



ICAO

Doc 10088

Manual on Civil-Military Cooperation in Air Traffic Management

First Edition, 2021



Approved by and published under the authority of the Secretary General

INTERNATIONAL CIVIL AVIATION ORGANIZATION



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AMENDMENTS

Amendments are announced in the supplements to the *Products and Services Catalogue*; the Catalogue and its supplements are available on the ICAO website at www.icao.int. The space below is provided to keep a record of such amendments.

RECORD OF AMENDMENTS AND CORRIGENDA

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FOREWORD

The Preamble to the *Convention on International Civil Aviation* (Doc 7300, Chicago Convention) highlights that States, parties thereto, “agreed on certain principles and arrangements in order that international civil aviation may be developed in a safe and orderly manner and that international air transport services may be established on the basis of equality of opportunity and operated soundly and economically”.

Article 3 of the Chicago Convention provides that it shall be applicable only to civil aircraft and shall not be applicable to state aircraft, which are used in military, customs and police services as per Article 3 b). However, Article 3 d) requires that “contracting States undertake, when issuing regulations for their state aircraft, that they will have due regard for the safety of navigation of civil aircraft”.

Therefore, there is a need for States to establish a framework for ensuring adequate collaboration, cooperation and coordination between civil and military aviation stakeholders, aiming to support States to fulfil their national requirements and meet their obligations as parties to the Chicago Convention. The focus of this manual is to provide guidance to States wishing to implement or improve civil-military cooperation for air traffic management, for the safe and optimal use of the airspace by both parties. It is important to note, however, that most of this material would be equally relevant to the wider spectrum of state aircraft operations, as well as other airspace usage.

While the terms civil-military *collaboration*, *cooperation* and *coordination* may seem inter-changeable, these terms are used to differentiate between the various levels of effort needed to support the State’s aviation policies and objectives. *Collaboration* entails the long-term (5 to 20 years) envisioning, planning and development of future global aviation systems and operations. *Cooperation* is the more practicable effort towards developing mutually agreeable optimized solutions to strategic and pre-tactical issues and challenges in the nearer time horizon. *Coordination* refers to the real-time exchanges of information and joint tactical decisions at the operational level. The fundamental goal of collaboration, cooperation and coordination is to improve the safety and efficiency of all aviation operations.

Civil and military operations differ in nature and in purpose. While civil aviation supports global interconnection and contributes to the global economy, military operations are conducted for reasons of national security or defence. However, both types of operations take place in a single continuum of airspace and, therefore, civil aviation and military stakeholders need to cooperate to ensure their mutual safety. Successful cooperation is based on mutual trust, respect, transparency and understanding. Additionally, the modernization of air traffic management (ATM) towards greater information flows and operational flexibility creates a need to enhance civil-military cooperation and coordination.

Notwithstanding civilian requirements, militaries also need to use airspace effectively and efficiently while conducting their operations. States are encouraged to foster better civil-military cooperation to meet the increasing need for access to airspace by both types of actors, alongside the growing need for operational flexibility.

Guided by the *Global Air Navigation Plan* (Doc 9750), the evolution of the ATM system requires global, regional and national cooperation between civil and military aviation authorities. This cooperation will ensure the integration of State aviation needs and facilitate the planning required to support the effective implementation of the ATM evolution. Although current ATM research and development programme outcomes are not directly applicable to the military, their impact on military authorities and other agencies operating state aircraft will be operationally and financially relevant. In view of these increasing interoperability requirements, cooperation and coordination at all levels will enable the appropriate planning and evolution of military fleet, equipment and control systems.

Optimizing airspace for both civil and military operations results in nation-wide benefits. The flexible use of airspace (FUA) is fundamental in supporting the optimization process. It is recommended that civil and military experts jointly develop advice and guidance on the best practices for civil-military cooperation and coordination. The principle “as civil as possible,

as military as necessary” enhances interoperability, performance and military mission effectiveness, while providing performance benefits for the whole aviation community.

The production of this manual stems from the recognition that, considering the current and foreseeable needs of aviation, a majority of States are facing challenges related to the management of the limited airspace available to fulfil the needs of both civil and military activities.

This document provides information and guidance to relevant aviation authorities on the establishment of a framework for civil-military cooperation and coordination to enhance and optimize the management and use of the airspace, and to achieve and strengthen the trust between civil and military. This manual will also serve as reference for authorities and units responsible for establishing and implementing the processes and procedures that will facilitate civil-military collaboration, cooperation and coordination. This manual supersedes *Civil-Military Cooperation in Air Traffic Management* (Cir. 330).

Future developments

In order to keep this manual relevant and accurate, suggestions for improvement in terms of format, content or presentation are welcome. Any such recommendation or suggestion will be examined and, if found suitable, will be included in regular updates to the manual. Regular revision will ensure that the manual remains both pertinent and accurate. These comments should be addressed to:

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GLOSSARY

ABBREVIATIONS/ACRONYMS

AAR	Air-to-air refuelling
ACAS	Airborne collision avoidance system
ACC	Area control centre
ADEP	Aerodrome of departure
ADES	Aerodrome of destination
ADIZ	Air defence identification zone
ADS-B	Automatic dependent surveillance — broadcast
ADS-C	Automatic dependent surveillance — contract
AFTN	Aeronautical fixed telecommunication network
AFUA	Advanced flexible use of airspace (FUA)
AIP	Aeronautical information publication
AIS	Aeronautical information service
AMC	Airspace management cell
AMHS	ATS message handling system
ANSP	Air navigation services provider
APV	Approach procedures with vertical guidance
ASM	Airspace management
ATC	Air traffic control
ATFM	Air traffic flow management
ATM	Air traffic management
ATN	Aeronautical telecommunication network
ATS	Air traffic services
ATSU	Air traffic services unit
AUP	Airspace use plan
BVLOS	Beyond visual line-of-sight
CAOM	Committee for Airspace Organization and Management
CBA	Cross-border area
CBP	Customs and border protection
CDM	Collaborative decision-making
CDR	Conditional route
CIDIN	Common ICAO data interchange network
CMAB	High-level civil-military aviation cooperation policy board
CNS/ATM	Communications, navigation, and surveillance/air traffic management
CPDLC	Controller-pilot data link communications
DCB	Demand and capacity balancing
DMA	Dynamic mobile area
EASA	European Union Aviation Safety Agency (EASA)
EGPWS	Enhanced ground proximity warning systems
ENR	En route
FIR	Flight information region
FMP	Flow management position
FUA	Flexible use of airspace
GANP	Global air navigation plan
GBAS	Ground-based augmentation system

GNSS	Global navigation satellite system
IATA	International Air Transport Association
IFALPA	International Federation of Air Line Pilots' Associations
IFR	Instrument flight rules
ILS	Instrument landing system
IP	Internet protocol
ISR	Intelligence, surveillance and reconnaissance
KPA	Key performance area
KPI	Key performance indicator
LOA	Letter of agreement
MLS	Microwave landing system
MMR	Multi-mode receiver
MT	Mission trajectory
PANS	Procedures for air navigation services
PBN	Performance-based navigation
PSR	Primary surveillance radar
RF	Radio frequency
RPA	Remotely piloted aircraft
RPAS	Remotely piloted aircraft system
RVSM	Reduced vertical separation minima
SAR	Search and rescue
SARPs	Standards and Recommended Practices
SBAS	Satellite-based augmentation system
SMC	SAR mission coordinator
SMS	Safety management system
SSR	Secondary surveillance radar
SUA	Special use airspace
SUPPs	Regional supplementary procedures
SWIM	System-wide information management
SWOT	Strength, weakness, opportunity, threat
TACAN	Tactical air navigation system
TAWS	Terrain awareness and warning system
ToR	Terms of reference
TRA	Temporary reserved area
UAS	Unmanned aircraft system
UIR	Upper flight information region
VFR	Visual flight rules
VHF	Very-high frequency
VIP	Very important person
VLOS	Visual line-of-sight
VOR	VHF omnidirectional radio range

GLOSSARY OF TERMS

Aeronautical information. Information resulting from the assembly, analysis and formatting of aeronautical data.

Aeronautical Information Publication (AIP). A publication issued by or with the authority of a State and containing aeronautical information of a lasting character essential to air navigation.

Aeronautical information service (AIS). A service established within the defined area of coverage responsible for the provision of aeronautical data and aeronautical information necessary for the safety, regularity and efficiency of air navigation.

Airspace management cell (AMC). A is a joint civil-military cell responsible for the day-to-day management and temporary allocation airspace.

Airspace management (ASM). The process by which airspace options are selected and applied to meet the needs of the air traffic management community.

Air traffic flow management (ATFM). A service established with the objective of contributing to a safe, orderly and expeditious flow of air traffic by ensuring that ATC capacity is utilized to the maximum extent possible and that the traffic volume is compatible with the capacities declared by the appropriate ATS authority.

Air traffic management (ATM). The dynamic, integrated management of air traffic and airspace (including air traffic services, airspace management and air traffic flow management) — safely, economically and efficiently — through the provision of facilities and seamless services in collaboration with all parties and involving airborne and ground-based functions.

Air traffic management system. A system that provides ATM through the collaborative integration of humans, information, technology, facilities and services, supported by air and ground- and/or space-based communications, navigation and surveillance.

Air traffic management (ATM) performance. A measure of how well the ATM system satisfies the ATM community's expectations. In each of the KPAs, performance is measured at the level of individual performance objectives using performance indicators.

Air traffic management (ATM) security. The safeguarding of the ATM system from security threats and vulnerabilities; and the contribution of the ATM system to civil aviation security, national security and defence, and law enforcement.

Air traffic service (ATS). A generic term meaning variously, flight information service, alerting service, air traffic advisory service, air traffic control service (area control service, approach control service or aerodrome control service).

