US military has an extensive, well established space weather observing network. The US will remove this reservation once text is revised to reflect the current capabilities. The US will remove this reservation once text is revised to reflect the current capabilities.<br>(3) The USA does not agree with reliability, readiness and effectiveness as METOC Support principles. The United States recognizes accuracy, relevancy, timeliness and consistency as its |

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| | METOC Support principles as described US national joint and service doctrine (JP 3-59 and AF Doctrine Annex 3-59). Accordingly, the US will comply with those principles defined in our national joint doctrine. The US will remove this reservation once text is revised to align with US joint doctrine. The US will remove this reservation once text is revised to align with US joint doctrine.<br><br>The USA disagrees with the term "METOC Functions". US policy (CJCSI 1210.01) describes minimum training requirements for USA METOC personnel and the USA cannot guarantee attendance at these NATO courses.<br><br>Accordingly, the US will adhere to US METOC training policy. The US will remove this reservation once the text is revised to be less prescriptive regarding training.<br><br>The USA disagrees with the reference to a "recognized environmental picture". REP is not an extant capability and should not be referred to in doctrine, particularly an AJP. In addition, it is inconsistent with the USA presentation of weather information. The US will remove this reservation once the text is revised to reflect current extant practice in this portion of the doctrine. |
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| 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. | |

# Summary of changes

a. The term ‘Joint Forces’ has been removed from the end of the title, to make the publication consistent with other level 2 publications. The revised title, ‘*Allied Joint Publication (AJP) – 3.11 Allied Joint Doctrine for Meteorological and Oceanographic (METOC) Support*’, more correctly reflects the need to provide METOC support across the full spectrum of NATO operations.

b. Chapter 3 Section 3 has been changed in order to include descriptions of new entities such as the Multi National METOC Support Group (MN MSG).

c. Guidance for new areas of METOC support, such as provision of space weather support to operations has been included, along with a proposed definition provided by the military space weather panel of “military space weather”.

d. The Recognized Environmental Picture (REP) concept is further explained, including a contextual footnote.

e. Introduction of terms such as NATO METOC principles, processes and functions are explained and how these align with policy (MC 0594); specifically for the concept of ‘one theatre, one forecast’ and the use of ‘METOC Information’ to encompass METOC data, information and services.

f. The IMETOC definition has been updated, including terms such as: IMETOC Assisting Nation, IMETOC Lead Nation, etc.

g. Appropriate diagrams to illustrate the organization, command and control and information flow for METOC support have been included.

h. Questioned areas to help lift current national reservations have been clarified.

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# References

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| MC 0133 | NATO's Operations Planning, |
| MC 0458 | NATO Education Training Exercises and Evaluation (ETEE) |
| MC-0632 | NATO Recognised Environmental Picture Concept |
| MC-0594 | METOC Support to Allied Forces |
| NATOTerm | NATO Terminology Database |
| AJP-2 | Allied Joint Doctrine for Intelligence, Counter-Intelligence and Security |
| AJP-3 | Allied Joint Doctrine for the Conduct of Operations |
| AJP-5 | Allied Joint Doctrine for Planning of Operations |
| AMETOCP-2 | NATO Meteorological Support Manual |
| AMETOCP-2.1 | NATO Library of Meteorological and Oceanographic Tactical Decision Aids |
| AMETOCP-3 | NATO METOC Communications Manual |
| AMETOCP-4 | NATO Meteorological Codes Manual |
| ATP-32 | NATO Military Oceanographic and Rapid Environmental Assessment Support Procedures) |
| AD 80-34 | Meteorological and Oceanographic (METOC) Services for Allied Command Operations |
| AD 81-05 | Allied Command Operations REP Implementation Plan (ARIP) |
| ACO COPD | Allied Command Operations Comprehensive Operations Planning Directive Interim Version 3.0. |
| Bi-SC 080-006 | Lessons Learned |

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# Preface

## Context

Meteorological and oceanographic (METOC) information[1] is key to provision of situational and risk awareness in addition to supporting decision superiority; METOC information enables the efficient exploitation of the physical environmental conditions and helps to assure the effective and safe delivery of effects.

## Scope

Allied Joint Publication (AJP) - 3.11, *Allied Joint Doctrine for Meteorological and Oceanographic Support* provides guidance to plan, execute and assess METOC support throughout the full spectrum of NATO activities.[2] It describes the METOC contribution to the operational commander's situational awareness, risk management and environmental exploitation by delineating NATO METOC support capabilities, tasks and responsibilities.

## Purpose

AJP-3.11 supports keystone publications specifically AJP-2, *Allied Joint Doctrine for Intelligence, Counter-Intelligence and Security* and AJP-3, *Allied Joint Doctrine for the Conduct of Operations*.[3,4] It bridges between these documents, METOC specific policy[5] and more detailed guidance provided within supporting publications.

## Application

AJP-3.11 provides guidance for the joint NATO commanders and staff on how to use METOC capabilities to support activities including operations; it also provides guidance for subordinate commands and non-NATO entities participating in NATO activities that receive NATO METOC support.

## Structure

This publication is divided into three chapters: Fundamentals, Operational Procedures, and Conduct of Allied Forces METOC Support.

