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Presentation Outline

- Civil-Military Interoperability
- Civil and Armed Conflict, Natural Disasters, Special Activities
- Civil-Military Cooperation Performance Measurement Framework
- ATM Security
- Air Defence Identification Zones (ADIZS)

Civil-Military Interoperability

CIVIL-MILITARY INTEROPERABILITY

Resources, systems and organization:

- Interoperability between civil and military CNS/ATM infrastructures, including those supporting civil and military ATM and air defence, increases capacity in congested airspace, enhances safety levels, preserves the environment, raises flight efficiency and contributes to optimal ATS provision.
- To overcome the difficulties caused by the mismatch of civil and military standards and certification, an alternative certification process based on the principles of performance equivalence can utilize available military capabilities to comply with civil CNS/ATM requirements expressed as performance levels and attributes.
- Performance equivalence is one option for compliance. If it cannot be used, other options can be considered such as full compliance with civil requirements or other special measures such as specific procedures to be developed.
- For example, the increase of separation between civil and military aircraft, should the military aircraft be unable to comply with certain navigation performance.

CIVIL-MILITARY INTEROPERABILITY

- Military authorities usually have stringent security requirements when they decide to exchange information with their civil counterparts.
- Security measures should be implemented when applicable to preserve the confidentiality, integrity and availability of sensitive data.
- Where a State deems it necessary for national interest, secure ground-ground communications may be established between military units and civil ATS units to enable the coordination within State established security requirements.
- Appropriate agreements should be in place to safeguard sensitive information.
- Synergies in acquisition, integration and modification of new systems that cater fully for civil as well as military requirements, should contribute to higher interoperability levels
- Civil-military coordination for research, planning, project management and procurement strategies should be performed when replacing legacy systems and when developing new technologies.

CIVIL-MILITARY INTEROPERABILITY

- Interoperability between civil and military systems should be done at the lowest possible cost for both civil and military stakeholders,
- Respective systems implementation costs should also be weighed against the economic benefits they will yield or the positive budgetary outcome they could induce for the State (gained e.g. by the common use of CNS/ATM infrastructures, common procurement or by enabling more efficient civil and military flights).
- Military acquisition is a management process dealing with State investments in the technologies, programmes and product support needed to achieve national security and defence objectives.
- Roadmaps on Enhanced Civil-Military CNS Interoperability and Technology Convergence are openly available on the internet.
- The limits of civil-military interoperability solutions are reached when it jeopardizes the ability of the armed forces to conduct military training and operational missions.

PROCEDURES AND/OR TECHNICAL INTEROPERABILITY

- Where technical interoperability, i.e. relying on the ability to exchange information between equipment or systems, cannot be achieved, applying procedures can be an alternative option to achieve the required safety level and accommodate military aircraft in airspace where mixed (civil-military) operations are supported.
- An example of such operational procedures could be the handling of a non-reduced vertical separation minima (RVSM) approved flight in a designated RVSM airspace, where this flight would be separated by 2000 ft. from all other traffic.

REGULATIONS AND STANDARDIZATION

- States should establish standing civil-military bodies consisting of aviation authorities, service providers and the military.
- This determination should consider specific civil and military requirements including security. State regulations in this regard should be agreed to at this level.
- For example, some States such as Germany or the United Kingdom, have established Military Aviation Authorities to address the airworthiness and regulatory consideration of parts of their state aircraft operations.
- The process and outcome of the state aircraft and/or military system certification that originates from a competent military authority and emanating from the international standards published or referenced by ICAO, could serve as the basis for national and mutually agreed responsibility

REGULATIONS AND STANDARDIZATION

- States may publish national equipage mandates including exemption procedures for state aircraft
- States should offer transition arrangements for retrofit or forward fit, and consider exemption or derogation schemes. For example, automatic dependent surveillance — broadcast (ADS-B) performance requirements mandates will permit ANSPs to provide a surveillance based ATS service in areas where surveillance is not traditionally available.
- As this technology reduces lateral separation standards, suitably equipped aircraft will benefit from more efficient flight routes and increased safety.
- However, non-ADS-B equipped state aircraft operating within ADS-B mandated airspace on exemptions or waivers will still require non-surveillance separation standards. Combination of non-ADS-B and ADS-B aircraft prevent the latter from fully benefiting from the technology when operating along the same trajectory

Ground-ground communications

- Today, most military units rely on the ICAO aeronautical fixed telecommunication network (AFTN) or the common ICAO data interchange network (CIDIN) to receive aeronautical information, NOTAMs, meteorological data, etc.
- Military access to new ATS messaging handling system (AMHS) structures will become a civil-military interoperability requirement as soon as AFTN is gradually replaced by AMHS.
- Networking based on the Internet Protocol (IP) is being introduced and access to its infrastructure will become a civil-military interoperability requirement.
- This will enable more advanced services including system-wide information management (SWIM). However, military use of the SWIM component of this infrastructure will depend, inter alia, on adequate security provisions.

Ground-ground communications

Longer term requirements may imply the overall compliance of military systems with the following provisions:

a) aeronautical information and flight data; b) data quality requirements;

c) communication protocols (profiles).

- The above would require suitable interfacing solutions to cover civil-military interoperability at the level of technical infrastructure, also considering security.
- To ensure operational coordination, especially in emergency situations, civil ATS, appropriate military units and their air defence units, should be connected by direct voice circuits or their digital equivalent.
- To improve safety as well as efficiency, voice should be complemented by an inter-centre electronic notification, coordination and transfer of messages according to the prevailing standards for civil aviation.(e.g. AIDC)

Ground-ground communications

- Due to evolving security requirements State and military authorities should consider enabling a direct secure voice coordination between appropriate military and civil ATS units.
- This requirement will vary from State to State but should consider the following factors:

a) the level of civil ATS support required for a specified type military operation;

b) the alignment of a State, civil ATS authority and military security requirements; and

c) the risk to civil aviation of not sharing information.

