APAC Civil/Military Cooperation Lecture/Seminar

Overview of Circular 330 - *Civil/Military Cooperation in Air Traffic Management* and Institutional and regulatory framework

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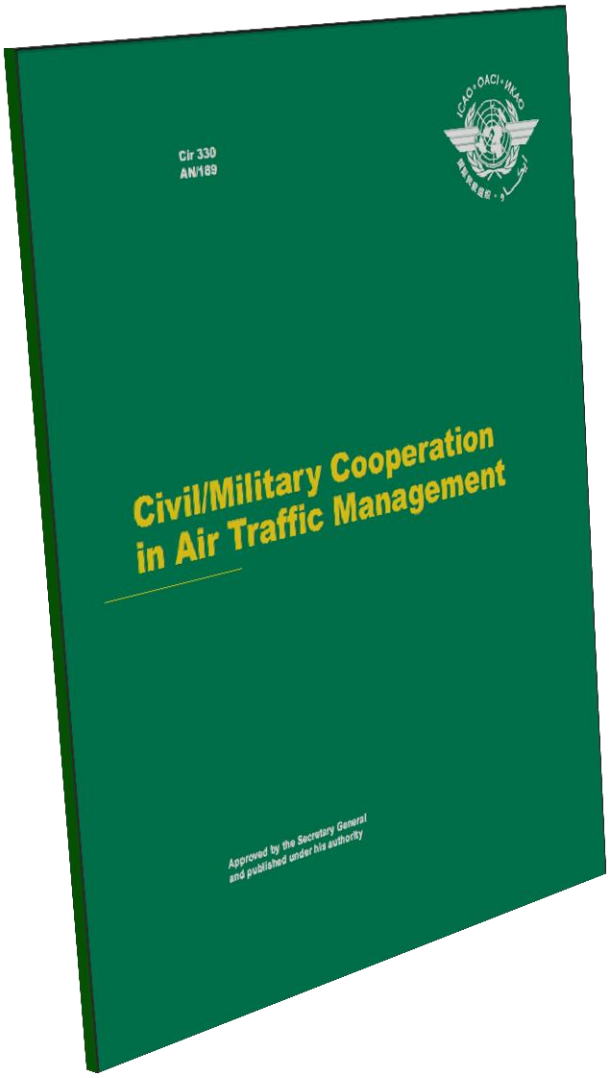
ICAO- Montreal

Beijing, China
19 to 21 November 2014

Guidance Material Rationale

- **Growing demand x finite capacity**
- **State responsibility**
  - Civil aviation impact on the global economy and environment
  - Obligations to national/international security and defense
- **Enhance civil-military cooperation and coordination**

ICAO Guidance Material - Circular 330-AN/189



- Institutional and regulatory framework
- Civil/Military Interoperability
- Airspace organization and management
- ATM Security and ATM in crisis situation
- State aircraft operations
- Summary - Civil-military Collaboration a global challenge
- Appendices: Best Practices of Civil-military cooperation