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[1] Frequently provided today via services, METOC information as a term incorporates both METOC data and METOC products (not NATO agreed).
[2] NATO activities is used to encompass the full spectrum of operations and exercises that are NATO-led in addition to cooperative activity that includes participation of NATO elements in non-NATO led activities.
[3] AJP-2, *Allied Joint Doctrine for the Conduct of Operations*, Edition A.
[4] AJP-3, *Allied Joint Doctrine for the Conduct of Operations*, Edition C.
[5] MC-0594, *METOC Support to Allied Forces,* Edition 2.

## Linkages

AJP-3.11 is related to AJP-3.17, *Allied Joint Doctrine for Geospatial Support*. It is also underpinned by processes and procedures described in Allied METOC publications, Allied tactical publications and standardised reference documents.[6]

[6] *Allied METOC Publication* Series and ACO Directives 80 and 81.

# Chapter 1 – Fundamentals

## Section 1 – Purpose

1.1 The purpose of this publication is to characterise, in general terms, the role and coordinated provision of accurate and timely meteorological and oceanographic (METOC) support to NATO. This support can be tailored to the specific requirements of the commander's missions, and subordinate operational units' tasks, weapons, sensors and systems. This publication stipulates METOC support doctrine for joint forces operating across the full spectrum of NATO led-activities.

## Section 2 – Overview

1.2 NATO forces operate on a global scale. They rely on having knowledge of current and forecasted environmental conditions to enhance the effectiveness of all domain and humanitarian missions. Accurate, timely, relevant, consistent and reliable METOC Information is integral in the process to inform military decisions during all phases of planning and execution. These METOC Information characteristics are key to the integrated METOC (IMETOC) support principle.[7]

1.3 METOC information provides commanders, planners and operators with the necessary environmental knowledge and awareness to anticipate and exploit the best windows of opportunity in which to plan and execute specific operations and missions. Using IMETOC information as the basis for optimising the employment of sensors, weapons, targeting, logistics, equipment and personnel is key to safe, effective, efficient, and ultimately successful operations.

1.4. To ensure consistent situational awareness, it is important that a single common and recognised source of METOC information is provided to all NATO force elements; this assures coherency and standardisation. To better tailor the provision of IMETOC support, a requirement also exists to feedback information on the observed METOC impacts upon both adversary and friendly force operations.

[7] MC 0594 defines the Integrated Meteorological and Oceanographic (IMETOC) support principle.

## General

1.5 AJP-3.11 outlines doctrine for METOC support to joint operations in a generic way and neither the doctrine nor command titles depicted in AJP-3.11 are specific to the static NATO command structure (NCS) or a deployed or activated joint task force (JTF). The term joint force commander (JFC) is used in a generic way to represent commanders of any joint force unless the use of a specific term is more appropriate.

1.6 Throughout this publication 'METOC' refers to the entire range of support required. Specifically it:

- describes support responsibilities of METOC staff;
- provides a reference and common understanding and application of available METOC support at all levels;
- supports and is subordinate to overall NATO operational doctrine; and
- accounts for the provision of military space weather[8,9] information.

## Meteorological and oceanographic support to joint forces

1.7 Relevant IMETOC information must be available from the start of planning and then iteratively throughout a mission or operation until it is completed. It is used to contribute to a commander's comprehensive understanding of their operating environment and to inform decision making. IMETOC information may also be used during post mission analysis to help assess performance and shape future missions or operations. Higher keystone publications mention the inclusion of georeferenced meteorological or oceanographic information to support common operational pictures[3] but specific input of IMETOC information is required to generate the joint intelligence estimate. AJP-2[10] outlines a description of IMETOC input to the joint intelligence estimate, however specific details including the processes and procedures employed, and the role and input of IMETOC information, is provided in related doctrine[11] and Allied Command Operations' (ACO)'s planning directive.[12]

1.08 By providing commanders with better situational awareness of the changes in environmental conditions, IMETOC information helps improve understanding of

[8] MC 0594 defines METOC support and includes activities pertaining to meteorology and oceanography, including meteorological and oceanographic climatology and military space weather effects.
[9] The term "military space weather" describes the collection, processing, analysis, and dissemination of space weather data, information and knowledge in support of military activities. Not NATO agreed, TTF tracker 2022-0210.
[10] AJP-2 *Allied Joint Doctrine for Intelligence, Counter-intelligence and Security,* Edition A.
[11] AJP-2.1 *Allied Joint Doctrine for Intelligence Procedures*, Edition B.
[12] COPD *Allied Command Operations Comprehensive Operations Planning Directive* v3.0.

environmental impact upon friendly and adversary force capabilities. This enables decisions to be taken on force disposition to safely and efficiently optimise the delivery of effect. IMETOC information should include limits of confidence or reliability to support risk assessment.

1.09 METOC support to NATO joint forces originates from national and international METOC organisations and capabilities, and may be supplied as either raw data (e.g. observations, imagery) or as processed information such as NATO joint operations area forecasts or impact matrices. The breadth of missions and the associated composition of forces define the corresponding METOC information requirements.

