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TACTICS TECHNIQUES AND PROCEDURES (TTP) FOR ESTABLISHING AIR TRAFFIC CONTROL (ATC) IN TIMES OF CRISIS AND CONFLICT

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NORTH ATLANTIC TREATY ORGANIZATION

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NORTH ATLANTIC TREATY ORGANIZATION (NATO)

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NATO LETTER OF PROMULGATION

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1. The enclosed Allied Air Traffic Management Publication AATMP-02 Edition A, Version 1, TACTICS TECHNIQUES AND PROCEDURES (TTP) FOR ESTABLISHING AIR TRAFFIC CONTROL (ATC) IN TIMES OF CRISIS AND CONFLICT which has been approved by the nations in the AIR TRAFFIC MANAGEMENT – COMMUNICATIONS, NAVIGATION AND SURVEILLENCE ADVISORY GROUP, is promulgated herewith. The agreement of nations to use this publication is recorded in STANAG 7216.

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Edvardas MAŽEIKIS
Major General, LTUAF
Director, NATO Standardization Office

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RECORD OF RESERVATIONS

CHAPTER	RECORD OF RESERVATION BY NATIONS

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RECORD OF SPECIFIC RESERVATIONS

[nation]	[detail of reservation]
DEU	
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TABLE OF CONTENTS

LIST OF TABLES

ANNEX A – STEP 2 – DEPLOYED AIR TRAFFIC CONTROL OPERATIONS

CHAPTER 1

NATO Standard for Tactics Techniques and Procedures (TTP) for Establishing Air Traffic Control (ATC) in Times of Crisis and Conflict

0101. Purpose

1. The intent of this TTP for Airfield Operations is to:

a. Focus on planning, deployment, preparation and coordination for ATC, Airspace, ongoing military operations and post conflict/operational and administrative transition of airspace and services from military to civil control.

b. Outline how Forces open and operate a deployed or contingency airfield, including planning considerations for airfield management (AM), ATC, and Deployable Air Traffic Control and Landing Systems (DATCALS) capabilities, procedures, forces, and equipment.

c. Retain coherence and refer to existing documentation pertaining to Joint Airspace Control under the auspices of the Air Operations Working Group (AOWG) (AJP 3.3.5 and ATP 3.3.5.1), but expand significantly on the integration of air traffic with battlespace operations.

0102. Scope

1. The STANAG covers the following areas:

Chapter 2	Initial Operations
Chapter 3	Sustained Operations
Chapter 4	Transition for NATO Military to Civil or Other Military Control

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CHAPTER 2

INITIAL OPERATIONS

0201. Assessment

1. The airfield operations mission is to deploy in support of operational forces at Host Nation (HN) or bare base locations and provide basic airfield services.

2. Pre-deployment analysis of ATC integration within a proposed Joint Operating Area (JOA) should carefully consider the types of operation proposed i.e. humanitarian, crisis, war, etc.

3. Assessment of the existing aeronautical facilities is essential, with widely varying material, personnel and procedural requirements depending upon extant structures i.e. bare base, existing aerodromes with limited facilities or existing aerodromes with in-place operational facilities/resources etc. The surrounding airspace infrastructure may still be in existence and in use by civil or neutral agencies, so construction of combat airspace and military ATC structures requires extensive planning for integration and construction to produce a mature airspace construct.

4. To effectively employ air power, the Commander of Air Forces (COMAFFOR) must ensure the safe and expeditious operation of aircraft with a reliable and effective airfield operation that enables both the projection and sustainment of aviation capability.

0202. Planning Considerations

1. The following planning considerations should be utilised when preparing to conduct initial entry operations:

a. **Type of mission**. The type of mission determines the material and personnel requirements necessary to complete the tasking.

b. **Length of operations**. Factors such as personnel numbers required for sustained periods, establishment of lines of communication (LOC), engineering support and life support issues such as accommodation and medical support must all be detailed within the planning process. Controller management issues such as fatigue management and controller currency must also be considered.

c. **Type of services required**. This planning consideration involves the type of ATC operation being proposed, from Terminal operations requiring instrument flight rule (IFR) recovery capabilities to enroute services. If required a series of terminal recovery procedures or enroute procedures must be developed and agreed by the relevant authorities for approval and certification if required.

d. **Support requirements**. Support requirements are determined by the type of services, surveillance, communications and NAVAID equipment required at the airfield and the length of mission. Once established, these requirements must be met by the

support and logistic channels. Initial airfield operations should plan to deploy with adequate capability and supplies to maintain operations until the theatre is capable of supporting operations and the LOC are established. A conceptual logistics system development, identifying capabilities, requirements and shortfalls should be performed during the planning phase or initial analysis of the operation.

e. **Future mission of the base**. If the base is used as a theatre airfield later in the operation, ATC planners should consider and plan for:

(1) Site surveys and construction of the IFR recovery and departure procedures as required.

(2) Terminal airspace coordination.

(3) Development and publication of local airfield procedures.

(4) NAVAID and ATC communication frequency requests with timelines for their use.

f. **Current combat airspace/additional airspace requirements**. The existing combat airspace is a critical planning measure. During the planning process a risk assessment should be completed and relevant control measures and mitigations implemented. Mechanisms should be established for the promulgation of current and future combat and ATC airspace to all airspace users, controllers and aircrews.

g. **Environment**. The operating environment directly impacts the planning process. Terrain determines equipment placement and may impact on equipment capabilities based on line of sight communications, surveillance equipment shadowing and NAVAID performance. The terrain can also dictate site layout for Landing Zone (LZ), Forwarding Arming Refuelling Point (FARP) or aerodrome operations. Factors such as the mission, enemy, terrain, weather, troops and support available, time available and civil considerations (civil airspace constructs, local population centres etc) should be addressed within the mission planning risk assessment/management process used in the construction of procedures.

h. Mission planning for ATC operations should be closely incorporated into the planning cycles and mechanisms of the airspace control authority (ACA) and area air defence commander (AADC) ensuring unity of effort across the spectrum of airspace usage, reducing the risk of fratricide and balancing those risks with the requirements for an effective air defence system. Common airspace control procedures throughout the JOA enhance the effectiveness of air operations.