Air traffic services unit (ATSU). A generic term meaning variously, air traffic control unit, flight information centre or air traffic services reporting office

Appropriate military unit. A military unit planning and/or executing any type of aerial activities, providing any type of control to aircraft, and or/having any form of responsibility in an airspace. For example, an appropriate military unit can be a military unit providing ATS, a combat control unit, a fighter controller unit, a ground defence control unit, range control unit, a wing, an airbase, a special operation unit operating UAVs or RPAS.

Approved agency. A unit authorized by a State or AMC to request allocation of airspace to an AMC.

Collaborative decision-making (CDM) process. The process whereby ATM decisions are based on the sharing of information relevant to air traffic operations between all civil and military partners.

Conditional route (CDR). A non-permanent ATS route or portion thereof which can be planned and used under specified conditions.

Cross-border area (CBA). An airspace reservation or segregation established for specific operational requirements over international boundaries.

Danger area. An airspace of defined dimensions within which activities dangerous to the flight of aircraft may exist at specified times.

Flexible use of airspace (FUA). An airspace management concept based on the principle that airspace should not be designated purely as civil or military, but rather as a continuum in which all user requirements are accommodated to the greatest possible extent.

Global navigation satellite system (GNSS). A worldwide position and time determination system that includes one or more satellite constellations, aircraft receivers and system integrity monitoring, augmented as necessary to support the required navigation performance for the intended operation.

Key performance area (KPA). KPAs are a way of categorizing performance subjects related to high-level ambitions and expectations.

Note.— The Manual on Global Performance of the Air Navigation System (Doc 9883) has defined eleven KPAs: safety, security, environmental impact, cost effectiveness, capacity, flight efficiency, flexibility, predictability, access and equity, participation and collaboration, and interoperability.

Key performance indicator (KPI). The performance indicators used for the purpose of performance target setting.

Military mission effectiveness. Ability of the military to execute their operations and training (including the necessary exercises) in order to maintain their required operational skills to safeguard essential security or defence policy interests and achieve the political goals of their State.

NOTAM. A notice distributed by means of telecommunication containing information concerning the establishment, condition or change in any aeronautical facility, service, procedure or hazard, the timely knowledge of which is essential to personnel concerned with flight operations.

Performance-based navigation (PBN). Area navigation based on performance requirements for aircraft operating along an ATS route, on an instrument approach procedure or in a designated airspace.

Note.— Performance requirements are expressed in navigation specifications (RNAV specification, RNP specification) in terms of accuracy, integrity, continuity, availability and functionality needed for the proposed operation in the context of a particular airspace concept.

Performance indicators. Current/past performance, expected future performance (estimated as part of forecasting and performance modelling), as well as actual progress in achieving performance objectives is quantitatively expressed by means of key performance indicators (sometimes called KPIs).

Performance management. The process of defining performance objectives, performance indicators and performance targets. Also includes performance monitoring and the identification of performance gaps.

Performance monitoring. The continuous process of collecting and analysing data to measure the actual outcome of a system versus the relevant (key) performance targets and performance plans using the (key) performance indicators.

Performance objective. Within key performance areas or focus areas, the intention to establish performance management is “activated” by defining one or more performance objectives. These define — in a qualitative and focused way — a desired trend from today’s performance (e.g. improvement). A distinction is made between generic objectives and instantiated objectives. Generic objectives specifically focus on what has to be achieved, but do not make statements about the when, where, by whom or how much. Instantiated objectives add the when, where, by whom and how much to the generic objectives.

Performance target. Performance targets are closely associated with performance indicators: they represent the values of performance indicators that need to be reached or exceeded to consider a performance objective as being fully achieved. A single performance objective can have one or more performance targets.

Procedures for Air Navigation Services (PANS). Procedures for Air Navigation Services are approved by the ICAO Council. They comprise of mostly operating procedures not yet having attained a sufficient degree of maturity for adoption as international Standards and Recommended Practices, or material of a more permanent nature which is inappropriate or too detailed for incorporation in an Annex.

Prohibited area. An airspace of defined dimensions, above the land areas or territorial waters of a State, within which the flight of aircraft is prohibited.

Recommended Practice. Any specification for physical characteristics, configuration, matériel, performance, personnel or procedure, the uniform application of which is recognized as desirable in the interests of safety, regularity or efficiency of international air navigation, and to which Contracting States will endeavour to conform in accordance with the Convention.

Regional Supplementary Procedures (SUPPs). Operating procedures supplementary to the Annexes and PANS developed for the greater part through the ICAO regional air navigation meetings to meet the needs of a specific ICAO region.

Note.— SUPPs deal with matters affecting the safety and regularity of international air navigation. They are published in a single document covering all regions. The ICAO Regional Supplementary Procedures (Doc 7030) form part of the Air Navigation Plan developed by regional air navigation meetings to meet the needs of specific areas, which are not covered by the worldwide provisions. They complement the statement of requirements for facilities and services contained in the Air Navigation Plan publications.

Remotely piloted aircraft (RPA). An unmanned aircraft which is piloted from a remote pilot station.

Remotely piloted aircraft system (RPAS). A remotely piloted aircraft, its associated remote pilot station(s), the required C2 Link(s) and any other components as specified in the type design.

Restricted area. An airspace of defined dimensions, above the land areas or territorial waters of a State, within which the flight of aircraft is restricted in accordance with certain specified conditions.

Segregated airspace. Airspace of specified dimensions allocated for exclusive use to a specific user(s), with operations that are not able to be safely integrated with other airspace users.

Special use airspace (SUA). In the context of this manual, SUA is a generic term used for airspace volumes designated for specific operations, such as military training, exercises and operations, of a nature such that required limitations on airspace access may be imposed on other aircraft not participating in those activities. These may include, but are not limited to, restricted, danger and prohibited areas or temporary reserved areas (TRA).

Standards and Recommended Practices (SARPs). Standards and *Recommended Practices* are adopted by the ICAO Council under the provision of the *Convention on International Civil Aviation* and are defined as per below.

Standard. Any specification for physical characteristics, configuration, matériel, performance, personnel or procedure, the uniform application of which is recognized as necessary for the safety or regularity of international air navigation and to which Contracting States will conform in accordance with the Convention; in the event of impossibility of compliance, notification to the Council is compulsory under Article 38.

Safety template. Tool for the assessment and management of the risk associated with the operation of aerospace vehicles including aircraft, space launch vehicles, returning spacecraft, various forms of guided and unguided munitions or unmanned aircraft. A safety template is calculated for a particular set of mission conditions and would provide visual representation of the risk area and necessary buffers.

System-wide information management (SWIM). Standards, infrastructure and governance enabling the management of ATM-related information and its exchange between qualified parties via interoperable services.

Temporary reserved area (TRA). An airspace that is temporarily reserved and allocated for the specific use of a particular user during a determined period of time and through which other traffic may or may not be allowed to transit under air traffic control clearance.

Unmanned aircraft system (UAS). An aircraft and its associated elements which is operated with no pilot on board.

REFERENCES

ICAO documents

1. Annex 2 — *Rules of the Air*
2. Annex 11 — *Air Traffic Services*
3. Annex 10 — *Aeronautical Telecommunications*
4. Annex 15 — *Aeronautical Information Services*
5. Annex 19 — *Safety Management*
6. *Procedures for Air Navigation Services — Air Traffic Management* (PANS-ATM, Doc 4444)
7. *Procedures for Air Navigation Services — Aeronautical Information Management* (PANS-AIM, Doc 10066)
8. *Convention on International Civil Aviation*, (Doc 7300)
9. *Air Traffic Services Planning Manual* (Doc 9426)
10. *Manual Concerning Interception of Civil Aircraft (MICA)* (Doc 9433)
11. *Manual Concerning Safety Measures Relating to Military Activities Potentially Hazardous to Civil Aircraft Operations* (Doc 9554)
12. *Manual on Collaborative Air Traffic Flow Management* (Doc 9971)
13. *Global Air Navigation Plan* (Doc 9750)

14. *Global Air Traffic Management Operational Concept* (Doc 9854)
 15. *Air Traffic Management Security Manual* (Doc 9985)
 16. *Assembly Resolutions in Force (as of 4 October 2019)* (Doc 10140)
 17. *Manual on System-Wide Information Management (SWIM) Concept* (Doc 10039)
 18. *Safety Management Manual (SMM)* (Doc 9859)
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Chapter 1

A GLOBAL OPPORTUNITY

1.1 FRAMEWORK

1.1.1 Overview

1.1.1.1 The aims and objectives of ICAO in accordance with Article 44 of the *Convention on International Civil Aviation*, (Chicago Convention, Doc 7300) are to develop the principles and techniques of international air navigation and foster the planning and development of international air transport to ensure safe and orderly growth.

1.1.1.2 The Chicago Convention establishes the privileges of and restrictions on all Member States and provides for the adoption of international Standards and Recommended Practices (SARPs) regulating international air transport. The Chicago Convention recognizes and accepts the principle that every State has complete and exclusive sovereignty over the airspace above its territory under Article 1, with Article 2 further clarifying that the territory of the State includes the land and the adjacent territorial waters.

1.1.2 Article 3 of the Chicago Convention

1.1.2.1 Article 3 a) of the Chicago Convention expressly excludes state aircraft from its scope of applicability. Articles 3 b), c) and d) further clarify the definition and scope of application of the Articles of the Chicago Convention, extracted below:

- a) *This Convention shall be applicable only to civil aircraft, and shall not be applicable to state aircraft.*
- b) *Aircraft used in military, customs and police services shall be deemed to be state aircraft.*
- c) *No state aircraft of a contracting State shall fly over the territory of another State or land thereon without authorization by special agreement or otherwise, and in accordance with the terms thereof.*
- d) *The contracting States undertake, when issuing regulations for their state aircraft, that they will have due regard for the safety of navigation of civil aircraft.*

1.1.2.2 Pursuant to Article 3 d) of the Chicago Convention, ICAO urges States to consider the safety of navigation of civil aircraft when issuing regulations for their state aircraft. Regulations for state aircraft, and particularly military aircraft, established by States with the support of their military aviation authorities must take into account the civil aviation dimension. The publication by a State of its national regulations will enhance the awareness of all stakeholders on how due regard for the safety of navigation of civil aircraft is applied by its state aircraft.