1.10 National support may be further processed within a NATO command or designated framework nation entity facilities, e.g. the multinational METOC support group (MN MSG), to produce value-added or tailored information and products. Examples include the recognized environmental picture (REP) which can be employed to support specific tactics, techniques and procedures. Supreme Headquarters Allied Powers Europe (SHAPE) chief METOC officer and staff in conjunction with other appropriate SHAPE staff, JFC and single service command METOC staff coordinate inclusion of information in a REP or its subsequent depiction within the NATO common operational picture. This co-ordination effort is aimed at enhancing overall effectiveness of information and support. Chapter 3 describes the main tasks and responsibilities of these METOC personnel.

1.11 Joint operations may require a rapid environmental assessment (REA) potentially including dedicated tasking to collect and process required information to assess the physical environment and its impact upon military operations. This near real time assessment of the physical environment is intended to determine the impact of the physical environment upon specific military operations or activities. It may include meteorological, oceanographic, hydrographic, geophysical and space weather conditions that influence the capabilities and performance of forces involved. REA is frequently conducted where a gap is identified within traditional or routine support. Pending update to existing routine support provision, and to meet operational expediency, REA may capture available METOC data or information to inform the operational requirements of local force commanders. REA is designed to complement and be carefully harmonised with existing support methods and should not impact existing architecture provided for routine IMETOC support, including geospatial and hydrographic data collection or product dissemination.[13]

[13] MC-0632 *NATO Recognized Environmental Picture Concept*, 9 Jun 2015.

1.12 METOC manning to support NATO joint forces should be a blend of both national and NATO personnel. NATO commanders define their manning requirements through the established NATO peacetime establishment and crisis establishment processes. Specified METOC capabilities, including deployed and reach-back assets should be responsive to the requirements of the JFC.

1.13 METOC equipment to support NATO joint forces may also be a blend of both national and NATO infrastructure. This equipment may encompass data sensing, collection, processing and dissemination capabilities as well as METOC forecasting systems. NATO encourages the maximum possible standardisation and interoperability between national METOC capabilities through NATO's federated mission networking (FMN) initiative.

1.14 METOC impacts should be considered by decision makers during all phases of an operation, including post-conflict operational phases such as transition from military to civil control.

**Doctrinal guidance on the provision of meteorological and oceanographic support**

1.15 IMETOC Principle. This governs the data and products on which support for a specific operation is based. Support for a specific operation is typically provided by one particular nation designated by SACEUR. This nation is entitled the IMETOC Lead Nation (LN). The IMETOC LN may be supported by other nations where specific or niche expertise and/or information spatial coverage exists. This nation is entitled the IMETOC assisting nation (IMETOC AN).

1.16 IMETOC LN and AN information is used at ACO commands and primarily provided via the MN MSG. A comprehensive and standardised METOC support effort is required across the whole of the operating environment, spanning from the ocean floor or ground, through all water bodies and the atmosphere out across the space environment. The intent is to ensure command confidence in the expected environmental impacts and subsequent decision-making processes. This is achieved through the provision of a consistent and coherent "look and feel" that enhances shared awareness and interoperability.

1.17 The IMETOC principle of "One Theatre, One Forecast" establishes the following essential quality attributes for information support:

a. **Accurate**. Joint forces depend on accurate information for planning and operational execution. Inaccurate information can cost lives, undermine the successful execution of a mission, waste resources and impair readiness. This is true across the full spectrum of operations. The capability to collect data within and beyond the declared JOA with sufficient spatial and temporal resolution to model and forecast conditions is key to METOC accuracy. The impact these factors have on forecast confidence should be explained to

decision makers to enable them to better understand the impact METOC has upon courses of action;

b. **Timely**. Support to NATO joint forces is only effective if it is received by SHAPE, subordinate commands and all appropriate entities in time to inform and support their decision making processes. Reliable and adequate bandwidth communications capable of supporting web services are also vital to the timely delivery of information;

c. **Relevant**. Overall effectiveness of support is a direct reflection of its specific relevance and employment to joint force operations. METOC support provision must be relevant throughout all phases of planning and mission execution. This means it support provision should be continually assessed in terms of content, form, medium, presentation and frequency of update. When necessary METOC staff should engage directly with information users to verify the relevance of support provided. National and NATO METOC support entities should direct actions to sustain this objective including identification of appropriate criteria and constant assessment of performance. The NATO Lessons Learned system[14,15] should be accessed by planners;

d. **Consistent**. Support for discrete theatres of NATO activity should be consistent throughout the strategic, operational and tactical levels of both planning and execution; and

e. **Reliable**. Confidence in this process must be established in the user community; mission success is dependent not only upon the quality of support products but also through user confidence and understanding that information has been continuously validated against recognised standards.

1.18 In order to be responsive and effective, METOC readiness must be maintained. This is achieved through appropriate trained personnel with proper access to joint equipment and a joint communications capability. It is a national responsibility to train METOC personnel to the appropriate professional level, defined in individual job descriptions to meet NATO standards and to maintain a high level of operational METOC support.[16]

1.19 National and NATO METOC assets should be co-ordinated to ensure they are standardised and interoperable. NATO standardization agreements are available in support of Force proposals and have to be continuously developed to meet any change in requirements.[17] Additionally adherence to the Federated Mission

[14] NATO Lessons Learned Policy is detailed in PO(2011)0293-AS1 and can be referenced from the NATO Lessons Learned Portal.
[15] Bi Strategic Command Directive 080-006, *Lessons Learned*, 23 Feb 2018.
[16] *Allied METOC Publication-2: NATO Meteorological Support Manual*, 26 Jan 2016.
[17] *Allied METOC Publication 4: NATO Meteorological Codes Manual*, 24 May 2019.