Air-ground

- The availability of very-high frequency (VHF) on board military aircraft improves global airspace access. States may consider other interoperability solutions utilized by civil aviation
- For air-ground data communications, acquisition of data link capabilities for controller-pilot data link communications (CPDLC) should facilitate more efficient use of the airspace that requires such capability.
- However, it is expected that many state aircraft will request exemptions from data link equipage requirements, due to mission requirements and challenges of forward fit.
- *Note.— Guidance on the use of air-ground capabilities is contained in the Global Operational Data Link (GOLD) Manual (Doc 10037), and the Performance-Based Communications and Surveillance Manual (Doc 9869).*

Navigation systems

- The PBN concept is defined in Performance-based Navigation (PBN) Manual (Doc 9613). Military aircraft should gradually comply with PBN specifications where deemed necessary by authorities.
- PBN, including the use of satellite-based signals for en route and approaches, is replacing sensor-based navigation (typically supported by terrestrial navigation aids).
- When aircraft navigation systems do not meet PBN requirements, exemptions or special handling status by ATC may be required.
- Future navigation requirements will rely on GNSS, including augmentation services.
- The availability of restricted signals capability of state aircraft should be considered to support navigation in a mixed-mode environment by the military
- The long-term goal is to reach a high level of convergence between civil and military aeronautical navigation solutions. Military operational requirements with regard to positioning, navigation and timing already exceed those imposed for civil navigation

Navigation infrastructure rationalization

- For civil aircraft, the ICAO strategy for rationalization of conventional radio navigation aids and evolution toward supporting performance-based navigation is summarized in Annex 10, Volume I, Attachment H.
- Military aircraft are likely to operate in all weather conditions, day or night. They can fly at a low level, with or without the support of ground-based navigation aids, within civil-controlled airspace, at civil airfields and even when conducting military training in parallel with civil traffic.
- This may require a residual number of VHF omnidirectional radio range (VOR) to be retained to support local operations in the vicinity of military aerodromes and to cope with limited airborne equipage. Retention of military en-route navigation aids (such as the tactical air navigation system (TACAN) for military aircraft use, should be envisaged in the overall navigation scenarios until alternative consolidated navigational equipment is in place.

Instrument landing system (ILS)/microwave landing system (MLS)

- New civil systems and avionics will yield benefits for the military in terms approach of and landing requirements.
- Civil evolution in this domain includes the use of vertical guidance, based on approach procedures with vertical guidance (APV), to multiple runway ends to improve non precision approaches and/or to offer Category (Cat) 1 precision approaches.
- Ground-based augmentation systems (GBAS) have been standardized by ICAO to offer Cat II/III performance also. The ICAO strategy for introducing and applying non-visual aids to approach and landing is in Annex 10, Volume I, Attachment B.
- The main driver of future military approach and landing concepts will require commonality with a civil system that will rely on a satellite-based GNSS infrastructure and use augmentation techniques (e.g. GNSS landing systems with combined SBAS/GBAS avionics).

Other considerations

- States are encouraged to establish a formal process of coordination between all concerned civil and military organizations at the early stage of future avionics definition and development, to achieve maximum system interoperability and to retain compatibility, where feasible, with legacy systems.
- Where civil and military navigation infrastructures coexist and are compatible, the State should aim at coordinating their availability and reducing duplications to increase cost-efficiency.
- In addition, the joint acquisition of equipment and e.g. surveillance data sharing agreements should be considered in addition to common maintenance and/or training.
- The established national policy board may wish to oversee these actions.

Surveillance systems

- Air defence units rely on extensive primary surveillance radar (PSR) coverage to detect non-cooperative targets.
- The provision of such data from independent non-cooperative surveillance systems such as PSR to the controller increases the situational awareness, safety and security of all stakeholders by adding a layer of surveillance and capability to ascertain the movement of civil aircraft when secondary surveillance radar (SSR) transponders are inoperable. ***(PSR Not AFI Requirement)***
- Compared to independent non-cooperative surveillance systems, cooperative surveillance systems such as SSR and automatic dependent surveillance-broadcast (ADS-B) are vulnerable to malicious electronic attacks and unlawful interference.

Other considerations

- For safety net systems such as airborne collision avoidance systems (ACAS), ground proximity warning systems (GPWS)/terrain avoidance and warning system (TAWS), the militaries are expected to equip those avionics on a voluntary basis on some state aircraft, which are at least transport-type state aircraft flying regularly in typically civil airspace. Civil-military surveillance interoperability based on allowing for data sharing from those systems is encouraged.
- In addition to safety benefits, the sharing of surveillance data reduces ground infrastructure, cost and radio frequency congestion.
- Surveillance data non-availability should be coordinated, for example when military sensors operate in special electronic counter-measure modes producing unverified data, or when maintenance is planned.

Other considerations

- Civil and military surveillance systems share the same frequency spectrum. To avoid unnecessary radio frequency (RF) load and interference between surveillance systems used for similar applications, the frequency utilization used by such systems needs to be coordinated and de-conflicted by civil and military authorities.
- since the frequencies 1 030 and 1 090 MHz support several surveillance systems such as SSR, ADS-B and ACAS, the need to limit RF load in the bands 1 030/1 090 MHz is recognized.
- A reduction of RF load would also be possible by strategic cooperation between civil and military authorities to ensure the rationalization of the overall surveillance infrastructure and by coordinating frequency utilization and reducing the extraction of on-board data with active interrogations.