0203. Entry Conditions

1. The entry conditions of the operation dictate the initial role of ATC and the planning considerations thereafter:

a. **Opposed Entry**. Opposed entry operations require full coordination of joint capabilities to potentially place large numbers of ground and air assets into theatre. All

ATC activities must be synchronised with other supporting fires and air assets engaging the enemy. Within the JOA, ATC units may expect to provide terminal ATC services, airspace information services, tactical ATC support and HN airspace integration and airspace coordination.

b. **Unopposed Entry**. In an unopposed entry with HN assistance, units that deploy early may flow through airports or seaports into a theatre staging base from which they will prepare to assist forward presence or HN forces. When part of initial entry forces, ATC units establish terminal operations at landing areas as required, which may include existing HN airfields or captured enemy airfields. Unopposed entry operations potentially allow formed ATC units to deploy and establish provision of services. By deploying as a formed unit, time required to initiate such items as HN agreements, construction of terminal procedures and flight checking is reduced. Processing and publishing of airspace requirements, local flight rules, and airfield procedures can begin immediately, while other required airfield services may be established with minimal delay.

0204. Establishment of Airspace for ATC

1. It is necessary for the first ATC personnel deploying to not only establish a functioning ATC unit, but to also develop the operating procedures and airspace within which it operates. The basic mission as defined in the Joint Air Operations Plan (JAOP) together with the Airspace Control Means articulated in the Airspace Control Plan (ACP) and Theatre SPINS should offer significant guidance to how general air Command and Control (C2) procedures will be conducted. The deployed Senior Air Traffic Control Officer (SATCO) and his team must engage with the Airspace Control Authority (ACA), aircraft operators, other military C2 agencies and any HN specialist to develop a safe and efficient set of procedures that allow safe and efficient ATC/Airspace Management (ASM) with minimal operational risk whilst maintaining the required working tempo.

0205. ATC Airspace and Procedure Design

1. The classification and design of airspace for use by NATO ATC agencies will be entirely dependent upon the role, position and available equipment and personnel resources required to meet the tasking, be it an uncontrolled Visual Flight Rules (VFR) landing site, towered airport (controlled - VFR) with no supporting IFR service, towered airport (VFR/IFR) with remote IFR service (radar control remote to the location) and towered airport (VFR/IFR) with local IFR services (approach control). Each one of these scenarios will require different explanation of airspace needed to conduct operations. All airspace and airspace structures must be in accordance with NATO AATCP-1 NATO Supplement to ICAO Doc 8168- OPS/611 Volume II for the Preparation of Instrument Approach and Departure Procedures and also defined by the JACC through the ACP and ACO. It is vital that any deployed ATC element ensures they have established links with the following agencies in order to coordinate their activities effectively and allow efficient airspace construction and co-ordination:

a. ACA;

b. Local air C2 and Battlespace Management agency[1];

c. A3 operations within the Regional Air Ops Centre or Combined Air Operations Centre (CAOC);

d. The Airspace Management element at the CAOC;

e. Local Military ATC agencies;

f. Local Civil ATC agencies;

g. HN civil aviation authorities[2];

h. HN Military air C2 agencies;

i. Local Land and Maritime Component HQ Air Staffs (e.g. Divisional or Brigade HQs).

0206. Airspace Control Means (ACM)

1. There is a wide range of ACMs that can be used to subdivide the airspace to enable Procedural deconfliction. Generally, Routes can be used by either civil or military aircraft, whilst Corridors and all other ACMs are for military use only. All requests for ATC airspace or ACM themselves are to be made to the JFACC who will then decide on the most appropriate ACM to be used. All requests must include details of why the airspace or ACM is required. The daily ACO[3] and SPINS will nominate which ACM will be used during the specified period and, if required, include amendments to the airspace structure. Full details of ACMs available are listed in ATP 3.3.5.1

0207. ATM Standards

1. Regardless of individual national regulatory requirements and practises for deployed operations, all personnel, procedures and equipment must conform to the NATO standard. The full list of relevant STANAGS and related documents is listed at Annex D. The fundamental STANAGS/APs relating to ATC operations are:

AJP 3.3.5 (A) Doctrine for Joint Airspace Control

ATP 3.3.5.1 Joint Airspace Control Tactics, Techniques and Procedures

AATCP-2 NATO Radiotelephony Phraseology

AAP-49 Air Traffic Services for Deployed Operations – On Going study

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[1] This could be an Airborne C2 capability such as E-2 or E-3 or ground-based C2 capability such as ACCS or DARS.

[2] This engagement may be done via the CAOC or a CFACC LNO.

[3] Where the ACO does not change on a daily basis it is commonly referred to as a “Standing ACO”.

NATO STANAG 7204 NATO minimum requirements for personnel providing Air Traffic Services (ATS) in NATO-led operations.

NATO STANAG 3052 Aeronautical Briefing Facilities

NATO STANAG 3158 Day Markings of Airfield Runways and Taxiways.