Networking (FMN) concept as new capabilities come on line, should assure broader interoperability between NATO and National assets.

## Section 3 – Meteorological and oceanographic activities

### Sensing and collection

1.20 METOC support depends on the timely collection of METOC data and information to the required temporal and spatial resolution. Observations of specified physical characteristics from space, air, land and sea by sensors, platforms and/or weather observers are the basis for effective METOC support. These observations, are essential inputs to numerical models from which METOC services and products are derived. Due to the rapidly changing nature of the METOC environment, these observations must be continuously updated and made available to METOC organisations. The senior METOC officer at the operational level, in coordination with the JTF and/or functional component commands, reviews the readily available METOC data in light of the requirements developing or recommending a sensing and collection plan for METOC data, as required. Further details on the observation formats are detailed in standardised NATO METOC Publications.[18]

### Processing

1.21 Processing METOC data into relevant information enhances support to the commander's decision-making cycle. Mission and task impact thresholds, tailored as appropriate, are developed for particular NATO operations and/or supporting assets according to commanders' requirements. Processing takes place within NATO, national and/or multinational military facilities and includes quality control. Analysis of METOC data and products to form a coherent picture of current and predicted METOC environment states contribute to the REP[18,19] and is part of the NATO Common Operating Picture.

### Dissemination

1.22 METOC data and products provided by IMETOC LNs, are disseminated via ACO's METOC exchange communication network to meet strategic, operational, tactical and/or other requirements. The MN MSG works in conjunction with IMETOC LN data and products to standardise NATO informational support and facilitate its use within the national METOC production and visualisation systems of troop contributing nations.

1.23 Communications are an essential component of the NATO IMETOC support infrastructure. Due to the perishable nature of METOC data and products, delivery of information to users is time critical if it is to reach users and still have operational and

[18] MC 0632 details the NATO Recognized Environmental Picture (REP) Concept. The REP is also a primary component for display of Geospatial and METOC information within NATO's Federated Mission Networking programme.
[19] AD 81-05 is ACO's REP Implementation Plan (ARIP) which details implementation of the concept.

planning value. Shortfalls in communications that cannot be met by existing communications capabilities should be highlighted via the chain of command to both the NATO communications planners and representatives of nations participating in IMETOC support. National data producers and IMETOC LNs enhance timeliness and deliverability of support through adherence to defined meteorological communication standards[20] and standards related documents.

1.24 Under the IMETOC principle, information is provided to ensure seamless support to NATO operations and activity. Nations seeking information in support of their own non-NATO related activities must negotiate and secure independent agreement with METOC data providing nations.

**Evaluation**

1.25 IMETOC LN data and products need to be continuously evaluated via a robust quality assurance system that utilises knowledge, experience, operational / situational awareness, staff networking and other techniques as appropriate. It shall assist in the proper use and continuous improvement of support. This approach ensures that:

a. the accuracy of information provided directly by the IMETOC LN or via the MN MSG, is continuously evaluated and improved; and

b. gaps in the dissemination of data and products provided either directly by assigned IMETOC LN or via the MN MSG are identified and minimised.

## Section 4 – Security

1.26 NATO METOC support is subject to NATO security regulations articulated in the NATO Security Compendium.[21] Special arrangements for accessing and handling information may be necessary during some collective defence and crisis response operations.

[20] *Allied METOC publication 3: NATO METOC Communications Manual*, 11 Jan 2016.
[21] C-M(2002)49 – Security within NATO, 17 June 2002.

# Chapter 2 – Operational procedures

## Section 1 - Operations planning process

2.1 Meteorological and oceanographic (METOC) aspects of the NATO operations planning process and support are defined in standardized tier 2 policy and Allied Command Operations (ACO) directives.[22,23] During the planning phase, METOC focus is on supporting mission analysis. This includes producing and integrating required METOC inputs within planning documents. These inputs include descriptions of how METOC will support joint force operations. At the strategic level this includes authoring annex T within concept of operations or operational plans (OPLAN) documents and annex W for exercise plans. Military space weather support details are laid down separately at Annex DD.

2.2 METOC information exchange requirements are co-ordinated with communication and information systems J6 for inclusion in Annex Q to OPLANs. Requirements for NATO METOC crisis response measures are provided in Annex JJ. During planning phases and specifically in preparation of the joint intelligence estimate, climatological information and long range, seasonal forecasts for the area of interest or joint operations area may be required. METOC considerations are required for both advance planning and crisis response planning.

## Section 2 – Meteorological and oceanographic information

2.3 Foundation METOC information, primarily numerical weather prediction model output and weather observations, is delivered by the Integrated METOC lead nation (IMETOC LN). They are supported by an assisting nation (IMETOC AN) where niche capability, or information of higher resolution or better spatial coverage than the IMETOC LN can provide is available. The IMETOC LN is identified and designated by Supreme Headquarters Allied Command Europe (SHAPE). The procedures for IMETOC LN and AN appointment are outlined in standardised reference documents.