Other considerations

Civil and military surveillance coverage often complement/duplicate each other. Integration of surveillance infrastructures wherever sharing of data is beneficial for several reasons:

- a) the coordinated implementation of surveillance infrastructure would reduce the overall cost of surveillance;
- b) greater redundancy with multiple systems;
- c) reduction in the need for special air defence interrogator codes if civil flight identification data is available to the military; and
- d) decreased cooperative infrastructure would reduce the RF load on the 1 030/1 090 MHz bands – improving data quality in dense traffic areas.
- Specific formats of extended squitter have been defined by ICAO for interoperability between civil and military authorities, allowing civil authorities to detect military operations while securing the data.

Aeronautical Information Management (AIM) systems

- The harmonization and seamless exchange of AIM, MET and flight and flow data can benefit both civil and military operations, such as for civil airfields open to military aircraft operations.
- In terms of data modelling, the information that is relevant for all stakeholders needs to be fully harmonized.
- Existing international Standards applicable to aviation should be used.
- States should ensure that the military stakeholders have access to and use AFTN/AMHS, or future IP-based networks.
- States should integrate civil and military aeronautical information service (AIS).

System Wide Information Management (SWIM) systems

- In a transitional phase, SWIM may facilitate information exchanges with legacy systems.
- The close coordination of SWIM developments with military organizations is important and relevant requirements, associated with information exchange needs supporting ATM and air defence, should be covered by SWIM-related research, deployment and standardization.
- Military participation in SWIM governance structures is paramount.
- Military involvement in SWIM will ensure interoperability and financial savings, taking civil and military security (confidentiality, integrity and availability) issues into account.

Procedures

- Harmonized procedures are achieved by applying common operational standards and procedures in conjunction with close civil-military coordination, using standardized terminologies and acronyms.
- ICAO SARPs should be applied whenever possible.
- When military units provide ATS to civil aviation, it is desirable that those services adhere to civil standards or at least offer a level of safety and harmonized procedures with civil systems that is equivalent to what is expected from similar civil service providers.

Advantages of Military Voluntary Compliance with Civilian Standards

- Over the past decades, the evolution of technology has led to increased requirements on aircraft when operating in certain airspace (for example RVSM, ADS-B);
- the evolution towards trajectory-based operations will add to the increased requirements on aircraft.
- While military aircraft that cannot meet equipage or certification requirements have historically sought exemptions to operate in airspaces with such requirements, it is expected that granting exemptions will become more complex in the future as the number of requirements,
- therefore necessary exemptions, may lead to the impossibility (or with high difficulty and impact on the system) to handle the non-compliant aircraft.

Advantages of Military Voluntary Compliance with Civilian Standards

When considering retrofit/upgrades of fleet or new aircraft acquisition, authorities should consider the following options to aim for technical compliance:

- a) the certification of the appropriate modules of military systems taking into account civil standards (for example installation of civil certified ACAS on board military transport aircraft);
- b) the existence of military certificates that match, as a minimum, civil standards (for example the United States Department of Defence certification of some models of military Mode 5 Level 2 transponder that meet Annex 10, ADS-B provisions);
- c) performance equivalence process when military certificates do not meet civil standards (EUROCONTROL, the European Defence Agency and the North Atlantic Treaty Organization, are developing such processes); and
- d) the implementation of an acceptable alternative means of compliance based on tailored standards.

Advantages of Military Voluntary Compliance with Civilian Standards

When initiating a performance equivalence process related to military CNS capabilities, military authorities should consider the following:

- a) military certificates and technical documentation should consider civil requirements and performance or appropriate acceptable means of compliance;
- b) gaps in the available military certificates and technical documentation in relation to relevant civil requirements and performance or agreed acceptable means of compliance should be identified;
- c) the accuracy, integrity, continuity of function and availability of military systems and data produced regarding the identified gaps should be evaluated, and the results documented; and
- d) based on a) to c), determine and evaluate the performance equivalence before issuing the operational approval

Potential Obstacles Regarding The Interoperability Of Military Systems

The following factors may still limit the ability of military authorities to adopt certain equipage improvements:

- a) the civil nature of multiple CNS/ATM equipage requirements lacking military justification;
- b) large military fleets with multiple military aircraft types and variants;
- c) technical integration constraints;
- d) differences in procurement cycles timelines and budgetary constraints;
- e) lack of civil-military coordination during CNS/ATM equipage regulation drafting; and
- f) lack of military CNS/ATM technical specifications and certification processes.

Potential Obstacles Regarding The Interoperability Of Military Systems

- Budgetary and technical constraints, as well as legal processes may lead to a long procurement process.
- This process may be further influenced by the fluctuation of military budgets, which could influence the procurement outcome and achieving interoperability. This long process may deter industry players to develop a business case for civil- military interoperable solutions.
- Generally, military legacy systems, including airframes, are designed for military purposes and not for civil aviation.
- States should consider these obstacles when planning to meet interoperability requirements and should apply sound obsolescence management practices.
- Certain legacy airframes may not be suitable for retrofitting to meet interoperability requirements; this can sometimes be due to a lack of available space within the aircraft or other integration limitations.

Proposed Mitigations

The deployment of CNS/ATM improvements should be organized and planned using the following good practices:

- a) keep track of civil CNS/ATM developments;
- b) involve military in civil CNS/ATM standardization;
- c) integrate military requirements in civil developments, where applicable;
- d) grant equipage exemptions where justified and provide technical guidance;
- e) consider interoperability opportunities and performance equivalence;
- f) encourage technology convergence and infrastructure rationalization;

g) ensure agile adaptation of capabilities.

SHARING DATA AND INFORMATION

- Sensitive data and information could be exchanged between civil and military stakeholders **on a need-to-know basis**: non- disclosure should be agreed upon where necessary and systems should restrict the transmission of sensitive data via unsecure means.