NATO STANAG 3297 NATO Standard Aerodrome and Heliport ATC Procedures

NATO STANAG 3316 Airfield Lighting.

NATO STANAG 3346 Marking and Lighting of Airfield Obstructions.

NATO STANAG 3374 Flight Inspection of NATO Radio/radar Navigation and Approach Aids

NATO STANAG 3534 Airfield Lighting, Marking and Tone down systems for non-permanent/deployed operations.

NATO STANAG 7210 Guidance in the selection of STANAGS for deployed Air Operations Services

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CHAPTER 3

SUSTAINED OPERATIONS

0301. Sustaining Operations

1. **Long Term Support**. At a pre-determined point regardless of tasked units, planners should initiate requests with the JFACC to consider installation or lease of semi permanent/permanent ATC equipment to release the limited supply of deployable mobile ATC assets. Equipment changes, especially if equipment is nation specific, should be carefully considered as type of service and capabilities may be affected and alterations to Letters of Agreement (LOAs) with host nations or adjoining/facilities may be necessary.

0302. Transition Between Initial and Long Term ATC Operations

1. Transition operations are defined as operations during the period where the initial entry ATC resources require replacement, replenishment, augmentation, or upgrade of ATC services until sustainment ATC forces are established. For planning purposes, this could be for an extended period of time based on the intended time frame of the operation or availability of airlift or sealift resources to deploy sustainment ATC forces. Planners should consider that initial entry might meet the desired operational capability. However, NATO initial entry forces will need relief to reconstitute the initial entry capability and provide a more conventional airfield environment. Sustainment operations exist when ATC forces have achieved the desired description of each service operational capability and conclude when long term facilities are constructed or redeployment occurs.

2. Planners should recognise the fact that operations may have been conducted without any flight validation or certification. While the risk may be significant, flight validation or certification is required if the operations are to continue for an extended time period IAW STANAG 3374.

0303. Synchronization

1. Equipment availability is only one of the major planning factors in determining the desired capability. Logistical support for equipment is a driving consideration; Base Support such as power, communications, LOC and personnel need to be in place to support sustained ATC operations.

0304. Interoperability

1. Planning consideration should be given to the fact that current deployable ATC systems are designed to national requirements and is not specifically set up to interoperate with other nations infrastructure services. During rotation of deployed personnel by different nations, equipment changes may also take place when one nation leaves and is replaced by another. Training must be considered for any new equipment requirements, new local operating procedures (unique to any given location) that are established and documented. Distinct national differences between aircraft performance and procedures also exist and

planners should request controllers who are experienced/current with anticipated traffic levels or have been pre-trained to meet the requirements.

CHAPTER 4

TRANSITION FROM NATO TO OTHER MILITARY OR CIVIL CONTROL

0401. Transitions

1. All transitions of NATO led ATC operations to either civil or other military ATC systems should consider, when handing over or closing an ATC organisation:

a. Releasing/reallocation of airspace.

b. Transition/cancellation of operational procedures.

c. Transition/cancellation of Instrument Flight Procedures.

d. Reallocation/Replacement of equipment including Surveillance, Communications, meteorological, NAVAIDS etc.

e. Reallocation of support contracts i.e. equipment maintenance and base support.

f. Coordination requirements/procedures with adjacent facilities.

g. Equipment compatibility with new systems.

h. Overlap, continuity of service provision.

0402. Redeployment

1. The end of the sustained operational phase would occur by either the redeployment of the mobile ATC equipment, installation of permanent ATC equipment, or by transfer to the HN ATC system of all equipment and responsibilities. A sequenced drawdown of operations may be required, reversing the build-up process and necessitating the second deployment of initial entry assets who are able to operate without base support. End of operations will require a planned handover or phase-out of ATC services. The deployed equipment may be redeployed to another location, returned for maintenance, or even transferred to the HN as part of a nation building program. The redeployment of personnel will also need to be planned, with re-training, harmonization time or in-theatre transfer all considered.

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Annex A: DEPLOYED AIR TRAFFIC CONTROL OPERATIONS

1. This annex will provide a more detailed look at the operational aspects of Deployed ATC (DATC), in particular it will cover the following:

a. Basing requirements.

b. Airfield Site Survey.

c. HN Support.

d. Detachments and Liaison.

e. ATC and Airspace Management Integration.

f. Airfield Patterns and procedures.

g. Civilian Aircraft Operations.

h. Unmanned Air Systems.

i. Coalition ATC.

2. Basing Requirements. In any operation NATO can be expected to meet a requirement to provide VFR and IFR ATC capabilities, including Air Ports of Disembarkation (APOD), Joint Operating Bases (JOB), Staging Airfields[1] (SA) and Tactical Landing Zones (TLZ). ATC may also be called upon to provide an En-Route capability.

3. ATC systems should be modular in construct and capable of providing ATC services from an early entry capability (VFR at a bare base TLZ) up to a fully deployed IFR system providing aerodrome visual control, aerodrome surveillance approach and area surveillance services, H24 and in all weather conditions. This staged approached is summarised at Table A-1.

4. Whilst the stages are shown as a linear progression it is quite possible that this incremental delivery of capability will be either compressed in terms of the timings or even delivered practically simultaneously. However, realistically the delivery of capability will be driven by equipment readiness states and the ability of the logistics elements to deploy it to theatre. Moreover, the in-theatre set up requirements will probably automatically mean the staged delivery of capabilities.

[1] Staging airfields are established airbases that will act as a hub for loading and unloading personnel and equipment and transfer from Strat to Tac AT; or an established force generation base.