2.4 The IMETOC LN for the NATO Response Force (NRF), major joint operations or small joint operations must be a NATO nation. To ensure consistency across the area of operations or area of interest, support provided by the IMETOC LN or AN is collected through a single point of entry for onward dissemination. This single point is provided by the NATO METOC data hub which is hosted by the German GeoMETOC Capability Support Cluster based at the Bundeswehr Geoinformation Centre (BGIC), Euskirchen. Management and delivery of this capability is delegated by BGIC to the

[22] *Allied METOC publication 2: Chapter 2 NATO Meteorological Planning & Administration,* Edition A Version 1, 26 Jan 2016.
[23] ACO Directive 080-034: *Meteorological and Oceanographic Services for Allied Command Operations* dated 18 Aug 20.

framework nation entity the multinational METOC support group (MN MSG). ACO must take account of the capabilities of an IMETOC LN, any IMETOC AN and NATO infrastructure when planning and co-ordinating support.

2.5 The ACO Chief METOC officer in conjunction with supporting METOC officers' assigned to SHAPE, joint force commands (JFCs), single service commands and joint task forces (JTFs) must also consider adequate provision of essential IMETOC information to non-NATO participating Nations or NGO's during some crisis response operations. This may include the use of caveated or limited password protection.

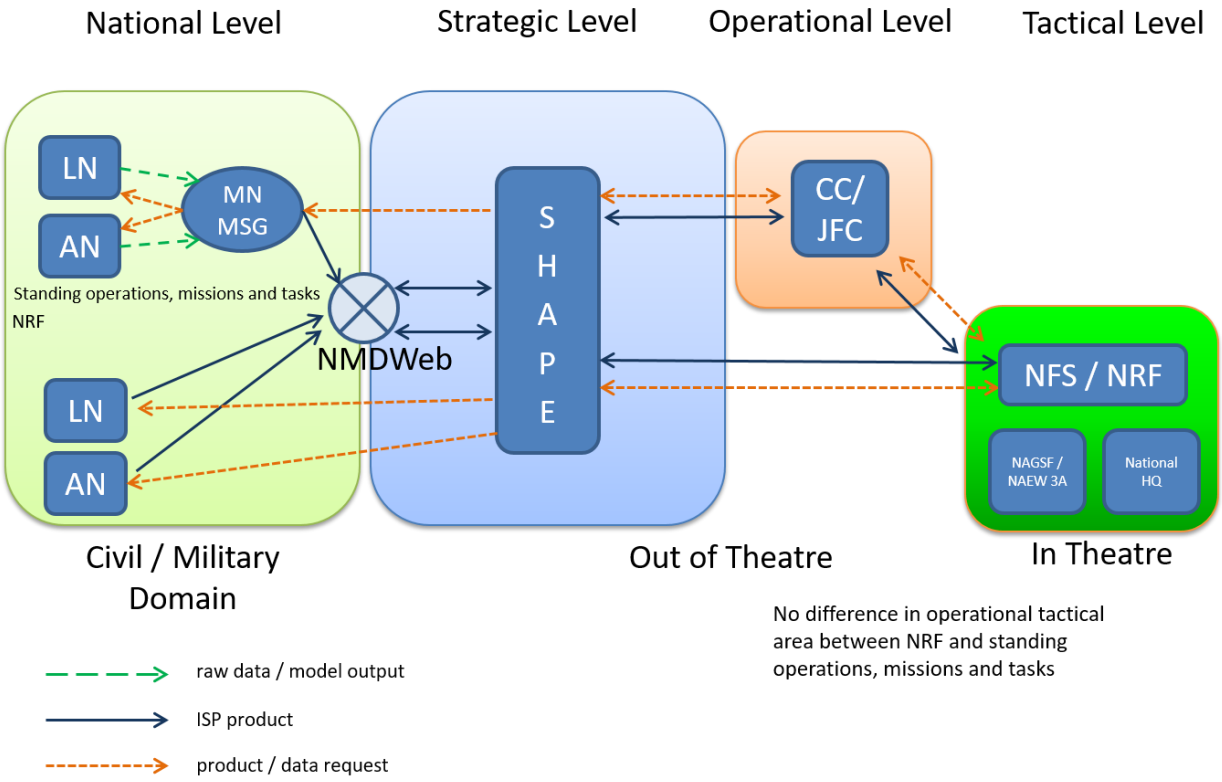


Figure 2.1 Schematic depicting NATO's integrated METOC support architecture

2.6 METOC support to the standing NATO Response Force (NRF) is co-ordinated directly by the NRF IMETOC LN to the NRF force structure. This does not preclude NRF access to support via the MN MSG and NATO METOC data hub using available system architecture including web services.

## Section 3 – Rapid environmental assessment

2.7 Crisis response, peace support and humanitarian operations, may alter the nature of military environmental support requirements. Decision processes on manoeuvrability or environmental viability, particularly for initial or spearhead force elements, often require support at locations where limited prior knowledge is available or the pace of activity exceeds existing support timescales. Encompassing both METOC and geospatial support, rapid environmental assessment (REA)[24] is frequently a pre-cursor activity configured to support joint intelligence processes. Standardised reference documents provide guidance for SME and non-SME on REA activity and how it should be co-ordinated, implemented and actioned.