1.1.3 Resolution A40-4, Appendix I, Coordination and cooperation of civil and military air traffic

1.1.3.1 Appendix I of Resolution A40-4, adopted by the 40th Session of the ICAO Assembly (*Assembly Resolutions in Force (as of 4 October 2019)* (Doc 10140) refers), describes the principles which should guide the development of States' regulations and ICAO provisions and guidance in relation to civil-military coordination and cooperation:

Whereas the airspace is a resource common to both civil and military aviation, and given that many air navigation facilities and services are provided and used by both civil and military aviation;

Whereas the Preamble of the *Convention on International Civil Aviation* stipulates that signatories thereto had "agreed on certain principles and arrangements in order that international civil aviation may be developed in a safe and orderly manner and that international air transport services may be established on the basis of equality of opportunity and operated soundly and economically";

Whereas Article 3 a) of the Convention states that "This Convention shall be applicable only to civil aircraft, and shall not be applicable to state aircraft" and Article 3 d) requires that "contracting States undertake, when issuing regulations for their state aircraft, that they will have due regard for the safety of navigation of civil aircraft";

Recognizing that growing civil air traffic and mission-oriented military air traffic would benefit greatly from a more flexible use of airspace used for military purposes and that satisfactory solutions to the problem of cooperative access to airspace have not evolved in all areas;

Whereas the flexible use of airspace by both civil and military air traffic may be regarded as the ultimate goal, improvement in civil/military coordination and cooperation offers an immediate approach towards more effective airspace management; and

Recalling that the ICAO Global ATM Operational Concept states that all airspace should be a usable resource, any restriction on the use of any particular volume of airspace should be considered transitory, and all airspace should be managed flexibly;

The Assembly resolves that:

1. the common use by civil and military aviation of airspace and of certain facilities and services shall be arranged so as to ensure the safety, regularity and efficiency of civil aviation as well as to ensure the requirements of military air traffic are met;
2. the regulations and procedures established by Member States to govern the operation of their state aircraft over the high seas shall ensure that these operations do not compromise the safety, regularity and efficiency of international civil air traffic and that, to the extent practicable, these operations comply with the rules of the air in Annex 2;
3. the Secretary General shall provide guidance on best practices for civil/military coordination and cooperation;
4. Member States may include, when appropriate, representatives of military authorities in their delegations to ICAO meetings; and

5. ICAO serves as an international forum that plays a role in facilitating improved civil/military cooperation, collaboration and the sharing of best practices, and to provide the necessary follow-up activities that build on the success of the Global Air Traffic Management Forum on Civil/Military Cooperation (2009) with the support of civil/military partners.

Associated practices

1. Member States should as necessary initiate or improve the coordination and cooperation between their civil and military air traffic services to implement the policy in Resolving Clause 1 above.

2. When establishing the regulations and procedures mentioned in Resolving Clause 2, the State concerned should coordinate the matter with all States responsible for the provision of air traffic services over the high seas in the area in question.

3. The Council should ensure that the matter of civil and military coordination and cooperation in the use of airspace is included, when appropriate, in the agenda of divisional and regional meetings, in accordance with Resolving Clauses 3, 4 and 5 above.

1.1.3.2 Increasingly, national and international military operations require complex coordination and planning processes to avoid unnecessary airspace segregation or restrictions, while maintaining the required level of safety. This is described in more detail in Chapters 3, 4 and 6. Although there may be exceptional circumstances and operational considerations that preclude either negotiation or notification, States are encouraged to consider the importance of such notifications in light of Article 3 d) of the Chicago Convention.

1.1.4 ICAO framework

1.1.4.1 Obligations of Member States under the Chicago Convention relevant to civil-military issues include:

- a) to develop regulations governing aviation safety in compliance with Standards and Recommended Practices (SARPs) contained in the Annexes to the Chicago Convention (Article 37); and
- b) to undertake, when issuing regulations for their state aircraft, that they will have due regard for the safety of navigation of civil aircraft (Article 3 d)).

1.1.4.2 Annex 2 — *Rules of the Air* includes provisions on the coordination with military authorities for the State's territorial integrity and sovereignty, and air defence reasons. To facilitate this coordination with appropriate military units, a flight plan should be submitted for any flight:

- a) within designated areas;
- b) into designated areas; or
- c) along designated routes;

when so required by the appropriate air traffic services (ATS) authority. This will facilitate coordination with appropriate military units in order to avoid the possible need for interception for the purpose of identification. Transparent and real-time data exchanges between civil ATS units and appropriate military units would facilitate this coordination.

1.1.4.3 Annex 11 — *Air Traffic Services* addresses the need for coordination with military authorities or units, depending on the degree and level to which state aircraft activities may affect civil operations or vice versa. To enable the safe and efficient coordination between civil and military stakeholders and facilitate the participation of military authorities in civil safety risk assessment for activities potentially hazardous to civil aircraft, States should refer to the provisions in Chapter 2, 2.18 and 2.19.

1.1.4.4 The procedures found in the *Procedures for Air Navigation Services — Air Traffic Management* (PANS-ATM, Doc 4444) and the Regional Supplementary Procedures (SUPPs, Doc 7030), together with the Standards in Annex 2, govern the application of the rules of the air and ATS. The PANS-ATM contains procedures applicable to other in-flight contingencies, such as strayed or unidentified aircraft, that require coordination with military authorities. Some miscellaneous procedures are detailed for the conduct of special military operations.

1.1.4.5 The purpose of the *Global Air Navigation Plan* (GANP, Doc 9750) is to guide States to achieve an integrated, harmonized and globally interoperable ATM system. A global system can be described as a worldwide system that achieves interoperability and seamlessness across regions for all phases of flight. The GANP includes technical, operational, economic, environmental, financial, legal and institutional elements and offers States practical guidance on implementation and funding strategies. Specifically, the GANP provides guidance on, and promotes the implementation of, the civil-military coordination measures and cooperation concepts embedded in the *Global Air Traffic Management Operational Concept* (Doc 9854). The concept defines seven components where the military and other state aircraft operators are recognized as part of the ATM community. Information management is the backbone linking these components together and is therefore critical for enhancing cooperation. The concept describes the services required to operate the global air traffic system in the future. It highlights the elements needed to increase user flexibility, maximize efficiencies and increase system capacity, while concurrently improving safety. Enhancing interoperability between civil and military aviation systems is an integral part of this approach.

1.1.4.6 The *Manual Concerning Safety Measures Relating to Military Activities Potentially Hazardous to Civil Aircraft Operations* (Doc 9554) describes the coordination that should take place between civil ATS and appropriate military units. It details the requirements to establish and maintain close cooperation with the military authorities responsible for activities that may affect civil aircraft operations.

1.1.4.7 The *Manual Concerning Interception of Civil Aircraft* (MICA, Doc 9433) consolidates all ICAO provisions and special recommendations relevant to the subject of interception of civil aircraft extracted from Annex 2, Annex 4 — *Aeronautical Charts*, Annex 6 — *Operation of Aircraft*, Annex 7 — *Aircraft Nationality and Registration Marks*, Annex 10 — *Aeronautical Telecommunications*, Volume I — *Radio Navigation Aids* and Volume II — *Communication Procedures including those with PANS status*, Annex 11, Annex 15 — *Aeronautical Information Services*, the *Procedures for Air Navigation Services — Aircraft Operations* (PANS-OPS, Doc 8168) Volume I and PANS-ATM.

1.1.4.8 The *Air Traffic Management Security Manual* (Doc 9985) complements the *Aviation Security Manual* (Doc 8973, Restricted) and provides guidance on security issues specific to ATM in order to assist States and air navigation services providers (ANSPs) in implementing appropriate security provisions. In addition, the manual provides guidance to the ANSP on ATM security services provisions in support of national security and law enforcement requirements and offers guidance on protecting the ATM system infrastructure from threats and vulnerabilities.

1.1.4.9 The *ATS Planning Manual* (Doc 9426) provides guidance on airspace management to achieve the most effective exploitation of the airspace in accordance with the requirements of the various airspace users. In order to make maximum use of airspace, civil-military coordination must be achieved, with airspace being shared, either simultaneously or on a time-share basis, taking into account the different levels of aircraft equipage and the various air traffic control (ATC) components.

1.2 CIVIL-MILITARY COLLABORATION, COOPERATION AND COORDINATION

1.2.1 For many States, the aviation sector is a significant contributor to the economy and requires a stable and secure environment. As such, the growth of civil aviation activity needs to be protected and encouraged, while concurrently appropriating priority to military aerial activities for security and defence purposes. To best accommodate the needs of both civil and military stakeholders, States should adopt the perspective that airspace is a strategic resource to be collectively managed in support of achieving national objectives. This resource would be best managed through civil-military cooperation, supported by coordination, which would allow for civil aviation to flourish and allow both civil and military aviation to operate safely and efficiently.

1.2.2 Based on the experience of many States, the joint management of airspace in an equitable and dynamic manner has resulted in the efficient use of airspace, better responses to changing operational conditions (e.g. adverse weather conditions, natural disasters), faster deployment of resources for contingency responses and enhanced safety for civil and military operations. This allows for efficient flight paths, resulting in lower fuel costs, reduced emissions and the availability of alternative routings to circumnavigate adverse weather conditions. This results in obvious financial, environmental and safety benefits. Flexible access to airspace translates into quicker responses to developing situations, improved effectiveness and optimized mission time of military aircraft. Cooperation to enhance systems (aircraft or ground) interoperability offers economies of scale, facilitates coordination and improves mutual understanding among stakeholders, which may promote a beneficial cycle of integration and improvement.