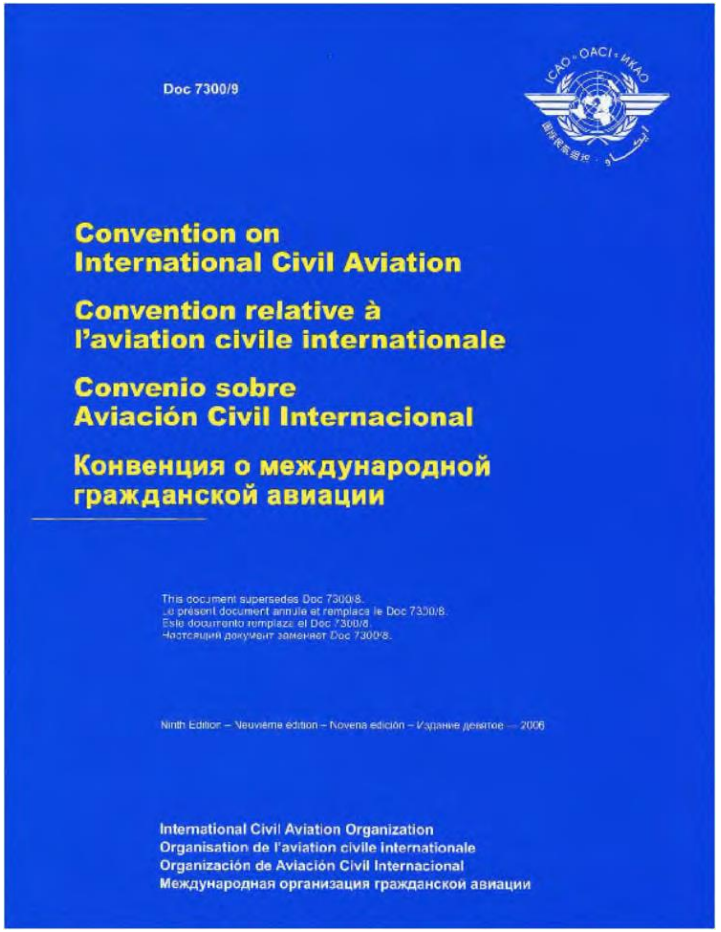
Institutional and Regulatory Framework

Regulatory Framework

Chicago Convention	• Constitution • Basic Aviation Legislation
Annex to Convention	• Standards and RP • Regulation
PANS	• Air Navigation Procedures
Document and Circular	• Manual • Technical Guidance

Chicago Convention

- The Convention on International Civil Aviation was signed in Chicago in 1944 by 52 States
- Distinguishing civil aircraft operations was important enough to warrant the creation of Article 3 , which exclude State aircraft used in military, customs and police service from ICAO's regulations
- As aviation has grown into a finite airspace, the need for greater civil/military cooperation has developed



Chicago Convention Article 3

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 due regard for the safety of navigation of civil aircraft.

Assembly Resolution A37-15 App.O

- 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 international civil aviation as well as to ensure the requirement of military air traffic are met;
- Regulation of States ensure operations state aircraft do not compromise safety, regularity and efficiency of civil air traffic over high seas and comply with Annex 2;
- ICAO to provide advice and guidance on best practices for civil/military coordination and cooperation;
- Contracting States include representatives of military authorities in their delegations to attend ICAO meetings; and
- ICAO should serve as international platform to facilitate improved civil/military cooperation, collaboration and sharing of best practices.

Annex 2- Rules of the Air

Annex 2 include provisions on the coordination with military authorities for reason of a State's territorial integrity and sovereignty

- **Chapter 3, 3.3.1— Submission of a flight pan**
- **Chapter 3, 3.8 —Interception**
- **Attachment A—Interception of civil aircraft**

Annex 11- Air Traffic Service

Annex 11 addresses the need for coordination with military

- **Chapter 2, 2.17— Coordination between military authorities and air traffic services**
  - Close cooperation should be maintained
  - Information relevant to safety and efficiency should be exchanged promptly
  - Flight plan should be submitted to military
  - Special procedures should be established to notify civil ATS units to avoid the need for interception.

- **Chapter 2, 2.18 —Coordination of activities potentially hazardous to civil aircraft**
  - Coordination with Civil ATS authority is must, whether the activities are over territory of a State or over the high seas
  - Achieve best arrangements to avoid hazards to civil aircraft
  - Promulgation of information regarding the activities

PANS-ATM Air Traffic Management

- Complementary to SARPs contained in Annex 2 and Annex 11, Contains procedures for the application of the rules of the air and air traffic services

- Procedures applicable to in-flight contingencies as strayed or unidentified aircraft involving coordination with military authorities

- Miscellaneous procedures for the conduct of special military operations

Doc 9433- Manual concerning interception of civil aircraft (1990)

- Consolidation of ICAO provisions and special recommendations related to the interception
- The provisions and special recommendations have been extracted from the text of Annexes 2, 4, 6 ,7, 10 , 11 and 15, PANS-OPS and PANS-ATM

- States ensure manual is brought to the attention of all civil and military administrative or operational personnel related with identification and interception of civil aircraft

Doc 9554-Manual Concerning Safety Measures Relating to Military Activities Potentially Hazardous to Civil Aircraft Operations (1990)