- Interfaces should also be protected against cyber threats and arrangements should be made for the timely exchange of information, to establish and maintain safe and regular use of airspace

TRAINING, LICENSING AND JOINT PROVISION OF SERVICES

- Training: The common application of Standards and equipment enables joint training and joint utilization of operational, administrative and technical personnel.
- Joint provision of services: Providing air traffic services for civil and military flights from single units can be beneficial, provided that:
- a) special treatment (for tactical or training purposes) beyond the abilities of the ATS unit is not required (in which case the appropriate military unit should be tasked);
- b) military aircraft are equipped and aircrews are trained to the standards required for the airspace concerned and that ATS unit is capable of catering to military flights that require exemptions from civil procedures; and
- c) a swift transfer to military entities, such as air defence, can be assured at all times.

TRAINING, LICENSING AND JOINT PROVISION OF SERVICES

- The co-location of civil and military services using common infrastructure, can yield significant benefits, in terms of safety and cost-efficiency.
- It is, however, not always possible because of the specific nature of military flights and missions.
- Finally, it should be highlighted that temporary co-location is also an option to address civil and/or military contingencies.

CIVIL AND ARMED CONFLICT, NATURAL DISASTERS, SPECIAL ACTIVITIES

CIVIL AND ARMED CONFLICT, NATURAL DISASTERS, SPECIAL ACTIVITIES

- Airspace disruptions arising from events such as armed conflict, natural disasters or public health emergencies will generate an unpredictable demand for airspace that can cause major planning challenges.
- A fundamental aspect in reacting to disruptions is the development of contingency plans.
- These types of events may result in different demands for airspace.
- Civilian authorities should therefore develop concrete airspace proposals in advance, to ensure the promulgation of contingency airspace plans and routings.
- An impact assessment on commercial traffic should be included as part of any contingency planning.

CIVIL AND ARMED CONFLICT, NATURAL DISASTERS, SPECIAL ACTIVITIES

- Coordinating with airspace managers, ANSPs and regulators at an early stage and on the different requirements for airspace use is extremely important.
- A checklist including timelines to assist event planners with the coordination should be developed to reduce last minute changes to airspace needs.
- A special activity may cause unusual military traffic flows, with or without prior notification or coordination.
- During special activities or contingencies, increased coordination between civil and military authorities is required to allow for civil air traffic to continue operating to the maximum extent possible, while facilitating operational freedom for air operations.

CIVIL AND ARMED CONFLICT, NATURAL DISASTERS, SPECIAL ACTIVITIES

- Further guidance concerning coordination prior to or during these circumstances is contained in Annex 11, Attachment C — Material relating to Contingency Planning

- Manual Concerning Safety Measures Relating to Military Activities Potentially Hazardous to Civil Aircraft Operations (Doc 9554).

- The Risk Assessment Manual for Civil Aircraft Operations Over or Near Conflict Zones (Doc 10084) provides guidance to States and operators for operation over or near conflict zones.

SPECIAL ACTIVITIES

- Certain types of events, such as international sporting events, visits by heads of States, high profile meetings of government officials from other States, etc., create a heightened requirement for civil-military cooperation and coordination.
- Temporary airspace changes, including the establishment of temporary prohibited areas and/or specific security procedures, may be required to address security concerns.
- Civil and military stakeholders at national, or international, levels should jointly plan as soon as they become aware that a high-profile special event is likely to occur.
- The CMAB, the CAOM and the AMC, as applicable, should be part of the planning process, and as early as possible.

CIVIL AND ARMED CONFLICTS AND EXCEPTIONAL SITUATIONS

Civil and armed conflict are commonly classified into the following three categories:

- a) intra-State: civil conflicts precipitated by deepening political discord, economic distress and growing inequalities, which in worst case scenarios can lead to the erosion of government legitimacy, a breakdown of law and order and escalating un-governability;
- b) inter-State: conflicts over the status of disputed territories or any other reasons; or
- c) trans-State: international terrorism, economic sabotage, or a cyber-attacks that may precipitate State paralysis, undermine national security and defence, or provoke international conflicts with sponsoring States;