Stage	Task[2]	Capability	Equipment Requirement
--- 1 VFR	--- Early Entry ATC Ops	--- TLZ/Runway Ops	--- Mobile Secure/non-secure radios Tactical airfield lighting system
--- 2 VFR	--- Aerodrome Visual Control	--- Runway Ops Localised Aerodrome control	--- MVCR[3] Radios Aerodrome Lighting
--- 3 VFR/IFR	--- Aerodrome visual control and Aerodrome surveillance approach	--- Runway Ops Localised Aerodrome control Surveillance approach and local area control	--- MVCR Secure/non-secure radios Aerodrome Lighting PSR/SSR
--- 4 VFR/IFR	--- Aerodrome visual control Aerodrome surveillance approach Precision approach	--- Runway Ops Localised aerodrome control Surveillance approach and local area control Precision approach for all weather conditions	--- MVCR Secure/non-secure radios Aerodrome Lighting PSR/SSR Precision approach capability Surveillance Ops Room[4]
--- 5 VFR/IFR	--- Aerodrome visual control Aerodrome surveillance approach Precision approach Area surveillance control	--- Runway Ops Localised aerodrome control Surveillance approach and local area control Precision approach for all weather conditions On-route ATC capability	--- MVCR Secure/non-secure radios Aerodrome Lighting PSR/SSR Precision approach capability Surveillance Ops Room Area surveillance sensor Area Surveillance Ops Room[5]
--- 6 VFR/IFR	--- Normalisation and Handover	--- Continued provision of the deployed level of ATC support	--- Development of procedures, agreements and training to facilitate handover to HN or follow-on force

Table A-1. Staged ATC Services

[2] Assumes 24hr ops.
[3] Mobile Visual Control Room.
[4] Consisting of an ops shelter and a number of controller work positions.
[5] Possibly co-located with the surveillance ops room but with dedicated area controller work positions.

STAGE ONE

5. Stage One VFR Operations. Covering the initial deployment of ATC personnel with controllers from a Tactical ATC unit the most likely to be involved, however, it is possible that elements of the Combat Ready (CR) Non-tactical controllers could be utilised. A Tactical ATC unit, being a limited resource, should normally only operate from a location for up to 14 days prior to being relieved by follow-on ATC personnel.

The early entry teams may be expected to reconnoitre, mark and conduct Tactical Aerodrome Visual control duties within a Tactical Landing Zone (TLZ), having deployed with man-portable radios, lighting and FP equipment suitable for the austere nature of the task. If there is a need to expand the ATC capability at the TLZ to a Stage 2 ATC capability then a transition plan should be developed.

STAGE TWO

6. Stage Two VFR Operations. Evolving the deployed task beyond the initial requirement for a Battlefield TLZ[6] due to a greater use of the landing strip requires the development of a more robust Aerodrome Visual Control task. Utilising an existing facility or providing mobile facilities for the Visual Control task, better radios and ground lighting would potentially be deployed. As well as providing the normal aerodrome visual control capabilities it can be expected that controllers provide some form of flight information or procedural approach service to recovering aircraft. As airfield movements increase it might become necessary to de-couple this from the Aerodrome task to maximise the controller's capacity and avoid un-necessary distractions.

7. The move to more standard ATC ops and H24 operations would see the deployment of additional ATC personnel and at this stage an Examining Officer and Training Officer should be deployed in order to develop and expand the ATC procedures. Assurance and Safeguarding of key capabilities on the airfield should also start, ensuring that future development and expansion is not compromised. A SATCO should be deployed during the expansion phase to assist the controlling team and to act as a buffer between the other military elements engaging with in-theatre HQs and other Command and Control (C2) elements and be able to advise on whether the requirement needed to progress to Stage 3.

STAGE THREE

8. Stage 3 VFR/IFR operations. As a temporary airfield becomes busier and the ATC requirements become more complex there will come a point where it becomes necessary to provide a greater degree of control over recovering and departing aircraft. The provision of a sequencing and separation service is likely to be dependent on the intensity and complexity of the ASM situation; however, the capability could be required at relatively low levels of air traffic, if there is a need for ATC in poor weather conditions.

[6] Situated in an operational area close to the battle area utilising natural terrain or existing facilities.

9. Any sequencing and separation service will require the use of a surveillance system; ideally Primary Search Radar (PSR) and Secondary Search Radar (SSR). It may be possible to use a HN capability or an extant system being used by another friendly unit, however, utilising such systems would require the system to be operationally safety analysed and the appropriate levels of training given NATO personnel. The deployment of the NATO Tactical PSR and SSR would provide a capability that is already approved for the task. It must be remembered that the deployment of this capability will require a comprehensive survey to be done prior to deployment to select an appropriate site and then once selected the site will need safeguarding to avoid infringing the safety areas. Furthermore, it is likely that the chosen site will require suitable preparation.

10. Additionally, it may be viable to offer a Surveillance Radar Approach (SRA) procedure using the radar equipment to provide a non-precision approach to the airfield. The SATCO as the in-theatre commander will be best placed to engage with the aircraft operators to assess the requirements and develop the operating procedures accordingly. It is vital that the ACP, ACO and SPINS are taken in to account when formulating local operating procedures for an airfield and the related airspace. In addition, engagement with the HN and civilian ATC agencies may well be required. It is essential that throughout the development of the stage 2 and 3 procedures the DATC staff fully understanding their roles and responsibilities in terms of ASM and those of the other Air C2 and ATC agencies.