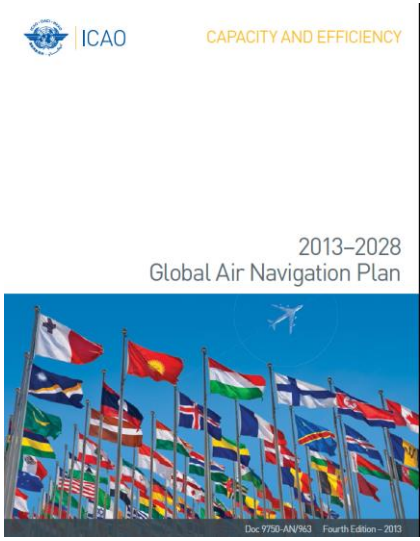
- The material is intended to assist States in determining actions to be taken in situations contemplated by paragraphs 2.17 and 2.18 of Annex 11
- Promote effective coordination so that activity potentially hazardous to civil aircraft operations may be accommodated within agreed airspace
- In particular, it aims to avoid a military unit from having to resort to notifying an intention to conduct hazardous activity over the high seas without prior consultation and the consequential penalties that such action may impose on other airspace users and ATS authorities.

Doc 9426 The Air Traffic Service Planning Manual

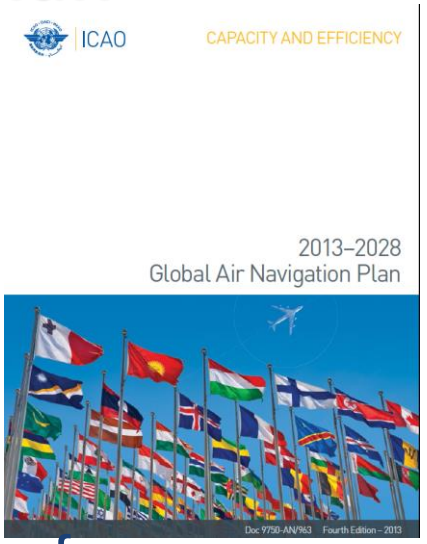
- Published in 1984, one of the first manuals to provide ICAO guidance material on civil/military coordination and cooperation.
- Most of that guidance material remains valid today

Doc9750 Global Air Navigation Plan

- High-level ICAO plan
  - Overarching framework that includes key civil aviation policy principles
  - Help ICAO Regions, sub-regions and States establish their air navigation priorities for the next 15years
  - With ultimate goal to achieve an interoperable global system



Doc9750 Global Air Navigation Plan



- The 4th edition -2013
  - ASBU (Aviation System Block Upgrade） systems engineering planning and implementation approach
  - Remain consistency with the third edition of the GANP's planning process encompassing near-term, mid-term and long-term global plan initiatives (GPIs)

Doc9750 Global Air Navigation Plan

- ASBU-B0-FRTO "Improved Operations through Enhanced En-route Trajectories"
  - To allow the use of airspace which would otherwise be segregated (i.e. military airspace) along with flexible routing adjusted for specific traffic patterns.
  - This will allow greater routing possibilities, reducing potential congestion on trunk routes and busy crossing points, resulting in reduced flight length and fuel burn

Appendix 2: Aviation System Block Upgrades

Block 0

Performance Improvement Area 3: Optimum Capacity and Flexible Flights

B0-FRTO Improved Operations through Enhanced En-route Trajectories

Allow the use of airspace which would otherwise be segregated (i.e. Special Use Airspace) along with flexible routing adjusted for specific traffic patterns. This will allow greater routing possibilities, reducing potential congestion on trunk routes and busy crossing points, resulting in reduced flight lengths and fuel burn.

Applicability

Applicable to en-route airspace. Benefits can start locally. The larger the size of the concerned airspace the greater the benefits, in particular for flex track aspects. Benefits accrue to individual flights and flows. Application will naturally span over a long period as traffic develops. Its features can be introduced starting with the simplest ones.