CIVIL AND ARMED CONFLICTS AND EXCEPTIONAL SITUATIONS

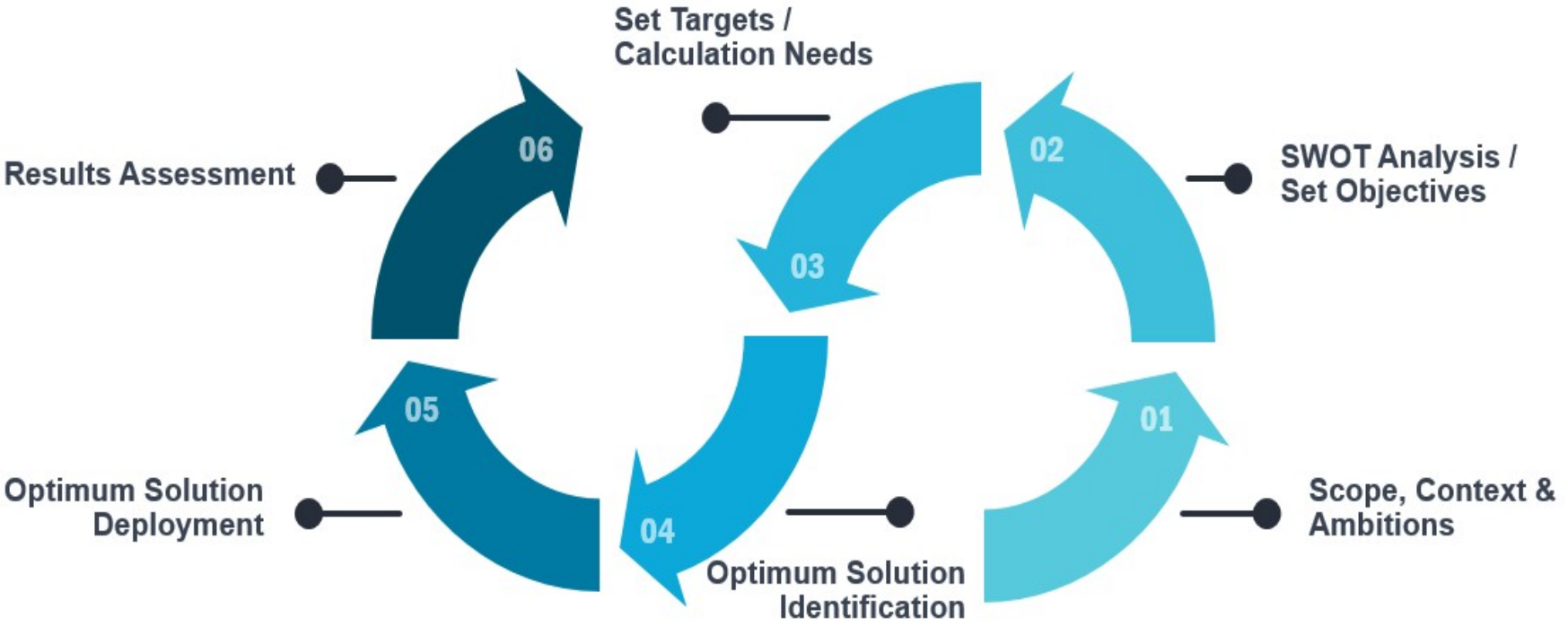
- The term “exceptional situation” is often used to refer to the broad spectrum of possible crises, ranging from a very limited regional disorder or humanitarian relief operation to large-scale crisis response operations involving the widespread mobilization and employment of military forces.
- A crisis could be instigated by a conflict, as described below, or be precipitated by natural disasters such as drastic climate change, floods, droughts, food and water shortages, pandemics, earthquakes, or volcanic eruptions.
- Responses to exceptional situations often involve multiple States mobilizing civil and military assets.
- Past events have highlighted a need to improve civil-military coordination to increase the effectiveness and timeliness of humanitarian responses

Civil-Military Cooperation Performance Measurement Framework

Civil-Military Cooperation Performance Measurement Framework

- The Manual on Global Performance of the Air Navigation System (Doc 9883) describes a performance management process for a safe and cost-effective modernization of the air navigation system.
- Collaborative decision-making is key for a cost-effective modernization of the air navigation system and ensures that all concerned aviation stakeholders are involved and given the opportunity to influence decisions and reach defined performance objectives
- This is a continuous process that can track and measure progress at regular intervals (daily, weekly, monthly or even annually depending on the metric).

Civil-Military Cooperation Performance Measurement Framework



Benefits and Challenges of Applying a Performance Management Process

- The guidance in Doc 9883 is relevant to civil-military cooperation as it relates to setting performance objectives and targets, as well as monitoring, evaluating and forecasting system performance.
- A civil-military performance measurement framework not only contributes to the establishment of mutual trust between civil and military entities, it also ensures an acceptable level of flexibility and efficiency of civil and military operations.
- For instance, key performance indicators related to ASM promote transparency and the fair application of cooperation.
- Challenges associated with cost and security due to data confidentiality associated with military performance, could arise from implementing a performance framework in the context of civil-military cooperation
- internal military metrics can provide useful indications on performance of civil-military cooperation(planning, reservation and release of airspace)

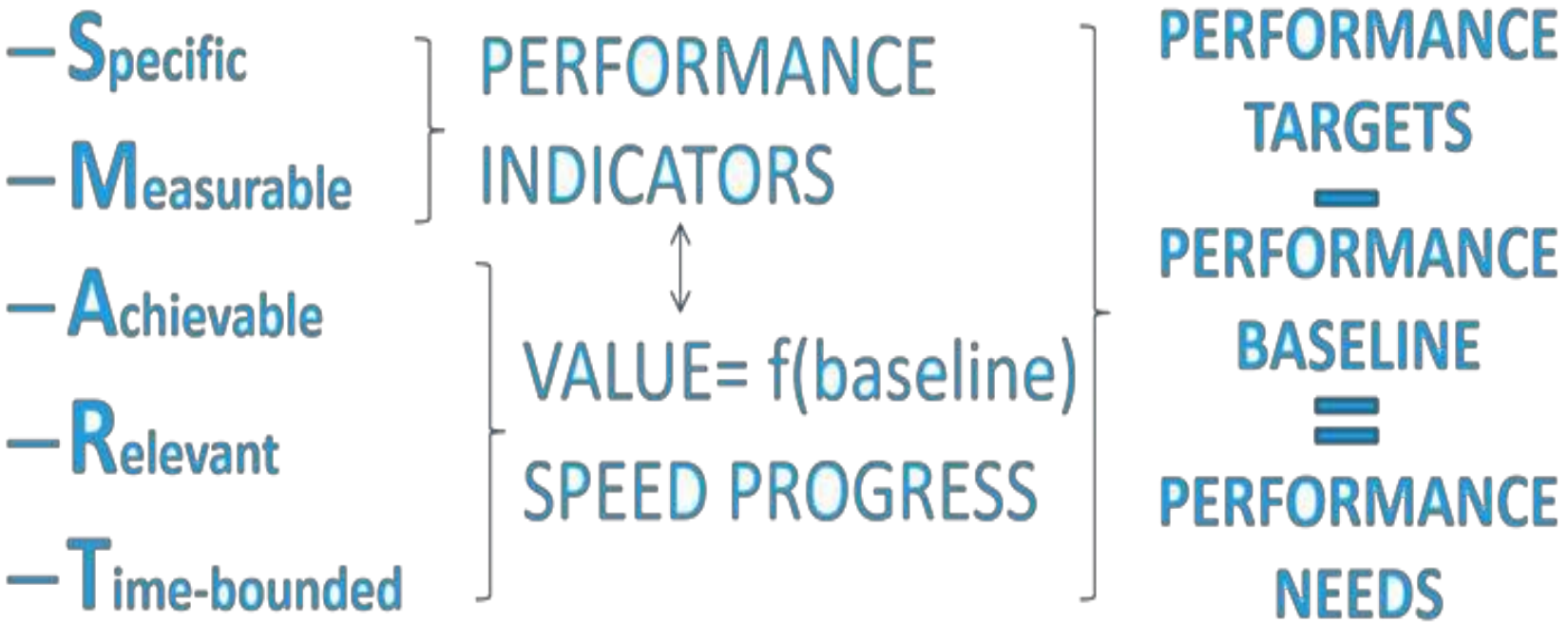
ESTABLISHING A PERFORMANCE MANAGEMENT PLAN