## Section 4 – Lessons learned processes and best practice

2.8 All involved METOC personnel need to provide feedback on shortcomings or problems with METOC support using their respective chain of command. Commanders shall endorse or provide solutions for validated shortcomings and problems reported. METOC personnel should submit all observations into the NATO lessons learned portal. The lessons learned portal is the single NATO tool for collection, managing, tracking, monitoring and sharing of lessons and can be accessed from the internet.[25,26]

[24] ATP 32 NATO Handbook of Military Oceanographic Information Services and REA Support Procedures.
[25] Joint Analysis and Lessons Learned Centre: https://nllp.jallc.nato.int/Pages/default.aspx
[26] ACO's Chief METOC Officer has requested that all METOC related observations are also forwarded to ACO J2 METOC for awareness and tracking.

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# Chapter 3 – Conduct of Allied joint force meteorological and oceanographic support

## Section 1 - Introduction

3.1 This chapter outlines the conduct of meteorological and oceanographic (METOC) support to NATO joint forces. It describes the roles of METOC personnel and the METOC organisation providing routine support to NATO joint forces. Further detail is provided in Allied Command Operations (ACO) directives. [27]

## Section 2 – NATO METOC command and control concepts

3.2 Command and control (C2) of METOC support to NATO joint forces mirrors the C2 architecture designated for specific operations. Two levels of command exist within the NATO Command Structure (NCS) to effect C2 of NATO forces throughout the Alliance area and beyond as directed. These two levels are the strategic and operational level. C2 for NATO operations are tailored to each operation individually and usually include tactical level elements. SACEUR routinely designates existing commands at the operational level, or command of a combined joint task forces (CJTF). Allocated personnel or entities with METOC responsibilities present within these commands or within supporting structures are described below.

### Strategic level

3.3 ACO plans and executes all Alliance operations and establishes operational requirements. It consists of a small number of permanently established headquarters, each with specific roles and responsibilities. Supreme Allied Commander Europe (SACEUR) assumes overall command of operations at the strategic level based at Supreme Headquarters Allied Powers Europe (SHAPE) in Mons, Belgium. The ACO Chief METOC officer, supported by a team, supervises ACO METOC operations and has overall responsibility for METOC support.

3.4 Headquarters Allied Command Transformation (HQ ACT) is responsible for warfare development including policy, doctrine, training and capability development. The METOC Project Co-ordinator working within the Joint ISR Capability Development section, (CAPDEV JISR) is the sole METOC SME within the HQ. ACT is responsible for warfare development of METOC and dependent capabilities in support to NATO joint forces.

[27] AD 80-34 *Meteorological and Oceanographic (METOC) Services for Allied Command Operations*, 18 Aug 2020.

## Commands at the operational level

3.5 Three Allied joint force commands (JFCs) exist at the operational level, and are based at Brunssum, Naples and Norfolk. Brunssum and Naples have a senior METOC officer with teams to support them.[28] They provide METOC support to operations or activities designated to each specific JFC.

3.6 Three theatre level component commands, Allied Maritime Command, Allied Land Command and Allied Air Command also have allocated METOC personnel. Similar to the JFCs these personnel provide METOC support to operations or activities designated to their respective component commands.

## Combined joint task forces

3.7 Combined joint task force (CJTFs) headquarters (HQ) are established and formed as necessary around a nucleus at a pre-designated parent HQ. They are augmented by support and capability modules as required. METOC augmentation for CJTF HQs is based upon the existing nucleus METOC capabilities and validated support gaps.

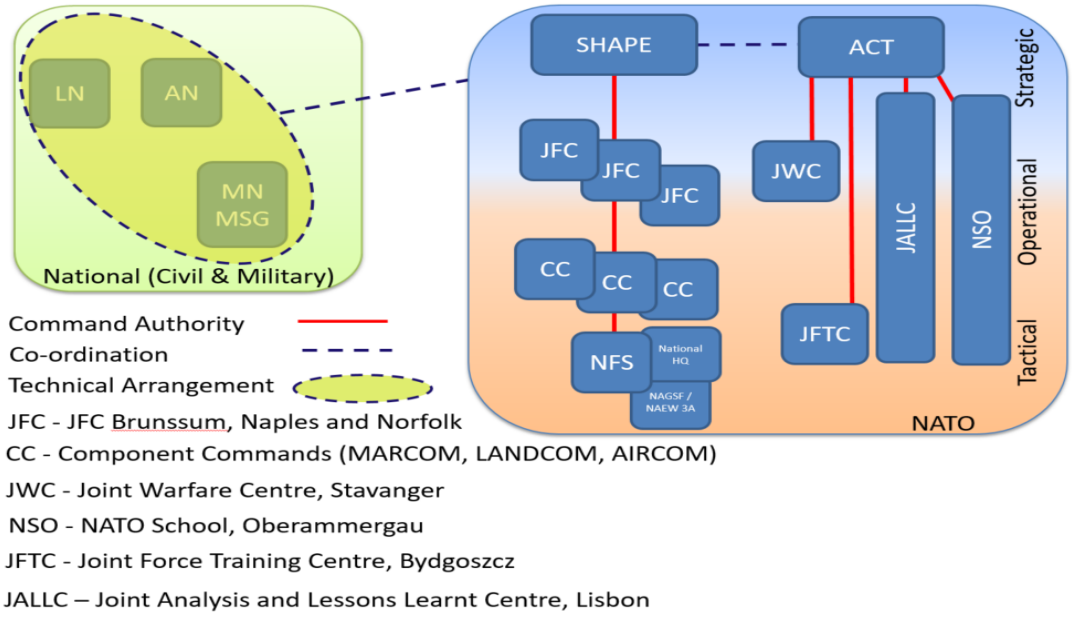


Figure 3.1 Schematic of NATO meteorological & oceanographic command and control

[28] Joint Force Command Norfolk currently employs reach-back for all METOC support.