STAGE FOUR

11. The delivery of the stage 2 and 3 capabilities will enable a busy and complex airfield to operate H24 and in most weather conditions. If the airfield is to be able to operate in all weather conditions consideration needs to be given to the provision and integration of a precision approach capability; either Precision Approach Radar (PAR) or Instrument Landing System (ILS) equivalents. The delivery of a Stage 4 capable airfield provides the full range of air traffic services that would be expected of a NATO MOB.

STAGE FIVE

12. Within a large and complex AOR there could be multiple airfields, APODs and DOBs operating concurrently with complex military ACMs and routes together with civilian routes and airways. This would require NATO to deploy an En-route or Area Radar type capability to assist in the coordination and management of the airspace. Whilst in more belligerent type operations this function may be provided by a Battlespace Management Air Control Centre or Tactical Air Operations Centre, in a transitional or benign environment it might be more appropriate to conduct this task using En-route trained ATC controllers. Depending on the volume of airspace that requires management, the role could be undertaken either using the organic Tactical radar system or by using another units longer range surveillance equipment[7]. Wherever the En-route task is delivered from, it is important that the procedures it uses are fully integrated in to the Theatre ASM system and with other military and civilian air C2 agencies.

[7] Using another agencies equipment would require a safety assessment to be done and appropriate training and assurance measures put in place.

STAGE 6

13. The final stage of the DATC process is the Normalisation and Handover stage. Early understanding of what the 'end-state' is anticipated to be will allow the DATC personnel in theatre and HQ planners to plan accordingly. Development of a road-map to enable transition to another agency or for the drawdown of forces will be essential in order to ensure the right plans and procedures are in place in a timely fashion. It should clearly mark out where key decision points are and what sequence of events are required to meet the end-state. Letters of Agreement may need to be drawn up and the exact mechanisms for the transfer of authority will need to be agreed upon. If the end-state is withdrawal, the phased deconstruction of the ATC system needs to be agreed upon both in terms of the gradual reduction in capability and the return of the ATC equipment and support elements. Logically in this instance the reverse of the arrival sequencing would sensible, but each scenario will differ so the key is to understand the commander's intent and plan accordingly.

RECONNAISSANCE

14. A variety of teams go into theatre to carry out reconnaissance for a range of purposes; these can provide valuable information to the ATC planning process. Liaison and reconnaissance teams should, at the higher levels, look at the joint level requirement while other teams should deploy in order to provide data on available airfields and the HN services that are available. Where there will be a large requirement for NATO deployed ATC it is essential an ATC SME is deployed with the reconnaissance teams to assess the JOA capabilities and to commence HN liaison[8] and once command has decided which operating base(s) is to be utilised, the information can be used to ascertain what needs to be deployed in terms of equipment and personnel.

HOST NATION SUPPORT

15. The level of HN support that is offered is critical to the planning process and will have a significant impact on the levels of equipment that need to be deployed. Simply because a HN airfield has the required facilities in place, e.g. telephone lines, radar, does not necessarily mean that they will be made available by the HN for use by NATO.

16. High-level political negotiations will often be transparent to the military, but effective communication between military formations and lead nation government departments will ensure that planners are aware of what will and will not be available to them in-theatre.

DETACHMENTS AND LIAISON

17. ATC personnel may be detached to the liaison roles within the JFACC HQ and other Components as deemed necessary. Where there is likely to be any notable degree of sharing of airspace between operational and domestic traffic, ATC Liaison Officers should be installed at relevant ATC Centres (ATCCs) and organisations.[9] The ATC LNO's responsibilities will include, but not be limited to:

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8 Where possible, reconnaissance reports should be complemented by any reports that are available from any Tactical ATC presence in the JOA.

9 ATC LNOs are in addition to the deployed controlling personnel

a. Representing the JFAC's airspace requirements to the HN.

b. Passing appropriate information from HN ATCCs to the JFACHQ.

c. Helping to ensure that ICAO Standards and Recommended Practices (SARPs) are followed whenever possible.

d. Acting as a conduit for raising issues to higher ATC formations.

While English is one of the international flight languages, consideration for including a foreign language qualified individual might be required to work host nation/ATC issues.

ATC AND BATTLESPACE MANAGEMENT INTEGRATION

18. Linkages with C2 agencies will differ dependent on the stage of the operation, the preponderance of national or coalition C2 agencies and the size, shape and capability of the HN's national ATC structure. Early contact, communication and constant liaison is essential to ensure the needs and demands of airfield users are met by the wider battlespace management agencies and vice versa. Whilst most day-to-day management is carried out at the tactical level there needs to be mechanisms established between all agencies to enable to best utilisation of the battlespace. It is vital that any deployed ATC element ensures they have established links with the following agencies in order to coordinate their activities effectively:

a. Local air C2 and Battlespace Management agency[10].

b. A3 operations within the Regional Air Ops Centre or CAOC.

c. The Airspace Management element at the CAOC.

d. Local Military ATC agencies.

e. Local Civil ATC agencies.

f. HN civil aviation authorities[11].

g. HN Military air C2 agencies.

h. Local Land and Maritime Component HQ Air Staffs (e.g. Divisional or Brigade HQs).

i. JACC.

[10] This could be an Airborne C2 capability such as E-2 or E-3 or ground-based C2 capability such as ACCS or DARS.
[11] This engagement may be done via the CAOC or a CFACC LNO.

AIRFIELD PATTERNS AND PROCEDURES

19. All procedures and terminal chart design should be IAW NATO AATCP-1 - NATO Supplement to ICAO Doc 8168- OPS/611 Volume II for the Preparation of Instrument Approach and Departure Procedures. The basic mission as defined in the Joint Air Operations Plan (JAOP) together with the control means articulated in the ACP and Theatre SPINS should offer significant guidance to how general air C2 procedures will be conducted. SATCO and his team, as the NATO ATC SMEs, are to engage with the aircraft operators, other military C2 agencies and any HN specialist to develop a safe and efficient set of procedures that allow safe and efficient ATM/ASM with minimal operational risk whilst maintaining the required working tempo.