Performance of civil-military cooperation include any civil or military entity, group or ATM community member who is affected by, or involved in, performance management at the national or sub-regional level such as:

- a) civil and military regulatory authorities;
- b) national supervisory authorities, which could involve the military;
- c) ANPS, civil-military military units – which could involve military air defence; and
- d) civil and military airspace users.

Key performance areas (KPAs) defined in the Global Air Traffic Management Operational Concept (Doc 9854) provide categorized and performance-related high-level expectations

Performance targets and indicators.



Using Metrics to Support the Flexible Use of Airspace

The impact of civil-military cooperation while supporting the flexible use of airspace can be measured in terms of:

- a) airspace capacity (FUA application, availability of airspace, efficient planning system, usage of released/available airspace even at short notice for civil or military needs); and

- b) airspace efficiency (adherence to optimum airspace dimensions, economic impact of transit to and from a given area when possible to measure, impact of airspace location on training, effective use of allocated airspace)

Using Metrics to Support the Flexible Use of Airspace

The national CAOM can be an important element of the performance framework.

In the specific context of the dynamic management of the airspace, it could:

- a) establish joint civil-military processes for the periodic (at least yearly) assessment of airspace efficiency and effectiveness of procedures at all three levels;
- b) ensure the definition and application of dynamic airspace management KPAs and key performance indicators (KPI) to monitor ATM performance against the needs of civil and military airspace users; and
- c) assess the effectiveness of dynamic airspace management in terms of its impact on civil and military airspace users, ATM service provision and civil-military cooperation.

Air Traffic Management Security

Air Traffic Management Security

- Civil-military cooperation allows States to better respond to international threats such as terrorism, counter unlawful interference and prevent the associated disruptions to civil aviation; a collaborative ATM security framework focusing on security policy, legislation and procedures, is needed.
- The requirements and obligations of each State with regards to security are detailed in Annex 17 — Security — Safeguarding International Civil Aviation against Acts of Unlawful Interference.
- The Air Traffic Management Security Manual (Doc 9985) complements the Aviation Security Manual (Doc 8973) and provides guidance on security issues specific to ATM to assist States and ANSPs in implementing appropriate security provisions and in support of national security, law enforcement requirements.
- It also provides guidance on the protection of the ATM system infrastructure from threats and vulnerabilities.

Cybersecurity

- Cybersecurity is an aspect of security that poses considerable challenges to both civil and military aviation.
- During the 40th General Assembly, States resolved to:
- encourage government / industry coordination with regard to aviation cybersecurity strategies, policies, and plans;
- sharing of information to help identify critical vulnerabilities that need to be addressed;
- develop and participate in government/industry partnerships and mechanisms, nationally and internationally, for the systematic sharing of information on cyber threats, incidents, trends and mitigation efforts (Assembly Resolution A40-10)

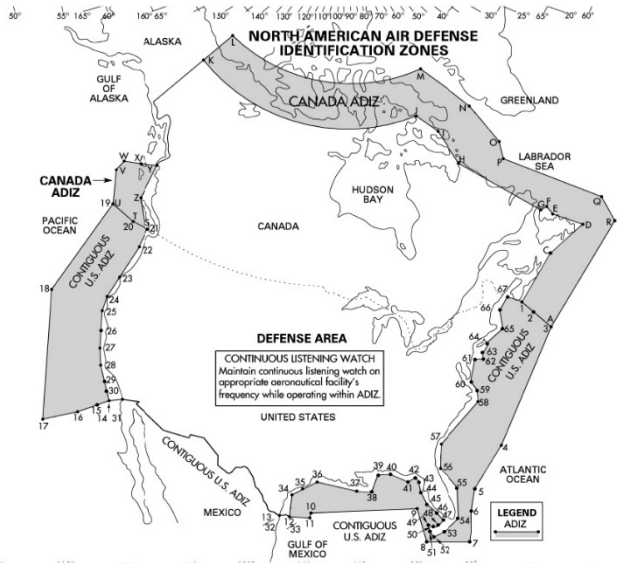
Cybersecurity

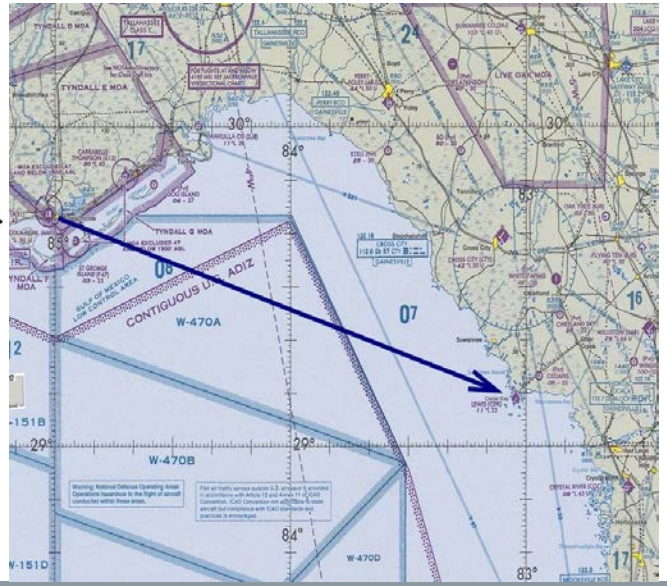
- Safeguarding the ATM system from security threats has become an issue of increasing concern
- ANSPs have become more involved in supporting roles related to national security and law enforcement situations, including disaster prevention and recovery operations for situations that are not intentionally directed at the aviation system, but which could have profound, negative impacts on the aviation system if not managed effectively.
- These situations often require the use of ATM procedures such as temporary airspace/flight restrictions for security purposes.
- There are therefore two aspects of ATM security: protection against threats and vulnerabilities; and provision of ATM security services to support organizations and authorities engaged in aviation security, national security, defence, and law enforcement.