1.2.3 In addition to its positive impact on airspace management on a day-to-day basis, cooperation also allows for improved planning and execution of future technical and operational concepts. States should initiate cooperation, and potentially collaboration, on aviation aspects such as the design and management of the airspace, technical requirements, interoperability and system-wide information collection and dissemination. This could be achieved through the establishment of effective civil-military cooperation and coordination processes to address present and future air transport demands for enhanced safety, national security and air navigation capacity and efficiency. A collaborative assessment of costs and benefits will allow States to meet the future demands of civil and military aviation with greater certainty. Consequently, States will likely be encouraged to consider common requirements for technology, capabilities, performance and procedures to meet future ATM demands. This would also ensure sustainability for both civil and military operations and potentially enhance military mission effectiveness.

1.2.4 State commitments to civil-military cooperation and collaboration are conducive to an internationally harmonized approach to aviation. The establishment of national and international agreements will benefit States and international civil aviation stakeholders alike.

1.2.5 Historically, agreements between civil and military authorities, and/or the appropriate civil and military ATS authorities have focused on the needs of State defence, security, military readiness, emergency procedures and response requirements. However, procedures that support the efficient integration of civil and military aviation in day-to-day operations ensuring both flight-efficiency and mission effectiveness are consistent with the needs of both civil and military aviation.

1.2.6 Access to all airspace is a crucial requirement for state aircraft to perform their security and defence missions. Since the airspace is a single continuum, accommodating the requirements of all airspace users is dependent on the full cooperation of civil and military aviation authorities, relevant international and regional organizations, regional defence organizations, etc. In this context, civil-military cooperation becomes an opportunity to enhance the capacity, flexibility, efficiency, safety and security of the global aviation network.

1.2.7 The use of military assets to support humanitarian assistance has proven to be essential in certain circumstances, particularly in major natural disasters. Military units are often well placed and sometimes specifically mandated by their States to act as first responders. Bilateral and regional agreements on the use of external entities for disaster response are also being developed in some parts of the world. In this context, a solid approach to civil-military

cooperation becomes an essential tool for the humanitarian community, both strategically and operationally. Civil-military cooperation is the essential link that enables the necessary dialogue and interaction between actors in humanitarian emergencies.

1.2.8 Civil-military collaboration is a strategic long-term (5 to 20 years) system-wide approach to achieving the goals of the State, encompassing the development of the future air navigation system. When considering developments related to modernization at the global, regional or national level, collaboration is the process by which civil and military authorities jointly ensure that the requirements of both airspace users are considered. As stated in the GANP, “Civil-military collaboration is key to a seamless air navigation system, which is why military aviation authorities actively participate in the development of the GANP. By providing their operational requirements from the outset as new concepts and technical solutions are being developed, military airspace users ensure that their needs in terms of access to airspace, aircraft mobility, confidentiality and civil-military interoperability are taken into account. This helps to avoid potential adverse financial, security, efficiency and safety impacts and supports global interoperability”.

1.2.9 Supported by political will, civil-military cooperation is a joint effort, undertaken to provide optimum solutions for all stakeholders, based on consensus and mutual understanding, trust and established communications. It encompasses all the actions, structures, exchanges, processes, dialog and procedures at the strategic phase and further actioned at the pre-tactical phase that enable efficient air navigation and civil-military coordination. Cooperation involves the participation of a wide range of stakeholders, including civil and military aviation authorities, appropriate ATS authorities, civil ATS units and appropriate military units.

1.2.10 Effective civil-military coordination includes all the processes, procedures and actions conducted at the tactical phase (and sometimes at the pre-tactical phase) between operational actors (usually civil ATS units and appropriate military units) that enable safe and efficient air activities for all stakeholders. Coordination is normally an action initiated by one party, providing the other party(ies) with critical information, in order to agree on safe operational activities.

1.2.11 Establishing effective civil-military cooperation at the appropriate governmental levels is of utmost importance. Decision makers at the highest government levels should agree on a harmonized high-level policy for civil-military cooperation and coordination, including airspace design development, airspace access requirements, long- and medium-term planning, standardization of procedures, regulation, and deployment of new procedures, including support for ATS and interoperability planning.

Note.— When defining this high-level policy, States should consider identifying the collaborative decision-making (CDM) responsibilities for civil and military aviation authorities (regulators), appropriate ATS authorities and appropriate military units, airspace managers, and airspace users. More details on the cooperation framework can be found in Chapter 3, and on CDM in Chapter 4, as well as in the Manual on Collaborative Air Traffic Flow Management (Doc 9971).

1.3 STRUCTURE OF THIS DOCUMENT

1.3.1 High-level considerations regarding civil-military cooperation are contained in **Chapter 1**.

1.3.2 **Chapter 2** presents details on state aircraft operations and related ATM considerations.

1.3.3 **Chapter 3** describes a civil-military cooperation framework while its high-level considerations are contained in this chapter. Before effective cooperation and coordination can be achieved, a series of steps, structures and processes should be implemented. **Chapter 3** also provides ample details on how to establish the necessary national structure and provides guidance on how to implement civil-military cooperation and coordination.

1.3.4 **Chapter 4** provides detailed guidance on the flexible use of airspace (FUA) and on airspace organization and management in the context of civil-military cooperation and coordination.

1.3.5 Interoperability between civil and military stakeholders is a key enabler of cooperation and coordination; **Chapter 5** provides guidance on how to improve interoperability of state aircraft and ground systems with the civil aviation systems.

1.3.6 While day-to-day routine operations are addressed in **Chapters 3, 4, 5 and 7**, the specific considerations related to civil and armed conflicts, natural disasters and special activities are highlighted in **Chapter 6**.

1.3.7 When considering a more advanced implementation of civil-military cooperation, a performance framework is a useful tool to measure the efficiency of the civil-military cooperation implementation with regard to airspace. **Chapter 7** provides basic elements to develop a performance measurement framework.

1.3.8 ATM security in the framework of civil-military cooperation is provided in **Chapter 8**.

1.3.9 When considering the implementation of an air defence identification zone (ADIZ), States should consider the guidance provided in **Chapter 9**.

1.4 COMMUNICATION: A BASIC, YET OFTEN OVERLOOKED, REQUIREMENT

1.4.1 Since effective communication is an essential foundation for better collaboration, cooperation and coordination, civil and military stakeholders should meet regularly to understand the needs, constraints and challenges relating to communications that each operator and service provider faces while operating within the airspace concerned. Good communication and mutual understanding will create a solid foundation upon which to build cooperation.

1.4.2 Military participation in civil aviation meetings will promote a better mutual understanding of civil and military needs. It is good practice to involve varying levels of military personnel at all stages of the civil-military cooperation and coordination processes. This enhances the interaction between civil and military stakeholders and ensures that civil-military airspace principles are understood by a wide range of personnel and that cooperation does not rely on specific individuals.

1.4.3 Establishing and enhancing effective lines of communication between military and civil aviation authorities provides mutual safety and efficiency benefits during times of normal operations. This supports mutual trust and understanding, which, along with open lines of communication, could be the critical factor that ensures the safety of civil aviation during situations requiring a military response.

1.5 STRUCTURES AND NEEDS

1.5.1 Differing structures

Organizational structures vary for civil and military entities. While civil aviation structures are generally similar around the world, military operators may be organized differently and are usually regulated by national military authorities or other national security authorities operating state aircraft. The established civil-military cooperation and coordination processes address the challenges arising from organizational differences and ensure the effective involvement of civil-military stakeholders at all levels of administration and for all phases of activities.

1.5.2 Varying needs

1.5.2.1 While civil aircraft aim to fly the optimum route at the most efficient flight level, military aircraft are mainly focused on executing operational requirements for both planned and contingency flights and therefore have different demands for airspace. When coordinating civil and military aviation activities, State authorities should take into consideration both types of needs.

1.5.2.2 State aircraft require access to sufficient airspace for training and for the execution of the security, defence and law enforcement operations mandated by States and by international agreements. It is in this context, and that of Article 3 d) of the Chicago Convention, that each State undertakes, when issuing regulations for state aircraft, that it will have due regard for the safety of navigation of civil aircraft. Armed forces may require large portions of airspace be reserved/restricted for training; however, such airspace may be made available to other users when military activities are not taking place. In some instances, coordination can allow joint usage by both civilian and military users.

Note.— Details on the expectations related to State aviation are available in Chapter 2.

1.6 AIRSPACE MANAGEMENT PRINCIPLES

Airspace management (ASM) is the process that allows the different needs of all airspace users to be met equitably. The ultimate goal of ASM is to achieve the most efficient use of the airspace based on actual needs and, when possible, to avoid permanent airspace segregation. In the context of civil-military cooperation, ASM should follow these guiding principles and strategies:

- a) airspace is a common resource to be used by all stakeholders and allocated as a result of coordination;
- b) all available airspace should be flexibly managed. Airspace boundaries should be adjusted to particular traffic flows and should not be constrained by national or facility boundaries;
- c) dynamic flight trajectories should be accommodated and optimum operational solutions provided;
- d) when conditions require different types of traffic to be segregated by airspace organization, the size, shape and time regulation of that airspace should be set to minimize the impact on operations;
- e) airspace use should be coordinated and monitored in order to accommodate the competing requirements of all users and to minimize any constraints on operations;
- f) airspace reservations should be planned in advance with requested changes accommodated dynamically whenever possible; and
- g) it should be possible to accommodate short-notice, unplanned requirements, while being cognizant that the complexity of operations may limit the degree of flexibility.

1.7 STRATEGIC, PRE-TACTICAL AND TACTICAL

1.7.1 When considering the various phases and levels of civil and military cooperation and coordination, the terms *strategic*, *pre-tactical* and *tactical* are used within this manual.