CIVILIAN AIRCRAFT OPERATIONS

20. It is likely that civilian and military operations will occur concurrently, particularly if an enduring operation expands resulting in a multitude of outlying operating bases that require sustainment. The nature of military operations means that reliance on military re-supply cannot be guaranteed, therefore civilian agencies are often contracted to fulfil this requirement. ATC staff will be pivotal in managing the operational priorities of military aircraft with the needs of civilian operators. The scale of military operations will dictate the scale of civilian contracted support. SATCO and his team must engage with aircraft operators to ensure that appropriate management of their operation takes place. Issues:

a. Language - establishing baseline English language comprehension standards required by NATO operated airfields is essential to ensure that the risk is minimised.

b. Managing contracts that are set up by agencies that have no idea about ATC or military operations.

c. Control on increase in assets – who approves and who can say no?

d. Flight line access for civilian contractors, control over flight line security and airfield driving.

e. PPR for civilian flights – strict controls on arrival and departure times.

f. Transition from austere to established MOB/airport – customs, security vetting, transport, baggage handling etc.

g. Official sponsors and handlers for civilian flights.

h. Fare paying passengers –HN benefit/revenue? Who regulates the approval of fare paying pax flights?

i. Liaison and interaction with HN CAA.

UNMANNED AIR SYSTEMS (UAS)

21. UASs form an integral part of modern military operations and will impact upon airfield operations when deployed in tandem with fixed wing or rotary wing assets. The unique nature of UASs and their requirements will, dependent on the size and characteristics of the System will have a varying impact. Careful management of the battlespace is required to facilitate the ingress and egress of UASs to and from their launch/recovery site. UAS operating issues include:

a. Control over assets being operated at airfield.

b. Different operating capabilities dependent on size and purpose.

c. Significant airspace constraints.

d. Landing surface available may place significant constraints on fixed wing/rotary operations v UAS ops.

e. Movement through the battlespace – very slow and stealth technology/size means they may not display on radar.

f. Differing nations SOP will vary, issues such as communications, ingress, egress, operating altitudes will have to be resolved.

g. Safety Procedures in the event of loss of link between the system and the pilot or the pilot and ATC.

INTEGRATION/COALITION ATC

22. The size and nature of NATO operations, coupled with the limited availability of NATO Air Traffic Controllers means there may be occasions when coalition ATC units may be formed with nations outside of NATO. The assessment of potential integration, in particular the identification of common controlling techniques/procedures will be crucial to facilitate integration. Coalition embeds within a NATO regulated ATC system will require detailed coordination between coalition nations to ensure that all training, standardisation and handling/investigation of any ATC related incidents is carried out in accordance with all nations' agreement. NATO embeds within other nations organic ATC system will require detailed analysis of operating procedures and clearly defined boundaries for their utilisation. There are significant benefits to be gained from working alongside coalition partners, any potential possibility of joint partnerships should be explored to maximise the experience and knowledge of coalition ATC agencies, particularly when airfields host a variety of forces and nations.

Annex B: DEPLOYED AIR TRAFFIC CONTROL EQUIPMENT

1. The requirement for a scalable and configurable suite of deployable ATC equipment is key to the provision of an effective and coherent ATC service in the deployed environment. The following assumptions apply:

a. A sustainable cadre of multi-skilled, trained and qualified NATO military personnel[1] are available for deployed ATC operations.

b. All the key enablers stated are funded, supported and available.

c. Tactical ATC Units will provide an initial deployment capability for airfield activation and the early entry ATC capability utilising 'organic' equipment.

d. NATO Nations will provide the equipment and engineering support capability.

EQUIPMENT REQUIREMENTS

2. ATC equipment requirements for any deployed operation will vary between operations. The following equipment types should form the basis of a deployed ATC capability:

a. **Air-Ground-Air Communications**. UHF air-ground-air communications should be established as a priority with VHF communications included wherever possible. Depending on the tactical environment of the operation, consideration should be given to the provision of both secure and non-secure radio equipment.

b. **Ground-Ground Communications**. Air-Ground-Air communications should be supplemented as soon as possible by both ground-to-ground voice and data communications to enable communication and interaction with other agencies, whilst Communications and Information Systems (CIS) connectivity enables the rapid dissemination of Flight critical data and other mission essential information. Both secure and non secure communications are essential.

c. **Visual Control Room**. On bases where a suitable building is not present or is not in a fit state for use a mobile Visual Control Room (MVCR) may be required.

d. **Surveillance Capability**. In complex operations there is likely to be a need to dynamically control and manage the airspace to achieve deconfliction between users whilst allowing maximum tactical flexibility. The ability to detect, identify and deconflict aircraft in all weather conditions may be vital to achieving the mission safely and effectively principally achieved through the provision of a surveillance picture for ATC purposes. Presently PSR provides this capability supported by SSR. If the PSR sensor is located correctly, it can be utilised to provide a non-precision approach to a

[1] Operators and Maintainers

base in the form of a Surveillance Radar Approach (SRA). Utilisation of surveillance equipment should be complemented by a suitable Control Room, accommodating the controller work positions and equipment. The radar signal processors should be capable of exporting multi-format data to other users, as well as importing, processing and fusing data from other radar feeds.

e. **Precision Approach Capability**. Consideration should be made for the requirement for a capability, such as, what type of Ground Controlled Approach will be provided i.e., precision/non-precision approach services.

f. **Supplementary Navigation Equipment**. Further equipment may be employed as needed to further assist aircraft in navigation (utilization of HN capability should be considered where it is available and functioning correctly). These Military and/or ICAO-specified navigation aids include, but should not be limited to:

(1). TACAN (Tactical Air Navigation).