Benefits

Access and Equity:	Better access to airspace by a reduction of the permanently segregated volumes.
Capacity:	The availability of a greater set of routing possibilities allows reducing potential congestion on trunk routes and at busy crossing points. The flexible use of airspace gives greater possibilities to separate flights horizontally. PBN helps to reduce route spacing and aircraft separations. This in turn allows reducing controller workload by flight.
Efficiency:	The different elements concur to trajectories closer to the individual optimum by reducing constraints imposed by permanent design. In particular the Module will reduce flight length and related fuel burn and emissions. The potential savings are a significant proportion of the ATM related inefficiencies. The Module will reduce the number of flight diversions and cancellations. It will also better allow avoidance of noise sensitive areas.
Environment:	Fuel burn and emissions will be reduced; however, the area where emissions and contrails will be formed may be larger.
Predictability:	Improved planning allows stakeholders to anticipate expected situations and be better prepared.
Flexibility:	The various tactical functions allow rapid reaction to changing conditions.
Cost:	FUA: In the United Arab Emirates (UAE), over half of the airspace is military. Opening up this airspace could potentially enable yearly savings in the order of 4.9 million litres of fuel and 581 flight hours. In the United States, a study for NASA by Datta and Barington showed maximum savings of dynamic use of FUA of $7.8M (1995$). Flexible routing: Early modelling of flexible routing suggests that airlines operating a 10-hour intercontinental flight can cut flight time by six minutes, reduce fuel burn by as much as 2% and save 3 000 kilograms of CO_2 emissions. In the United States RTCA NextGen Task Force Report, it was found that benefits would be about 20% reduction in operational errors; 5-8% productivity increase (near term; growing to 8-14% later); capacity increases (but not quantified). Annual operator benefit in 2018 of $39 000 per equipped aircraft (2008 dollars) growing to $68 000 per aircraft in 2025 based on the FAA initial investment decision. For the high throughput, high capacity benefit case (in 2008 dollars): total operator benefit is $5.7B across programme lifecycle (2014–2032, based on the FAA initial investment decision).

54 Global Air Navigation Plan: 2013–2028

Doc 9854 Global Air Traffic Management Operational Concept

- **Scope of the concept- operate the global air traffic system up to and beyond 2025. Increase user flexibility, maximize efficiencies and increase system capacity while at the same time improving safety**
- **Consideration of the interoperability and operations of military systems is an integral part of these elements**
- **Airspace Organization and management**
  - Usable resource
  - Use airspace based on principles of access and equity
  - Restrictions transitory
  - Organized to accommodate need of users on timely basis
  - Management dynamic, flexible and based on serviced demanded

Doc9854 Global Air Traffic Management Operational Concept

- **Demand and Capacity Balancing**
  - The allocation of airspace will be balanced between the needs of particular users, including, *inter alia*, commercial, general and military aviation.

- **Airspace User operations**
  - The ATM system will accommodate diverse types of airspace user missions. These are expected to encompass, but are not limited to, air transport, military missions, business, aerial work and recreation.

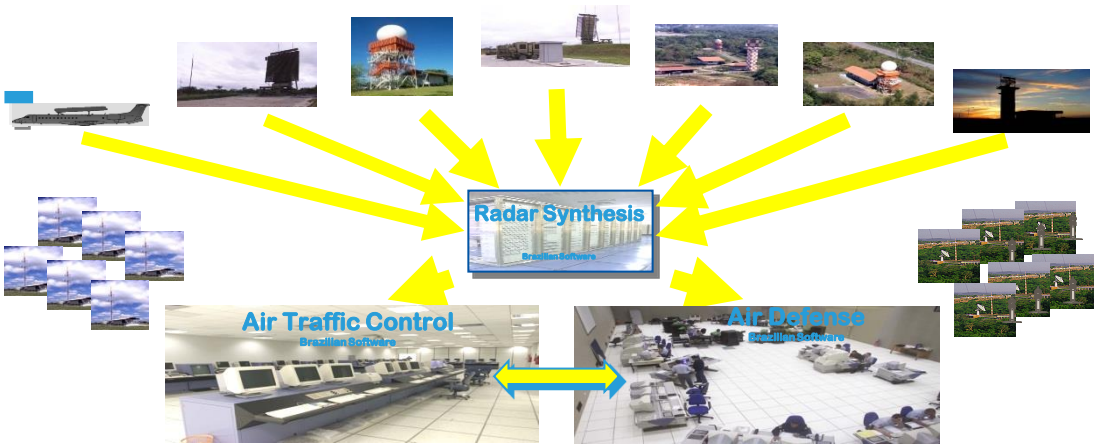
Civil/Military Interoperability

- **Interoperability can be considered as the ability of "systems" (not exclusively technical systems) to provide information and services to, and accept information and services from, other systems and to use the information and services so exchanged.**
  - Strategic and/or Political Interoperability
  - Operational and Technical Interoperability
  - Regulation and Standardization

Interoperability

Source: Cuban presentation to the Global Forum

- Operational and Technical Interoperability



Source: Brazilian presentation to the Global Forum

Airspace Organization and Management

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

ATM Security and ATM in crisis situation

- ***ATM security***
  - Safeguarding of the ATM system from security threats and vulnerabilities
  - Contribution of the ATM system to civil aviation security, national security and defence, and law enforcement.
- ***ATM in crisis situation***
  - Unforeseen or short-notice situations that occur outside the steady state of the routine global ATM system (for example: earthquakes, hurricanes, conflicts).