1.7.2 The term *strategic* represents the long-term, high-level planning and support to achieve the goals of civil-military collaboration and cooperation, including the development of a national airspace policy providing a framework for airspace management and utilization, and the development of harmonized procedures and mechanisms to be applied during the pre-tactical and tactical phases.

1.7.3 The term *pre-tactical* refers to an intermediate preparatory planning phase or timeframe whereby the decisions and objectives made during the strategic phase, as well as the procedures agreed during that timeframe, are implemented, leveraging cooperation and collaborative decision-making in order to meet the efficiency and safety objectives of the tactical phase.

1.7.4 The term *tactical* denotes the coordination mechanisms and exchanges between civil and military stakeholders in real-time or within the immediate timeframe of the commencement of activities. It is the execution of actions for a narrow immediate objective.

1.8 EXPECTATIONS OF CIVIL AND MILITARY STAKEHOLDERS

1.8.1 A delicate balance needs to be struck to meet the expectations of both civil and military aviation stakeholders. Competing demands for airspace are often a source of contention and should be managed collaboratively. In order to achieve this, civil and military users should make every effort to understand each other's operations.

1.8.2 The civil aviation community expects that States will ensure that their military airspace users define their operating airspace requirements based on operational requirements and responsibilities. It is also expected that state aircraft operators will use reserved airspace based on their actual needs, publish a reservation schedule, and release any unused airspace with as much notice as possible.

1.8.3 While it is recognized that there may be times when airspace will be reserved or used upon short notice, civil aviation expects States to provide a framework for airspace reservation, covering topics such as the modalities of activation, notification and safety buffers that will be used to ensure adequate separation. Considering the role which civil aviation plays in a State's economy and development, States should be mindful of the costs associated with delays incurred by civil operators due to their military operations and of the importance that adequate notice be given to ANSPs to allow them to adapt their airspace utilization plans. In both instances, civil and military aviation authorities expect stakeholders to use the airspace efficiently, with an overall goal of ensuring the best use of the available airspace by all stakeholders.

1.9 SAFETY CONSIDERATIONS

1.9.1 Safety is a common priority for all aviators and aviation authorities; however, civil and military aviation authorities may adopt different approaches to achieve safety. In some instances, military aviation authorities and operators plan and conduct their operations by assessing and mitigating risks using operational risk management methods to ensure safety. Civil aviation authorities and appropriate ATS authorities will apply the provisions contained in Annex 19 — *Safety Management*, also supported by the *Safety Management Manual* (SMM, Doc 9859) for safety investigations related to the application of safety management systems (SMS). When appropriate, the participation of military aviation authorities and/or appropriate military units in civil aviation SMS, and/or the application of such system in the military environment, will enhance the safety of the overall State aviation system.

1.9.2 Operating in compliance with international, regional and State civil aviation legislation, where practicable, is an effective means of complying with Article 3 d) of the Chicago Convention. However, the nature of defence and security missions can create unique situations that need special handling and considerations. As required by Article 3 d), States should ensure that regulations, procedures and safety management principles provide an adequate framework to ensure

the safety of civil aviation when state aircraft must operate outside of civil rules. Furthermore, States should ensure that military authorities actively participate in the processes established by civil aviation authorities to coordinate activities potentially hazardous to civil aircraft as described Annex 11, 2.19. Additional guidance on this topic is provided in Doc 9554.

1.9.3 Accidents and serious incidents involving civil aviation are reported and investigated in accordance with Annex 13 — *Aircraft Accident and Incident Investigation*. Detailed guidance for the conduct of such investigations is provided in the *Manual of Aircraft Accident and Incident Investigation* (Doc 9756), including for accidents and incidents involving both civil aircraft and state aircraft (which includes military aircraft).

1.10 LIAISON IN SUPPORT OF COOPERATION

1.10.1 Some States attach military personnel to civilian ATS units (ATSUs) where they are employed in operational and support positions. They may also be involved in research and development, including airspace planning. This type of arrangement supports consultation and cooperation in airspace planning and the development of new or revised procedures. Such an environment also fosters increased understanding and awareness of each other's needs, processes, procedures and aspirations.

1.10.2 Conversely, civil liaison personnel could be attached to appropriate military commands. These personnel should, as necessary:

- a) present and interpret the effect and purpose of civil aviation policy, regulations and procedures as they affect military operations;
 - b) assist military personnel in the preparation, coordination and processing of arrangements for the movement of military traffic; and
 - c) assist in the resolution of problems which arise out of misunderstanding of military operations, civil procedures, systems limitations, and other matters of controversial nature in relation to operations.
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Chapter 2

STATE AIRCRAFT OPERATIONS AND NATIONAL SECURITY AND DEFENCE CONSIDERATIONS

2.1 INTRODUCTION

2.1.1 Although the focus of this manual is on civil-military cooperation, this chapter will provide guidance on the wider range of state aircraft operations. State aviation operators in general and military aviation operators in particular are required to respond as quickly as possible when security, defence or law enforcement situations arise. In many cases, State aviation assets are also expected to respond to situations in other States, in accordance with bilateral and/or multi-national agreements. A solid foundation of cooperation will ensure that State aviation operators have access to sufficient airspace to support the training and exercises required to maintain personnel readiness and proficiency. This cooperation will also assist States and their state aircraft to operate with due regard for the safety of civil aircraft, as required by Article 3 d) of the Chicago Convention.

2.1.2 State aviation authorities and operators may be expected to fulfil a wide range of roles. In pursuit of these tasks, States should require compliance with international, regional and State civil aviation regulations to the extent practicable. However, it is recognized that the nature of certain defence and security tasks can create situations that may need special handling and consideration. This chapter provides examples of roles that could be performed by state aircraft and the general expectations for handling such aircraft by an ANSP. Lastly, this chapter outlines the basic operation principles and planning processes for military airspace users and the link between national security and airspace access requirements.

2.2 EXAMPLES OF STATE AIRCRAFT ROLES

2.2.1 The diverse roles that state aircraft fulfil mean that the types of aircraft used can vary considerably, ranging from highly agile military air defence fighter aircraft to wide-bodied cargo and passenger aircraft, as well as small manned or unmanned aircraft. The following paragraphs describe some of the operations and roles state aircraft could have (This list is not exhaustive.). In all cases below, where military requirements make it impossible to follow civil aviation regulations, States are reminded of their obligation under Article 3 d) to the Chicago Convention to ensure their military aircraft operate with due regard for the safety of civil aircraft.

2.2.2 *Aerial firefighting.* The use of aircraft to combat wildfires. The types of aircraft used include helicopters that transport firefighters who parachute into remote areas and multi-engine fixed-wing aircraft which deliver fire suppressants. This will often require a restricted area to be established to ensure that civil aviation operations do not interfere with firefighting operations. In addition, it will be necessary to accommodate aircraft transiting to and from the firefighting area, which are unlikely to conform to the usual traffic patterns in the airspace concerned. The firefighting operation itself cannot be safely integrated with civil aviation operations. However, it should be possible for aircraft transiting to and from the firefighting area to operate in compliance with civil aviation regulations and to be safely integrated with civil aviation operations.

2.2.3 *Aeromedical evacuation.* A specialized form of airlift for transporting ill or injured personnel under medical supervision to appropriate medical treatment facilities. Although predominantly a military task in hostile environments, aeromedical evacuation could also be conducted by military aircraft in other environments. In most environments, it should be possible for these flights to comply with civil aviation regulations and to be safely integrated with civil aviation operations. Certain medical situations may require slower climb or descent rates than might otherwise be expected from the type of aircraft.

2.2.4 *Airborne military operations.* The provision of air-delivered combat power to seize ground or installations through the airdrop or air-landing of land forces directly onto an objective. This activity is military-specific and involves helicopters or fixed-wing aircraft, possibly supported by air defence fighter aircraft and larger, multi-engine reconnaissance aircraft. This type of activity may take place in a known conflict zone or create an environment that is potentially hazardous for civil aviation. Due to the timing requirements of these operations, it may be impossible to provide forewarning to civil aviation authorities.

2.2.5 *Airlift.* Aircraft enabling the movement and sustainment of forces anywhere in the world and across the entire range of operations. These operations can be conducted by military aircraft or by commercial transport aircraft that have been called into duty for a period of time. It should be possible for these types of flights to fulfil most of their tasks while operating in compliance with civil aviation regulations and to be safely integrated with civil aviation operations. In certain situations, such as an airdrop, adequate prior coordination should be employed to guarantee the safety of civil aircraft operations.

2.2.6 *Air power contribution to land and maritime operations.* Such activities include air interdiction, close air support, electronic warfare, anti-surface warfare, anti-submarine warfare and aerial mining. Air assets involved in these roles are wide-ranging and can include, among others, helicopters, combat fighter/bomber jet aircraft, unmanned aircraft systems (UAS) and multi-engine wide-bodied aircraft. In most cases, these types of operations cannot be safely integrated with civil aircraft operations.

2.2.7 *Air-to-air refuelling (AAR).* The process of transferring fuel from one aircraft to another in flight. This is an essential capability that increases the range, endurance, payload and flexibility of the receiving aircraft. AAR requires sufficient airspace for aircraft to manoeuvre in close proximity to the aircraft supplying the fuel. The aircraft supplying the fuel may remain between fixed locations, may travel in formation with the aircraft requiring fuel, or may join aircraft in transit. In most cases, only minimal changes in aircraft attitude are possible during the refuelling process. Safe integration with civil aviation operations requires advance coordination between the military aviation authority and the ANSP to ensure adequate spacing is planned for and maintained between the AAR operation and non-participating aircraft, and to enable participating aircraft to enter and leave the airspace associated with the AAR operation.