## Section 3 – NATO METOC tasks and responsibilities

### Supreme Headquarters Allied Powers Europe

3.8 SHAPE Command tasks and responsibilities:

a. provide strategic guidance, direction, control and coordination on METOC support within ACO, including JTFs;

b. validate requirements, manning levels, facilities, equipment and communications;

c. liaise with subordinate commands and nations;

d. develop and oversee quality assurance within ACO;

e. improve integrated METOC (IMETOC) acceptance in theatre by:

- ensuring assigned personnel are correctly trained;
- continuously monitoring on the status of IMETOC support through detailed feedback reported in SITREPs;
- identifying and approving IMETOC Lead Nations (LNs);
- requesting and co-ordinating support required from IMETOC LNs; and
- leading relations with IMETOC LNs and managing the IMETOC LN support process;

f. task the multinational METOC Support Group (MN MSG) in relation to the provision and product development support to meet mission or operational requirements in accordance with the agreed technical arrangement;

g. identify and validate requirements for, and ensure best use of relevant communication and information systems (CIS), including connectivity to command structures and national METOC agencies; and

h. initiate rapid environmental assessment (REA), as directed by the NAC, designating an REA co-ordinator for operations and engagements.

**Headquarters Supreme Allied Command Transformation**

3.9 HQ Supreme Allied Command Transformation tasks and responsibilities:

a. warfare development including the NATO Defence Planning Program capability delivery, prioritisation of validated capability gaps;

b. identify and develop solutions to ACO's capability requirements;

c. support NATO's transformation process providing a framework for interoperability by federated forces, and;

d. support delivery of collective and individual training.

**Allied Command Operations**

3.10 ACO Commands on operational level tasks and responsibilities:

a. coordinate METOC support on operational and tactical levels;

b. liaise with IMETOC LNs and/or other NATO entities for the provision of basic and specific data and products for both peacetime support and crisis response operations as required;

c. issue guidance and provide advice to assigned component commands on IMETOC support, approve METOC aspects of their OPLANs and co-ordinate their IMETOC support;

d. identify support required from IMETOC LNs; and

e. establish a combined meteorological & oceanographic unit (CMU) responsible for a specific area of operation as required.

**Headquarters Combined Joint Task Force**

3.11 The HQ CJTF will have its own CMU or receive support co-ordinated through the METOC officer at the higher HQ. METOC support required by the JTF includes:

a. coordination of METOC support to the HQ;

b. coordination of the METOC support requirements, including manning, for forces under JTF control; and

c. co-ordination of CIS infrastructure to assure receipt of IMETOC LN information from the NCS into national METOC CIS systems within the JTF operational

area.

**Joint Warfare Centre**

3.12 Joint Warfare Centre Stavanger, is the only ACT command manned with a NATO METOC officer[29] and plans, prepares and executes joint operational level training. The METOC SME provides input to the planning and execution of exercises including sourcing IMETOC LN data or equivalent climatology data to meet the training aims and objectives. This mirrors ACO's role during live operations.

**Framework nation entities**

3.13 NATO accredited Centres of Excellence (CoE) are not part of NATO's command and force structures, but provide an important role as a hub aimed at enhancing interoperability between NATO Allies, partners and other non-NATO entities. Along with all relevant CoE, the Maritime GeoMETOC CoE based in Lisbon offers particular expertise supportive to NATO's METOC community. Within specific specialist domains CoE support the work of the Alliance across the following areas:

- Education, training, exercise and evaluation (ETEE);
- Analysis and lessons learned (ALL),
- Doctrine development and standardisation (DDS); and
- Concept development experimentation (CDE).

3.14 The MN MSG is a framework nation entity established by Germany at the Bundeswehr Geoinformation Centre (BGIC) in Euskirchen. The group has an implementation plan[30] and TA signed by SHAPE and the German government which agrees to the MN MSG being tasked to support NATO through the following key services:

a. development, production visualisation and dissemination of METOC products as well as collection and dissemination of METOC data according to the data and product catalogue established by ACOs chief METOC officer. Those METOC products and data are based on unique foundation data sets provided by the IMETOC LN to meet IMETOC support requirements for all NATO-led activities, such as operations, exercises, special missions, training and contingency planning etc. This supports all levels of the NCS and NATO force structure;

[29] Joint Force Training Centre (JFTC) Bydgoszcz and the Joint Analysis & Lessons Learned Centre (JALLC) in Portugal do not have assigned METOC SMEs.
[30] Implementation Plan for the Multinational METOC Support Group, Annex A to SH/SEM/J2/GEO/MET/CG/19-003899, 13 Sep 2019.