(2). VHF Omni-directional Radio Range (VOR).

(3). Non-Directional Radio Beacon (NDB).

(4). Distance Measuring Equipment (DME).

(5). Direction Finding Equipment (DFE).

g. **Airfield Lighting**. The requirement for scalable systems from an early entry capability which provides limited landing strip lighting through to a full runway, Precision Approach Path Indicator (PAPI) and approach lighting system.

h. **Meteorological Equipment**. Meteorological equipment is essential to the provision of ATC services and, as a minimum, must be able to provide:

(1). Surface wind speed and direction.

(2). Barometric pressure setting information.

(3). Temperature.

(4). Visibility.

SITING AND SAFEGUARDING

3. The correct siting and subsequent safeguarding of equipment is imperative to ensure the integrity of the signal/output of the ATC equipment is maintained. The term ‘safeguarding’ is used in its broadest sense and not only applies to the potential for physical interference of radars or navigation aids, but also to any external factors that may compromise the ability of the operators to conduct their duties to the full i.e. obstructions that may prevent fully visibility

of the operating area/landing surfaces. As airfield capabilities evolve regular assurance checks on existing sitings should be conducted as what was once acceptable may become an infringement. The impact of vehicle/personnel ECM systems also needs to be considered for operations on the airfield.

COMMISSIONING

4. Whilst the majority of the deployable ATC equipment can be utilised within hours of arrival at the deployed location, certain elements[2] will require a more formal procedure, which may include a Flight Check. This handover procedure will require the Detachment commander making a formal declaration to the SATCO or representative that the equipment has been deployed IAW the relevant SOPs, and is fit and ready for use. The parameters of the check need to be understood for the AOA (Airfield Operating Authority) to guarantee the assurance of the equipment for use, but should normally be based on STANAG 3374.

[2] PSR/SSR, TACAN and Lighting.

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Annex C: DEPLOYED AIR TRAFFIC CONTROL PERSONNEL

INTRODUCTION

1. In order for all Deployed ATC elements to achieve the commander's intent the requirement for effective manpower and equipment remains extant.

ASSUMPTIONS

2. The following assumptions apply:

a. A sustainable cadre of multi-skilled, trained and qualified NATO military personnel are available for deployed ATC operations.

b. All the key enablers stated are funded and available.

c. Tactical ATC Units will provide an initial deployment capability for airfield activation and the early entry ATC capability utilising 'organic' equipment.

d. NATO Nations will provide the equipment and engineering support capability.

TRAINING

3. All controllers must be trained to meet the standards specified in STANAG 7204.

4. **Combat-Specific Training**. Airspace control in the combat zone relies heavily on specific procedures and combat ready personnel. Airspace control procedures and personnel must be trained and exercised in peacetime to be effective in combat. This is particularly true of air traffic control procedures and personnel. Combat-specific ATC training should augment service component ATC training.

PERSONNEL

5. Personnel are the key assets to any deployed ATC capability. The 6 stages of deployment system are supported by 2 distinct groups of controllers detailed below:

a. Tactical ATC Unit.

b. Non-Tactical ATC personnel.

TACTICAL ATC UNIT

6. Tactical Air Traffic Control Units provide early entry ATC capability in support of operations worldwide. These forces should be deployed for no more than 2 weeks before being relieved by follow-on forces; however they should be capable of operating for up to 10 weeks prior to being replaced; it is anticipated that the relieving forces will come from Non-

Tactical ATC personnel. The NATO ATC cadre has a limited number of trained Tactical ATC personnel.

NON-TACTICAL ATC PERSONNEL

7. For enduring operations[1] replacement of the Tactical ATC personnel would come from ATC staff drawn from NATO MOB ATC Sqns who deploy as Non-Tactical augmentees. Staff should be trained to meet the minimum standards required in STANAG 7204 prior to deployment.

8. In-Theatre Training. For the early entry teams and the first Stage 2 ATC personnel, it is likely that they will receive little or no training in local practices and procedures or will probably only have limited opportunities to learn about the airfield in question prior to arrival. It will be necessary for this cadre of personnel, upon arrival in-theatre, to establish a functioning ATC unit. One person must be qualified as an examining officer and one needs to be nominated the training officer (UTO). It is they who will develop the training system and will maintain local standards, certifying newly-arrived personnel in-theatre after a short period of On the Job Training (OJT).

SUSTAINMENT

9. Depending upon the nature and intensity of operations, the availability of manpower and other factors, the deployed ATC commander will be best-placed to determine the length of time that personnel remain in-theatre. Home Nation standards will also need to be met. If personnel are to be replaced individually rather than the entire team, it is essential that during the first deployment a stagger is incorporated in to the change over to ensure the staged replacement of staff.

[1] Operations lasting longer than 6 months.