2.2.8 *Counter-air.* Counter-air operations achieve a desired or necessary level of control of the airspace. Air policing, air defence and patrol missions are practiced and conducted with high priority to safeguard nations against threats. They are usually conducted on short notice, e.g., to intercept unidentified or suspicious aircraft. During crisis situations, counter-air operations may involve the use of a variety of integrated weapons systems and sensors to counter threats, although the military requirements of these operations may make it impossible to provide forewarning to civil aviation authorities.

2.2.9 *Experimental/trials.* Acceptance testing for new aircraft, aerodynamics and systems research on aircraft. These activities range in variety and ATM requirements and, in most cases, these types of operations cannot be safely integrated with civil aircraft operations.

2.2.10 *Geographic and hydrographic support.* The measurement and description of the physical features and conditions of terrain, navigable waters and adjoining coastal areas, including oceans, rivers and lakes. Depending on the flight patterns required to achieve mission objectives, it may be possible to safely integrate these operations with civil aircraft operations.

2.2.11 *Humanitarian assistance.* Providing personnel, equipment and supplies in response to natural disasters or other situations affecting a significant number of people or a large geographic area. This type of mission may also involve transporting people out of a disaster area. Although it should be possible for these types of flights to fulfil their tasks while operating in compliance with civil aviation regulations and to be safely integrated with civil aviation operations, particular attention to civil-military coordination is required if these flights will operate in or near areas where military operations are taking place.

2.2.12 *Intelligence, surveillance and reconnaissance (ISR).* The integration of capabilities from all military components and some non-military platforms, in order to provide awareness essential to the successful planning and conduct of operations, through the collection, processing, exploitation and dissemination of accurate and timely information. Air assets involve various manned and unmanned systems. Depending on the flight patterns required to achieve mission objectives, it may be possible to safely integrate these operations with civil aircraft operations, although the security requirements of these operations may make it impossible to provide forewarning to civil aviation authorities.

2.2.13 *Maritime operations.* State aircraft may have a requirement to train and operate over the high seas. These flights, which vary in purpose, may originate from ships. The flight patterns required to achieve mission objectives mean that, in certain cases, these types of operations cannot be safely integrated with civil aircraft operations. Because it is not possible for airspace access to be denied for civil aircraft in high seas airspace, the military flights should operate with due regard for the safety of navigation of civil aircraft in accordance with Article 3 d) of the Chicago Convention.

2.2.14 *Meteorological support.* State aircraft may be employed by some States in support of data collection and research. These tasks predominantly use multi-engine, fixed-wing aircraft fitted with unique on-board meteorological equipment, although UAS offer increasing utility. Depending on the flight patterns required to achieve mission objectives, it may be possible to safely integrate these operations with civil aircraft operations.

2.2.15 *Police/customs.* Air operations in support of police operations and customs and border protection (CBP) services. Aerial units can be tasked to assist in surface vehicle pursuits and surveillance, which allow surface police/law enforcement units to disengage and follow from a discreet distance, making the pursuit less dangerous but still allowing for surface police/law enforcement units to be directed to apprehend suspects. These operations are generally conducted through the use of helicopters; however, multi-engine fixed-wing aircraft are also used, allowing for higher and quieter surveillance with less visibility from the perspective of the suspect. In a similar manner, support to CBP services may utilize helicopters for surveillance operations; however, given the larger scale and distances involved with their operations, the use of multi-engine aircraft and UAS may be more efficient. Depending on the flight patterns required to achieve mission objectives, it may be possible to safely integrate these operations with civil aircraft operations.

2.2.16 *Search and rescue (SAR).* A humanitarian activity with the primary objective of saving lives. In many States, the military is responsible for SAR operations; however, non-military air assets can have either a shared or leading role in this vital capability. The aircraft types involved include helicopters and multi-engine aircraft, which during actual SAR missions will require priority handling and unrestricted access to appropriate airspace. Depending on the flight patterns required to achieve mission objectives, it may be possible to safely integrate these operations with civil aircraft operations.

2.2.17 *Space operations.* States may sometimes wish to exploit space capabilities. Launches and recoveries of space vehicles may affect large volumes of airspace. In most cases, these operations cannot be safely integrated with civil aircraft operations.

Note.— See Appendix A for information on space launches and re-entry activities.

2.2.18 *Special air operations.* Specially organized military units manned by carefully selected individuals who are trained in unconventional applications of tactics against strategic and operational objectives. Special air operations are key enablers for special forces to conduct their operations. The nature of their tasks requires the element of surprise and covert handling. Depending on the flight patterns required to achieve mission objectives, it may be possible to safely integrate these operations with civil aircraft operations.

2.2.19 *Unmanned aircraft systems (UAS).* UAS are an increasingly important air asset that offers flexibility and utility. Although originally operating in segregated airspace or within visual line of sight (VLOS), UAS are more frequently operating on missions outside of segregated airspace, including beyond visual line of sight (BVLOS). Depending on the flight patterns required to achieve mission objectives, it may be possible to safely integrate these operations with civil aircraft operations. An example of such integration is the EU HALE Global Hawk flights performed outside of segregated airspace across the European skies.

2.2.20 *Very important person (VIP) aircraft.* It should be possible for these types of flights to fulfil their tasks while operating in compliance with civil aviation regulations and to be safely integrated with civil aviation operations. In some cases, however, the associated VIP status might require additional handling, separation and prioritization. Advance coordination between the military aviation authority and the ANSP will enable these requirements to be met without undue disruption to civil aviation operations.

2.3 STATE AIRCRAFT CONSTRAINTS

2.3.1 State aircraft can operate in a variety of contexts, with specific constraints. These constraints cover five general areas, which are detailed in this section.

2.3.2 *Institutional constraints.* State aircraft operations are non-profit and either serve a function or carry out a requirement. Mandated to meet security and defence interests as demanded by governments, they require easy access to training areas near their respective bases.

2.3.3 *Financial constraints.* Aging fleets and budget constraints can hinder the implementation of new equipment on military aircraft, despite the growing need to evolve alongside new ATM initiatives.

2.3.4 *Operational constraints.* State aircraft operations related to defence and security threats give rise to unique situations that require special handling and consideration. For example, activities such as SAR, air policing/patrol, aerial firefighting and special air operations may demand the utmost priority and be unable to accommodate any delay or denied access to airspace. An additional operational limitation is imposed by Article 3 c) of the Chicago Convention, which prohibits the operation of state aircraft of one State over the sovereign territory of another State without authorization. This authorization may include restrictions on how and where such aircraft may operate. Accordingly, state aircraft may not be able to accept ATC clearances which change their flight-planned route and/or altitude while they are within the sovereign airspace of another State or would cause them to infringe on the sovereign airspace of another State where no authorization has been given.

2.3.5 *Technical constraints.* Equipage of state aircraft is predominantly focused on the expected output and nature of the task. Physical space is not always available in such aircraft, because of limited space or conflict with mission essential systems and communications, navigation, and surveillance (CNS)/ATM equipment on board.

2.3.6 *Sensitive information constraints.* State aircraft conducting classified/sensitive operations may require special handling to preserve the integrity of the mission's classified nature. For example, tactical aircraft conducting counter-air operations may not meet surveillance or communications requirements, but still require ATS support to safely avoid civil aircraft.

2.4 MILITARY AIRCRAFT OPERATIONS

2.4.1 State aircraft usually conduct three types of missions: contingency/crisis operations, training/exercises or routine/steady state flights. Contingency/crisis operations occur where aircraft are engaged against assessed threats (suspected unlawful interference, sinking ship/aircraft, intruder alerts, pollution, etc.). In such cases, the appropriate State

authority (i.e. military, police, civil protection, transport, coast guard) expects the deployed assets to achieve a defined objective, while abiding by specific procedures. During an operation, aircraft may request priority to perform their mission, despite its impact on civil air traffic capacity and efficiency. Using due regard for the safety of civil aircraft, in accordance with Article 3 d) of the Chicago Convention, military aircraft are likely to also use non-civil separation minima in the conduct of the operation.

2.4.2 For security and defence operations, the gradation of the threat may require different levels of ATS handling. Before activating an operation, an alert, early notification and/or information to the appropriate ATS authority and/or ATS unit should be provided, where possible. The notice may vary according to the type of threat and the operational procedures of the State in question.

2.4.3 The objective of a training mission is to operate the flight as if it was a real operation. For military units participating in a training mission, the only difference between a training mission and a real operation is the absence of a threat. Military training flights form the bulk of military daily operational schedules. Flight training may take various forms, including (but not limited to):

- a) training flight;
- b) tactical flight;
- c) large-scale military exercise;
- d) alert training; and
- e) test flight.

2.4.4 Military forces must perform training missions and conduct exercises to remain operationally current and to preserve their readiness. An exercise is a situation where a variety of assets execute different tasks to react to a scenario and attain one or more objectives. Exercises will use scenarios which are as close as possible to real operations. Frequently, exercises are used to assess the capabilities of a unit, State, or group of States to meet operational expectations or a readiness status. Sometimes, an exercise may evolve mimicking the lack of predictability associated with a real operation.

2.4.5 Large-scale military exercises require access to large volumes of airspace, and therefore such exercises require appropriate planning and coordination to enable the timely reservation, in case of application of flexible use of airspace (FUA), and promulgation of temporary airspace restriction for the activity. When such exercises require segregation, airspace usage should be closely monitored to ensure that airspace is released for any other use as soon as possible.

2.4.6 Military air exercises should be carried out in accordance with Letters of Agreement (LOAs), or other appropriate and effective coordination arrangements, detailing comprehensive coordination for the deconfliction of military activities within the identified airspace.

2.4.7 Unless special arrangements have been made with the appropriate ATS authority, operational ATS units should not be subjected to no-notice military training exercises. Military exercises or training flights should be coordinated in advance with the appropriate ATS units when they could affect civil aircraft operations. Letters of Agreement are an excellent means to communicate notification and coordination procedures that ensure ATS units are prepared to handle military aircraft engaged in these types of training missions.