b. reach-back support to the full spectrum of operations, exercises, training and contingency planning at the strategic and operational levels;

c. extraction, preparation and dissemination of foundation data sets to be applied by supporting SME visualisation systems, tactical decision aids, weapon systems etc. at tactical levels;

d. development and implementation of methods to monitor and control the quality / performance of IMETOC LN data as well as MN MSG generated products;

e. contribution to relevant documentation and standardization to enhance interoperability and the operational value of NATO IMETOC standards;

f. contribution and support to NATO IMETOC training in accordance with the NATO military training and exercise programme with special focus on mission-specific training including operational and exercise feedback on METOC support and products; and

g. Liaising with NCS and their associated working groups on matters related to NATO IMETOC support.

**National military contingents**

3.15 National military contingents augmenting a NATO force may be either single service or joint in nature and have a wide range of operational capabilities, which may include organic METOC support capability. METOC tasks and responsibilities of the national military contingent include:

a. liaison with the CMU. CMU contact details are detailed in operational plans at annex T or W;

b. ensuring that their contingent complies with the IMETOC principle and its provisions;

c. ensuring that national military contingents are equipped with the means to retrieve and use data, information and products provided by IMETOC LNs and use them according to the IMETOC support provisions; and

d. articulating national military contingent concerns whilst simultaneously involving national military authorities to both coordinate and encourage international cooperation and collaboration to support the NATO mission.

### Integrated METOC lead nation

3.16 IMETOC LNs provide ACO with accurate, timely, relevant, consistent and reliable METOC data, products and information in accordance with TAs co-ordinated by SHAPE. Details of all METOC support information is captured in an IMETOC Support Plan. This includes routinely utilising and incorporating support from assisting nations.

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# Lexicon

The lexicon contains terms, abbreviations, and definitions relevant to AJP-3.11 and is not meant to be exhaustive. For abbreviations that are not listed below and for the most up-to-date terminology, please consult NATOTerm.

## Part I – Acronyms and abbreviations

| | |
|---|---|
| ACO | Allied Command Operations |
| AJP | Allied joint publication |
| ATP | Allied tactical publication |
| C2 | command and control |
| CIS | communication and information systems |
| CJTF | combined joint task force |
| CMU | combined meteorological and oceanographic unit |
| IMETOC | integrated meteorological and oceanographic |
| IMETOC AN | integrated meteorological and oceanographic assisting nation |
| IMETOC LN | integrated meteorological and oceanographic lead nation |
| JFC | joint force command & joint force commander |
| METOC | meteorological and oceanographic |
| MN MSG | multinational meteorological and oceanographic support group |
| NCS | NATO Command Structure |
| NRF | NATO Response Force |
| OPLAN | operation plan |
| REA | rapid environmental assessment |

## Part II – Terms and definitions

**IMETOC assisting nation**. A supporting nation determined by SHAPE METOC in conjunction with the IMETOC LN to provide additional support and assist the IMETOC LN in meeting the requirements of the IMETOC support plan. Such assisting information is typically for niche capability or offers greater resolution or spatial coverage for a specific operational need. Information is provided in a supporting and complementary manner. (Not NATO agreed).

**IMETOC lead nation**. The designated provider and coordinator of Integrated METOC data, information and products for a specific operation, response capability, or event. The integrated METOC lead nation ensures all IMETOC data, information and products required, including that provided by assisting nations, are integrated into the IMETOC support plan for a designated operation, response capability or event. IMETOC LNs may identify potential ANs and work with them through respective National Military Representatives to ACO. This may be particularly useful when finalising the technical arrangement between the LN and AN. (Not NATO agreed).

**METOC information**. Frequently provided today via services, METOC information as a term incorporates both METOC data and METOC products. METOC data represents the raw sensor observations of METOC parameters and the numerically weather predication (NWP) which comprises modelling of raw observations to derive current and future assessments of METOC parameters. METOC products typically refer to value added decision aids developed from the visualisation and analysis of METOC data. (Terminology proposal ongoing in TTF 2022-0226).

**military space weather (MilSWx)**. The collection, processing, analysis, and dissemination of space weather data, information and knowledge in support of military activities. (Terminology proposal ongoing in TTF 2022-0210).

**multinational meteorological and oceanographic support group (MN MSG)**. The framework nation entity established by the German military forces to provide meteorological and oceanographic support to NATO. (Terminology proposal ongoing in TTF 2021-0160).

Note: NATO's meteorological and oceanographic reach-back production and quality assurance centre which hosts NATO's meteorological and oceanographic data hub; in accordance with SHAPE the centre ensures METOC LN information is tailored to meet mission support requirements in accordance with designated IMETOC Support Plans.

**rapid environmental assessment**. The collection, processing and dissemination of meteorological, oceanographic and geospatial data and products to forces in near-real time, in order to contribute to the common understanding of the operational environment and to improve joint operational effectiveness through enhanced situational awareness and decision making. (NATO agreed).

**recognized environmental picture**. A complete and seamless depiction of geospatial, oceanographic and meteorological information designated for the planning and conduct of joint operations in a specific area at a specific time and which supports the unity of effort throughout the battlespace. (NATO agreed).

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