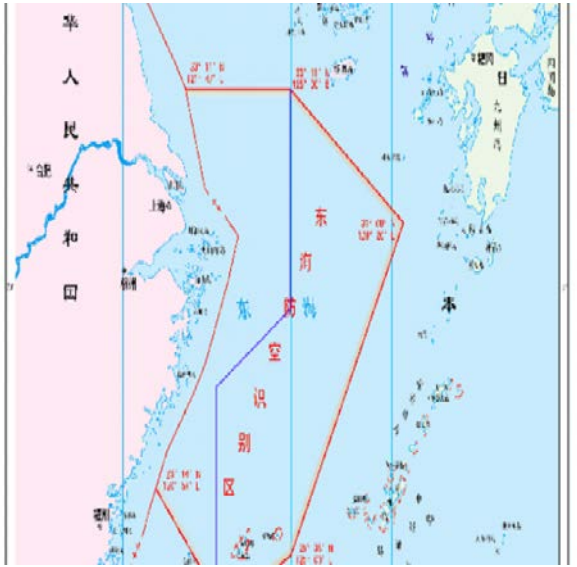
Cybersecurity

- One of the objectives of ATM security is to reduce the response time to security threats that affect flights (aircraft, passengers and crew) or the ATM system itself.
- Another objective is the safeguarding of the airspace from unauthorized use, intrusion, illegal activities or any other violation.
- This, along with the protection of the ATM system itself, requires that ANSPs provide ATM security services that enable military, law enforcement and aviation security authorities to carry out their roles and responsibilities within the ATM system.
- Improving ATM security standards relies on the combination of organization, means, regulations and procedures established to protect the ATM system.
- Security measures, when adopted by all parts of the ATM system, foster security awareness in both civil and military areas, improve the necessary dissemination of information, and will ensure that all security requirements are met for communications, navigation and surveillance domains and for the ATM infrastructure.

AIR DEFENCE IDENTIFICATION ZONES (ADIZS)







AIR DEFENCE IDENTIFICATION ZONES (ADIZS)

- Air defence identification zone (ADIZ). Special designated airspace of defined dimensions within which aircraft are required to comply with special identification and/or reporting procedures additional to those related to the provision of air traffic services.
- The promulgation of ADIZs have been driven by need for an additional air defence response to potential airborne threats during periods of heightened geopolitical tension.
- Constrained by the level of technology related to aircraft tracking, identification and communications of the era, it has been used as a preventive measure to allow for early identification of aircraft to minimise a security risk.
- The first ADIZ was established in the 1950s, and there are currently less than 20 active ADIZs globally.
- Information pertaining to ADIZ procedures can usually be found in AIPs

AIR DEFENCE IDENTIFICATION ZONES (ADIZS)

- The only other mention of ADIZ in ICAO documentation requires that States publish the details of their ADIZ in their aeronautical information publication (AIP) and aeronautical charts (Annex 4 — Aeronautical Charts and Annex 15
- — Aeronautical Information Services). There are no other ICAO Standards or procedures related to the establishment or operation of an ADIZ.
- Most of the current ADIZs are permanent and were established many years ago. Therefore, to ensure that the procedures do not unnecessarily impose additional workload on flight crew from meeting their normal obligations with respect to flight operations and air traffic services, the associated procedures and its dimensions should be regularly reviewed.
- States with established ADIZs should review if continued promulgation remains necessary consider limiting the procedures to requiring the submission of a flight plan with details of the relevant ADIZ entry point, entry time, and the radio communication channels to be used to contact the relevant ATS unit.

AIR DEFENCE IDENTIFICATION ZONES (ADIZS)

- ADIZ should be established with clearly defined, intuitive airspace dimensions, allowing the flight crew to easily ascertain the position of the aircraft relative to its boundary. This would allow pilots to meet any communications requirements accurately and in a timely manner.
- By ensuring civil-military cooperation and coordination between adjacent ATS authorities, States can effectively fulfil their national security requirements without any undue burden upon flight crews and operators.
- Under such circumstances, an ADIZ need not be promulgated where aircraft are identified by an ATS unit and information is duly passed to the military authorities.
- Identification procedures can be made more robust with coordination between civil and military units, and the availability of direct communications between the two.
- Arrangements can be made for sharing of ATS surveillance and flight plan data with military units.

AIR DEFENCE IDENTIFICATION ZONES (ADIZS)

- Annex 2, 3.3.1.2 A flight plan shall be submitted prior to operating: d) any flight within or into designated areas, or along designated routes, when so required by the appropriate ATS authority to facilitate coordination with appropriate military units or with air traffic services units in adjacent States in order to avoid the possible need for interception for the purpose of identification.
- ADIZ procedures and communication requirements should not conflict with any ATS or flight operations procedures, or the rules applying to any other ADIZ in the area.
- It is recognized that this may prove challenging for airspace under the authority of adjacent States' ATS authority, unless the scope of the ADIZ procedures are kept very limited.