2.5 STATE REQUIREMENTS FOR AIRSPACE NOT NECESSARILY RELATED TO AVIATION

States may require access to airspace for specific operations that are often not compatible with any other aviation activities. Non-aviation related operations can include, but is not limited to, surface/naval weapons firing, research, development and exercising of non-kinetic weaponry, jamming, weapons storage, ballistic launch and space re-entry activities. These activities will normally require the use of segregated airspace in order to ensure the safety of non-participating aircraft within the vicinity of these events.

2.6 PLANNING PROCESS

2.6.1 The planning of military training flights is somewhat different from that of civil air operations. Comparatively, military airspace scheduling requirements (dimensions and timings) may not be known until nearer to the operation date. While major exercises are usually planned months in advance, the specific airspace requirements may be determined only in the last few weeks or days. Civil and military airspace planners should continuously update their plans for restricted or reserved airspace and aim to finalize the dimension of the required airspace at an agreed upon time prior to the commencement of the exercise. The agreed timing should take into account the administrative and processing time required for the timely publication of the relevant information, ensuring adequate notice for other stakeholders and allowing the ATS authority to properly brief the ATS operational staff. Generally, the preparation for daily flight training starts two to three weeks in advance and is finalized one to five days before the operation.

2.6.2 The final planning and execution of training activity is based mainly on aircraft and pilot availability. On the day of operation, actual airspace needs will evolve alongside aircraft readiness and meteorological conditions. Unavailability of aircraft or unsuitable weather may require rescheduling flights and the associated airspace. The aim of a training flight is to qualify and maintain the pilot's proficiency and/or familiarity with tactical procedures. In terms of planning, this means that according to the concept of operations of each State, every type of pilot has specific qualification objectives to achieve and duties required to stay operationally current. Therefore, considering possible rescheduled and additional activities for the completion of the training syllabus is an important aspect of planning. Also, as many civil ATS units plan system capacity based on expected traffic, military planners should ensure that the appropriate ATS units are advised whenever the magnitude of a training activity is expected to change significantly.

2.6.3 It is a good practice to agree to a "cut-off" time to establish a time limit on any request to modify the airspace reservations or restrictions in support of training exercises. This cut-off time provides some planning stability and facilitates planning activities for all parties. Where robust coordination and cooperation processes are in place, the cut-off time can be established nearer to the start time. In consideration of unplanned changes due to adverse weather or operational challenges, the flexible use of airspace (see Chapter 4) would allow for the better accommodation of last-minute changes to airspace requirements. During more complex or large-scale exercises, the air component may be only a supporting element to the main ground or naval forces. For such cases, considering the intertwined roles, it is a very complex endeavour to predict the exact airspace dimension required to fulfil these activities, due to the many moving pieces and fluid nature of such activities. Changes to scheduled activities should be expected, and to some extent, planned for.

2.6.4 State aviation authorities may be reluctant to limit the flexibility afforded to national security flights, or to limit training opportunities, readiness capability, realism of exercise and the assessment of operations, for fear of being unable to meet the security objectives set out by the State. However, the guidelines provided in this manual for both civil and military stakeholders should aid in finding optimal solutions while preserving national security.

2.6.5 Where the airspace planning process calls for the safeguarding of sensitive information relating to national interests, the State should make provisions to ensure that representatives of the civil ATS authority are appropriately cleared and authorized to receive sensitive information. Civil ATS units require sufficiently advanced notice and details to be prepared to support military training or operational objectives while developing plans to mitigate impact to civil aviation.

2.7 NATIONAL SECURITY AND DEFENCE

2.7.1 National security and defence objectives

2.7.1.1 Each State defines its own national security and defence objectives which are then used to develop its security, defence, organizational and operational requirements. The airspace requirement and possible priorities afforded to state aircraft come as a direct consequence of these objectives. Such requirements also guide each State department and allow them to define their specific needs in terms of equipment, budget, personnel, and training. When defined at the highest level of the State, the underlying authority supporting these requirements will be more clearly recognized by different departments within its government.

2.7.1.2 The importance of defence and security forces will vary from State to State and will determine the number of air assets devoted to each respective airspace requirement.

2.7.2 State aviation airspace requirements

2.7.2.1 State aviation airspace requirements are generally established by a variety of government branches as a function of national objectives. In general, airspace requirements are developed for two main considerations:

- a) building and maintaining the readiness of State aviation capabilities; and
- b) undertaking actual operations.

2.7.2.2 When establishing these requirements, State authorities should consider the impact on civil aircraft operations and other airspace users. The airspace requirements linked to maintaining readiness capability are usually a consequence of needs such as pilot training, readiness check, exercises and certification.

2.7.3 Priorities

In order to satisfy national security and defence objectives and associated airspace requirements, States may need to define their priorities for airspace allocation. These priorities can help both civil and state aircraft operators undertake their operations in terms of both planning and execution when needed. They should therefore be clearly defined and communicated to all stakeholders.

Chapter 3

STRUCTURES AND IMPLEMENTATION

3.1 IDENTIFYING STATES' REQUIREMENTS

3.1.1 To achieve the intended benefits of civil and military cooperation and coordination, States should establish formal civil-military cooperation and coordination structures and processes. While the specific requirements may vary, the initial step towards implementation of such cooperation and coordination is to identify the needs of the various stakeholders and the objectives to be achieved. Civil and military stakeholders should assess their operational requirements to holistically determine the needs of the whole aviation community and the expected benefits deriving from the coordination and cooperation processes. This analysis will, in turn, be closely linked to the concept of operation for civil-military cooperation, coordination, and airspace organization and management.

3.1.2 Factors to be considered during this analysis include, but are not limited to:

- a) airspace structure and complexity;
- b) efficiency of the airspace usage;
- c) air navigation system performance issues;
- d) types of civil and military air activities;
- e) location of military training areas;
- f) airspace and/or aerodrome capacity constraints;
- g) location of military and civil aerodromes;
- h) weather;
- i) training requirements of the military;
- j) availability of access for both stakeholders;
- k) air traffic flow management (ATFM) requirements;
- l) pre-existing coordination mechanisms;
- m) level of interoperability between civil and military systems;
- n) airspace security considerations;
- o) traffic flows and volume;
- p) existing regulations (national, supranational, etc.);
- q) existing CNS infrastructure; and
- r) existing safety issues between civil and military activities.

3.1.3 Once the requirements are clear, stakeholders should perform a gap analysis against the existing baseline in terms of structures, cooperation and coordination mechanisms, airspace organization, management and policies, and thus determine the implementation requirements. The objective is to compare what is available to what is needed, and more specifically, the procedures used versus those needed.

3.2 STRUCTURE, PROCESSES AND FUNCTIONS

3.2.1 Overview

3.2.1.1 There is no “one-size-fits-all” operational structure framework for civil-military cooperation and coordination. States should carefully select and implement the elements suited to their national requirements, air activities and airspace organization and management objectives.

3.2.1.2 This section outlines the steps States may take to implement or enhance their civil-military cooperation and coordination structures, processes and functions in order to address the gaps identified in the analysis described in 3.1. It should be recognized that airspace structure, operational environment, national security requirements and overall ATM complexity will determine the necessary administrative structure, as well as the cooperation and coordination processes and functions. Effective civil-military cooperation, coordination and management of the airspace is an iterative process which must be ongoing in order to achieve full maturity and deliver the full benefits (Figure 3-1 refers).

3.2.1.3 The State will need to consider its existing organizations to determine the exact structure necessary for its strategy, policies and processes to implement civil-military cooperation. The names of the various bodies as presented in this manual are for presentation purposes only. States should consider their own objectives and tasks when establishing the different bodies proposed in the application of this manual.

3.2.1.4 The following legal and regulatory frameworks should be established to develop the necessary supporting structures, processes and procedures:

- a) formalize the high-level commitment of relevant stakeholders and authorities through official terms of reference, specifying the structure and responsibilities of a joint civil-military decision-making body as described in 3.2.1.6 (see Appendix E for a template);
- b) develop a framework for a collaborative national airspace planning policy which considers the needs of all airspace users in supporting national economic, security, defence and law enforcement requirements;
- c) develop framework agreements and/or Letters of Agreement (LOAs) between civil and military authorities as necessary;
- d) review the national legal framework to identify the elements of law or regulation to be amended as required to enable the implementation of cooperation, coordination and airspace management processes; and
- e) develop a State airspace policy.

Note.— A State airspace policy is a key document that details the different cooperation and coordination processes and interactions applicable in the State, the responsibilities of different actors and processes, as well as the regulatory framework and priorities.