ATM Security and ATM in crisis situation

Need to prevent the use of aircraft as weapons, as occurred on 9/11/2001

Need to identify would-be hijackers, prevent air piracy, and mitigate the impact of hijacks that do occur

Need to prevent attacks on aircraft through the use of on-board explosives as occurred on Pan Am 103 and as attempted by the "Shoe Bomber".

State ATM System

Need to prevent and mitigate the affects of stand-off weapons such as MANPADS

Need to prevent attacks on airports and ATM systems, including computer systems that support ATM and aviation security

Need to prevent and mitigate impacts of attacks on any other transportation systems that also affect the national aviation system.

Need to prepare for, and mitigate the impact of, natural disasters on the national aviation system such as occurred with earthquakes in Chile and Haiti

State Aircraft Operations

- **State Aircraft**
  - In accordance with the Chicago Convention, Article 3 (b), "Aircraft used in military, customs and police services shall be deemed to be State aircraft"
- **State Aircraft Roles**

State Aircraft Operations

Common Interests

Safety

No duplication or unnecessary equipage

User preferred routing

On time departure/arrival

Constant descent to landing

Efficiency

Security

State Aircraft Operations

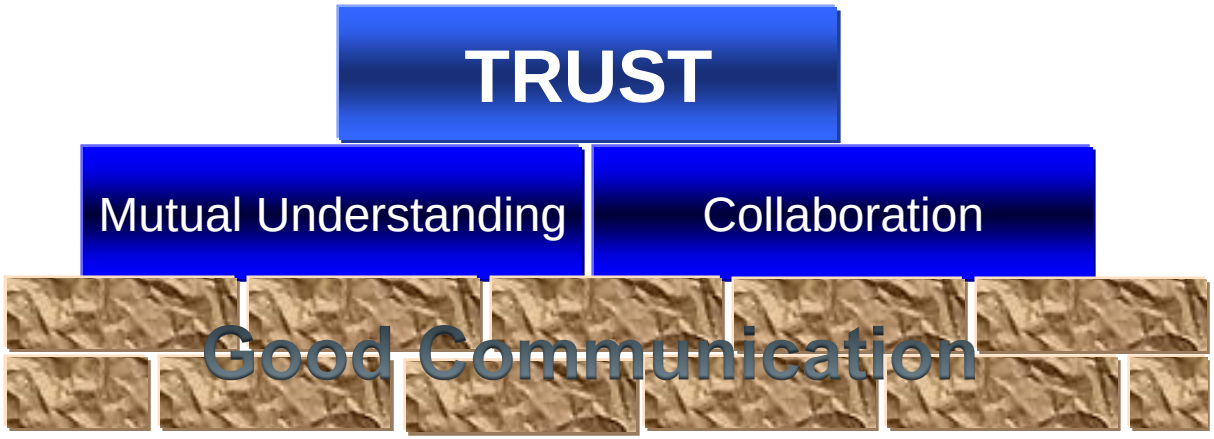
- FULLY-COMPLIANT OPERATIONS
- PARTIALLY-COMPLIANT OPERATIONS

Appendices

- **Appendices: Example of best practices in Civil/Military Cooperation:**
- **Appendix A: Civil/Military Cooperation in the United States**
- **Appendix B: Civil/Military Cooperation in Germany**
- **Appendix C: Civil/Military CNS/ATM Interoperability Roadmap- EUROCONTROL**

Summary of Circular 330

- **This circular was prepared by civil and military experts and offers guidance on and examples of successful practices for civil and military cooperation.**



Summary

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- Table of content of Circular 330
- Institutional and Regulatory Framework
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- Appendices
- Summary of Circular 330


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Thank You