AIR DEFENCE IDENTIFICATION ZONES (ADIZS)

- The following considerations should be taken in account when establishing the procedures for an ADIZ:

- a) ADIZ procedures should be drafted in clear, simple and concise language, and applicable only to aircraft intending to operate into, within or from sovereign airspace;
- b) flight planning procedures related to each ADIZ should be limited to the relevant ADIZ entry point and entry time listed;
- c) pilots should communicate with the relevant ATS units only. Most aircraft are not equipped for radio communications outside of the established spectrum used for civil aviation and are limited to the number of communication channels that can be selected simultaneously;

AIR DEFENCE IDENTIFICATION ZONES (ADIZS)

- The following considerations should be taken in account when establishing the procedures for an ADIZ:
- d) the aircraft inflight emergency communication channel should not be used as an ADIZ procedure channel; it is reserved for emergency use only;
- e) ADIZ procedures pertaining to abnormal operations and emergencies occurring within ADIZ airspace, such as radio communications failure, weather deviation, or equipment failures, should be included;
- f) ensure all relevant contact information, frequencies etc. are clearly promulgated in the AIP; and
- g) States should ensure that pilots are trained in the correct application of ADIZ procedures that apply.

AIR DEFENCE IDENTIFICATION ZONES (ADIZS)

- Unclear, complicated, or inadequate ADIZ procedures can result in a safety risk.
- Resultant non- compliance, potentially unintended, will necessitate a response from the ADIZ authority, which may prove unnecessary.

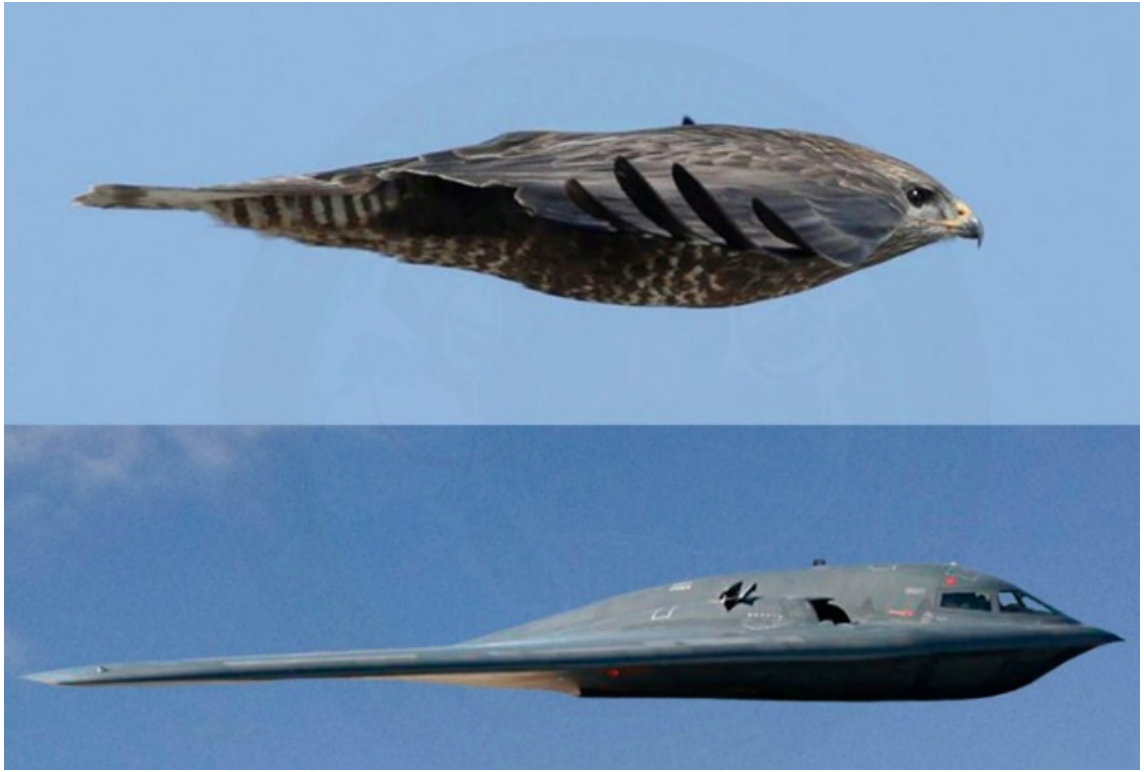
Template for Promulgating ADIZ Information in the AIP

- (name) AIR DEFENCE IDENTIFICATION ZONE (ADIZ)
- (geographical/vertical description of the area).
- The purpose of the (name) ADIZ is aircraft identification of flights entering or operating within the ADIZ.
- Pilots shall ensure that when submitting the flight plan, the ADIZ entry point and estimated time of entry is included in field 18 of the ICAO flight plan form.
- Pilots operating VFR flights are required to file a flight plan prior to entry into, or departure from within the ADIZ.
- Aircraft departing from location inside ADIZ shall contact the ATS unit concerned, on departure for identification purposes.
- For inbound flights (distance in nautical miles, if necessary) prior to entering the ADIZ, pilots are required to set the aircraft transponder to the assigned discrete code and contact the ATS unit concerned. Pilots are to report again when reaching the entry point as listed in the flight plan, and time of entry should be within plus or minus 5 minutes of the time reported.

Template for Promulgating ADIZ Information in the AIP

- Pilots unable to meet the reporting times as previously filed must update their flight plan with the ATS unit concerned prior to entering the ADIZ.
- A list of respective ATS units and the associated radio frequencies can be found at (specific reference or AIP section).
- In case of communications failure, pilots should comply with the published radio communication failure procedures in (AIP section)
- Compliance with these procedures reduces the likelihood of interception for the purposes of aircraft identification.

QUESTIONS ?



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