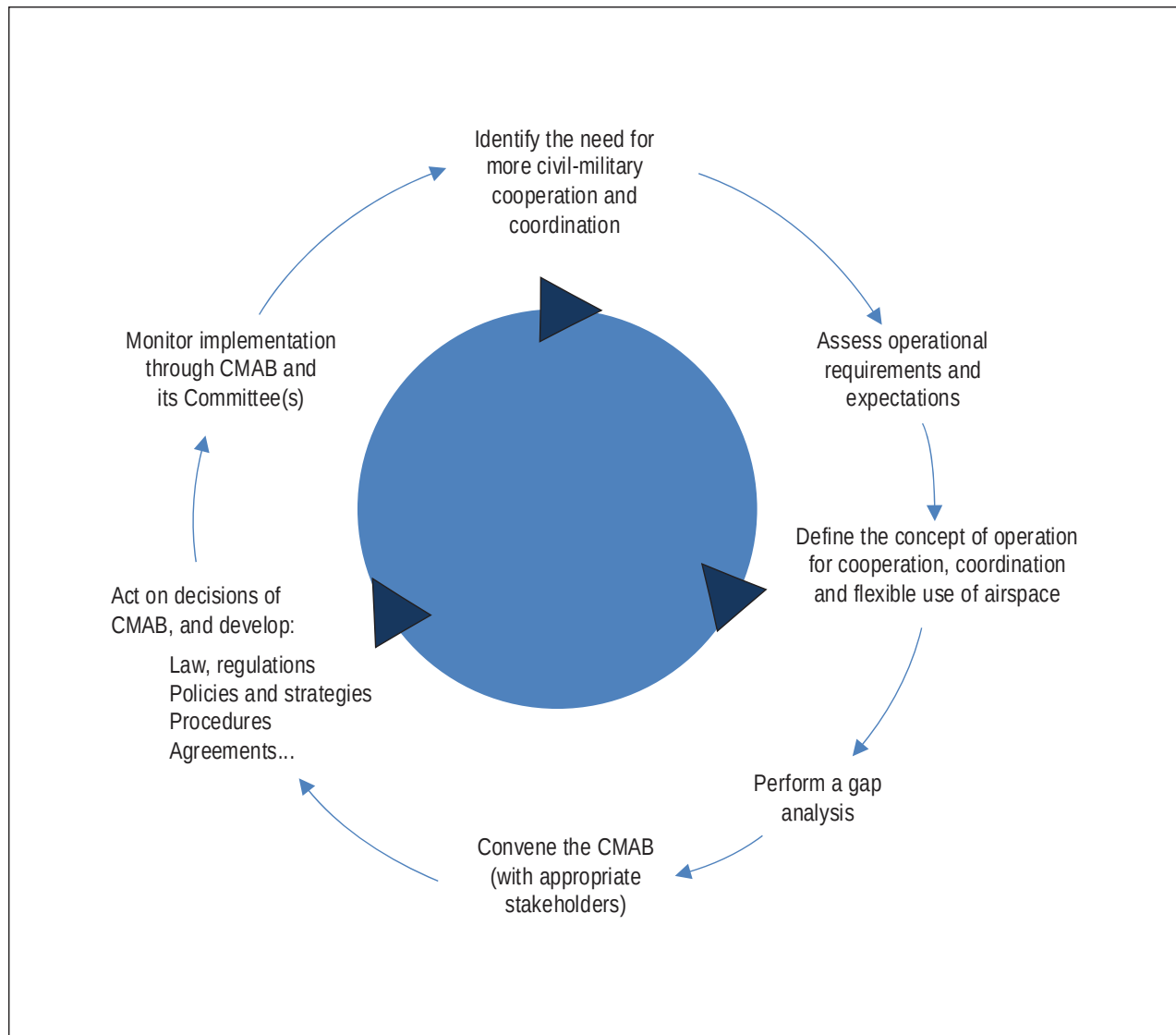


Figure 3-1. An example of an implementation and continuous improvement cycle

3.2.1.5 Formalizing the high-level commitment and cooperation structures of civil-military stakeholders differ in each State. Joint declarations, decrees, acts, laws or regulations are a few examples. This formal commitment indicates the intent of the highest civil and military authorities of the State regarding civil-military cooperation and coordination. This intent should be expressed through the establishment of high-level policies, strategies, and formal supporting structures which empower all civil-military stakeholders (personnel, regulators, ANSPs, ATS unit supervisors, appropriate military units, etc.) to work collaboratively and effectively for the common national interest and benefits.

3.2.1.6 It is crucial that States create a joint civil-military decision-making body to oversee and direct the activities required to implement, maintain and constantly improve civil-military cooperation. For ease of reference, this manual refers to such a body as the high-level civil-military aviation cooperation policy board (CMAB). A CMAB would be composed of appropriate high-level representatives from both civil and military aviation authorities, as well as others deemed necessary, and would have the authority to plan and allocate airspace, determine the provision of air navigation services and oversee the operations of military aviation authorities. The CMAB would be responsible for ensuring that civil-military cooperation policies are facilitated and implemented at all levels of the respective authorities. A CMAB should monitor and coordinate civil and military aviation activities, provide policy direction, allocate resources, and ensure the implementation of the State's high-level aviation policies and strategies.

3.2.1.7 To achieve the multitude of tasks within its mandate, CMAB should establish committees to study issues related to aviation, develop recommended courses of action, discuss and agree on policy and strategic considerations and present these recommendations and considerations to the CMAB. The CMAB should meet regularly to review the work of its committees and provide further direction as required. This process should be ongoing, maintained through regularly scheduled meetings and poised to respond to significant events affecting civil or military aviation-related activities. At minimum, the CMAB should consider the establishment of a Committee for Airspace Organization and Management (CAOM) (see 3.2.4.2). The establishment of other committees such as operations, CNS/interoperability and legal aspects, should be based on the State's requirements. (See Appendix F for a template Terms of Reference for the CAOM)

3.2.1.8 A CMAB should represent all relevant stakeholders as members or observers. Considering the strategic, regulatory and airspace policy responsibilities envisioned for a CMAB, the structure may include the Director General of the Civil Aviation Authority and the equivalent military authority as key members of the body, potentially co-chairing the board. The military authority should appoint a senior representative with the appropriate authority with respect to military airspace management, military airspace regulation, and who is accountable for air operation of all branches of the military services, including, when so delegated, other State aviation actors. To facilitate future development and implementation of cooperation and coordination, including all airspace management procedures, civil and military technical expertise should be made available through the participation of appropriate stakeholders.

3.2.1.9 Once fully established, a CMAB should provide a continuous role in monitoring the application of civil-military cooperation, coordination, airspace policy and the performance of the airspace management structures. A CMAB, and its committees, should monitor implementation and take corrective action, as necessary, to address performance gaps and account for changing requirements (Figure 3-1 refers), as well as conduct post-operation analysis (Figure 3-2 refers) to amend the structure, processes or procedures to address the mutually agreed objectives.

3.2.1.10 To be effective, a CMAB should have the following responsibilities:

- a) review and update its terms of reference for effective governance and maintain its supervisory role in implementing civil-military cooperation and coordination across the State;
- b) develop national civil-military policy and strategic implementation plans to foster civil-military collaboration, cooperation and coordination in line with the State's high-level policies and strategies;
- c) establish the necessary committees to implement the high level civil-military policies and strategies;

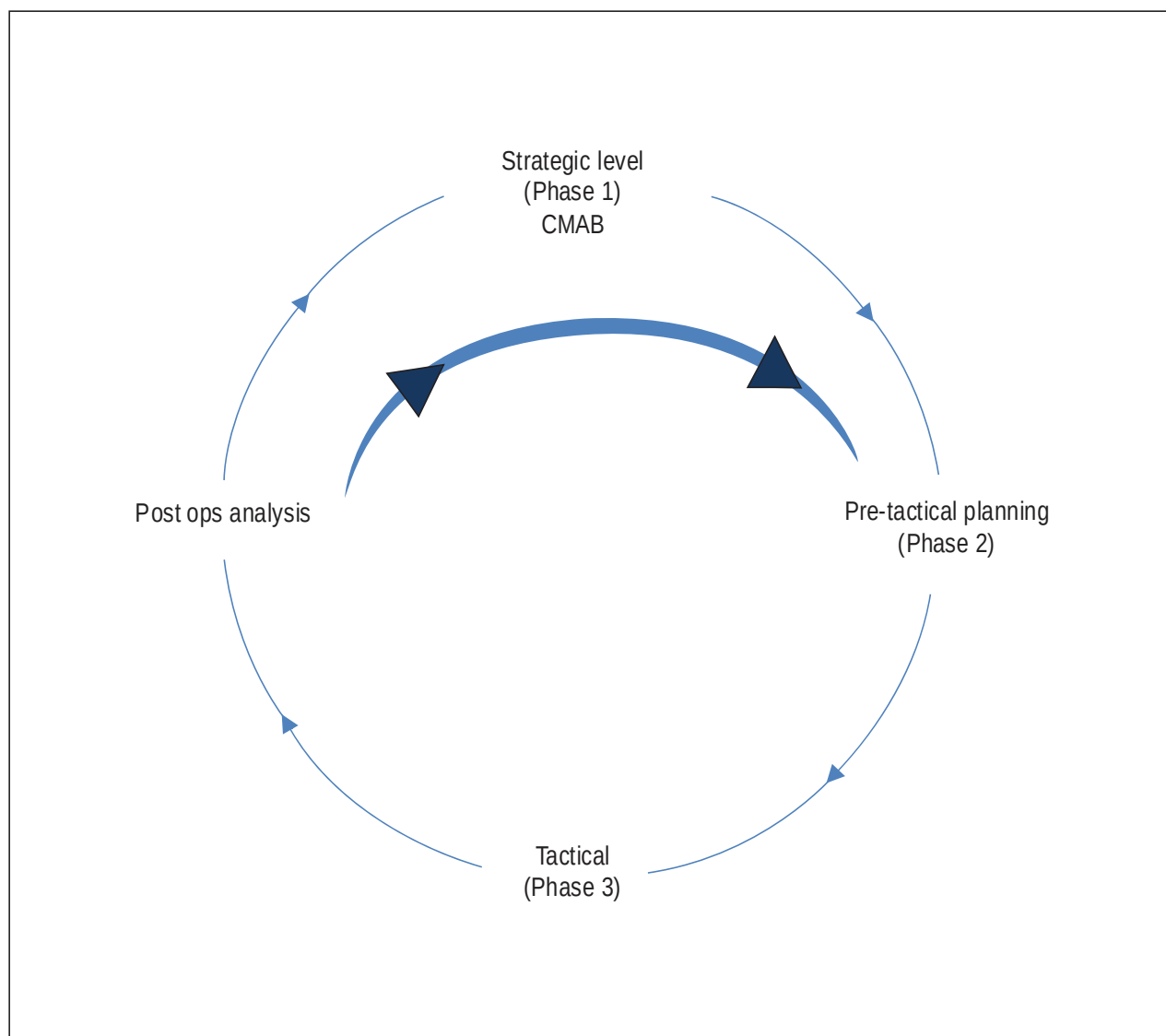


Figure 3-2. Continuous monitoring cycle