Annex D: RELATED STANAGS AND DOCUMENTS

AAP-49 AIR TRAFFIC SERVICES FOR DEPLOYED OPERATIONS – ON GOING STUDY
NATO AATCP-1(C) NATO SUPPLEMENT TO ICAO DOC 8168- OPS/611 VOLUME II FOR THE PREPARATION OF INSTRUMENT APPROACH AND DEPARTURE PROCEDURES
AATCP-2 NATO RADIOTELEPHONY PHRASEOLOGY
AJP 3.3 JOINT AIR AND SPACE OPERATIONS DOCTRINE
AJP 3.3 A ALLIED JOINT DOCTRINE FOR AIR AND SPACE OPERATIONS
AJP 3.3.5 DOCTRINE FOR AIRSPACE CONTROL IN TIMES OF CRISIS AND WAR
AJP 3.3.5(A) DOCTRINE FOR JOINT AIRSPACE CONTROL
ATP 3.3.5.1 JOINT AIRSPACE CONTROL TACTICS, TECHNIQUES AND PROCEDURES
NATO BI-MNCD 85-5 NATO APPROVED CRITERIA AND STANDARDS FOR AIRFIELDS – 1999

NATO STANAG 3052 AERONAUTICAL BRIEFING FACILITIES
NATO STANAG 3158 DAY MARKINGS OF AIRFIELD RUNWAYS AND TAXIWAYS.
NATO STANAG 3297 NATO STANDARD AERODROME AND HELIPORT ATC PROCEDURES
NATO STANAG 3316 AIRFIELD LIGHTING.
NATO STANAG 3346 MARKING AND LIGHTING OF AIRFIELD OBSTRUCTIONS.
NATO STANAG 3534 AIRFIELD LIGHTING, MARKING AND TONE DOWN SYSTEMS FOR NON-PERMANENT/DEPLOYED OPERATIONS
NATO STANAG 3374 FLIGHT INSPECTION OF NATO RADIO/RADAR NAVIGATION AND APPROACH AIDS
NATO STANAG 7010 PROVISION OF AIRFIELD MARKING INFORMATION
NATO STANAG 7204 NATO MINIMUM REQUIREMENTS FOR PERSONNEL PROVIDING AIR TRAFFIC SERVICES (ATS) IN NATO-LED OPERATIONS
NATO STANAG 7210 GUIDANCE IN THE SELECTION OF STANAGS FOR DEPLOYED AIR OPERATIONS SERVICES

ICAO CONVENTION ANNEX 2 RULES OF THE AIR
ICAO CONVENTION ANNEX 11 AIR TRAFFIC SERVICES
ICAO CONVENTION ANNEX 14 VOLUME 1 AERODROME DESIGN AND OPERATIONS.
ICAO CONVENTION ANNEX 14 VOLUME 2 HELIPORTS.
ICAO DOC 4444 RULES OF THE AIR AND AIR TRAFFIC SERVICES
ICAO DOCUMENT 8168-OPS/611 (VOLUMES 1 AND 2) PANS OPS

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Annex E: LIST OF ACRONYMS AND ABBREVIATIONS

A

AADC	Area Air Defence Commander
AAP	Allied Air Publication
AATCP	Allied Air Traffic Control Publication
ABM	Air Battlespace Manager
ACA	Airspace Control Authority
ACC	Air Component Commander
ACM	Air Control Means
ACO	Airspace Control Order
ACP	Airspace Control Plan
AJP	Allied Joint Publication
AM	Airfield Management
AOR	Area of Responsibility
AOWG	Air Operations Working Group
APOD	Airport of Disembarkation
ASM	Airspace Management
ATP	Allied Tactical Publication
ATC	Air Traffic Control
ATCO	Air Traffic Control Officer
ATM	Air Traffic Management
ATP	Allied Tactics Techniques and Procedures

ATS	Air Traffic Services

B

BM	Battlespace Management

C

C2	Command and Control
CAA	Civil Aviation Authority
CAOC	Combined Air Operations Centre
CIS	Communications and Information Systems
COMAFFOR	Commander of Air Forces
CR	Combat Ready

D

DATCALS	Deployable Air Traffic Control and Landing Systems
DATM	Deployable Air traffic Management
DFE	Direction Finding Equipment
DME	Distance Measuring Equipment
DOB	Deployed Operating Base

F

FARP	Forward Arming Refuelling Point

G

GCA	Ground Controlled Approach

	H
HN	Host Nation
	I
IFR	Instrument Flight Rules
ICAO	International Civil Aviation Organisation
ILS	Instrument landing System
	J
JACC	Joint Airspace Coordination Centre
JAOP	Joint Air Operations Plan
JFACC	Joint Force Air Component Commander
JOA	Joint Operating Area
JOB	Joint Operating Base
	L
LEO	Local Examining Officer
LNO	Liaison Officer
LOA	Letter of Agreement
LZ	Landing Zone
	M
MVCR	Mobile Visual Control Room
MOB	Main Operating Base
	N
NDB	Non-Directional Beacon

NATO	North Atlantic Treaty Organisation
NAVAID	Navigational Aid

O

OJT	On Job Training

P

PAPI	Precision Approach Path Indicator
PAR	Precision Approach Radar
PPR	Prior Permission Required
PSR	Primary Surveillance Radar

S

SA	Staging Airfield
SATCO	Senior Air Traffic Control Officer
SME	Subject Matter Expert
SOPs	Standard Operating Procedures
SPINS	Special Instructions
SRA	Surveillance Radar Approach
SSR	Secondary Surveillance Radar
STANAG	Standardisation Agreement

T

TACAN	Tactical Air navigation
TLZ	Tactical landing Zone

TTP	Tactics, Techniques and Procedures
	U
UAS	Unmanned Air System
UHF	Ultra High Frequency
UTO	Unit Training Officer
	V
VCR	Visual Control Room
VFR	Visual Flight Rules
VHF	Very High Frequency radio
VOR	VHF Omni-directional Radio Range

AATMP-02(A)(1)