TNyCA

Grado Aeroespacial

Air transport regulations

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Bibliography

- **Legislación e instituciones aeronáuticas**
  - ✦ Temario para Controlador de Tráfico Aéreo
  - ✦ ENAIRE 2015
- **Descubrir la navegación aérea**
  - ✦ F.J. Sáez Nieto, Y. Portillo Pérez
  - ✦ Servicio de publicaciones de Aena
- **Navegación Aérea, Cartografía y Cosmografía**
  - ✦ Dagoberto José Salazar Hernández
  - ✦ http://nacc.upc.es, 2008.

ENAIRE

LEGISLACIÓN E INSTITUCIONES AERONÁUTICAS

Air transport regulations

- **Introduction**
- **International conventions**
- **International organizations**
- **Legal and institutional framework in Spain**

Introduction

Aviation legislation

- Air Transport has had a globalized nature from its very beginnings.
- Aviation legislation has to have an international character so it has mainly evolved through *international conventions*.
- *International conventions* have to be ratified by the authorities of the different countries joining it, so they become a law in those countries.
- When a sufficient number of countries ratify the agreement, it *enters into force* and takes effect.

Introduction

Aviation legislation

- The legal framework must include **legal and political** related aspects:
  - *Sovereignty issues of airspace and within an aircraft.*
  - *Criminal and civil liability in case of accident.*
  - *Insurance contracts (aircraft, crew, passengers and cargo).*
  - *Special Crimes: Kidnapping, sabotage, etc..*
- Staff **licensing** related aspects:
  - *Training and licensing of aviation personnel.*
- Technical aspects of **navigation systems**:
  - *Communications systems and procedures.*
  - *Flying rules and practices and traffic control.*
  - *Aviation weather, maps and charts.*
- Technical aspects of **aircraft design**:
  - *Airworthiness requirements, registration and identification of the aircraft.*
  - *Design requirements of electronic navigation systems.*

Air transport regulations

- **Introduction**
- **International conventions**
- **International organizations**
- **Legal and institutional framework in Spain**

International conventions

- **Classification of international conventions**
  - *Legal and Political*: the goal is establishing common duties, rights and laws among countries. The most important are:
    - *Paris (1919).*
    - *Chicago (1944).*
  - *Air Transport*: they pursue protection for airlines in case of accident and facilitating uniform transport of passengers, baggage and cargo between countries. Some examples are:
    - *Warsaw (1929), which was further amended by:*
      - The Hague (1955).
      - Guatemala (1971).
      - Montreal (1975).
    - *Paris (1956).*
    - *Guadalajara (1961).*
    - *Montreal (1966).*
    - *Paris (1967).*
    - *Montreal (1999).*

International conventions

Classification of international conventions

- *The aircraft*: this type of agreement is focused on the aircraft as a good that can be owned, leased, mortgaged and foreclosed:
  - *Rome (1933).*
  - *Brussels (1938).*
  - *Geneva (1948).*
- *Damage to third parties*: the goal is to determine the limits of liability when they cause harm to third parties on ground during the operation of the aircraft. The typical example is:
  - *Rome (1952).*
- *Unlawful acts*: everything related to terrorism and wrongdoing, including kidnapping, sabotage and destruction of aircraft required the signing of agreements that covered specifically these cases:
  - *Tokyo (1963).*
  - *The Hague (1970).*
  - *Montreal (1971).*

International conventions

- **International Air Navigation Convention of Paris (1919).**
  - ✦ This convention created an *International Aviation Committee* and an ***International Commission for Air Navigation*** (**ICAN** / CINA) which was a technical agency that issued recommendations to member states to adapt their legal systems to rapid technological advances in aviation.
    - *First attempt to set the first rules for air traffic control and language and equipment compatibility.*
  - ✦ **Historical Context**: end of World War I
    - *Precedent: International Conference on Air Law (Paris, 1910) attended by 18 European countries.*
    - *The calling for this convention was in the Versailles Armistice, just after the end of World War 1.*
    - *The victorious powers, especially France, wanted to impose very restrictive conditions to the development of aviation in the losing countries, so they reserved the most advantageous conditions to those countries that had adopted a neutral position during the war.*
  - ✦ Only **ratified by 38 countries** due to its character.
    - *Not initially ratified by the U.S. and Russia.*
    - *Spain was not invited and made a call for the Havana Convention establishing the Convenio Iberoamericano de Navegación Aérea (CIANA) to countries of its influence.*
    - *The initial signatories of the ICAN reconsidered it to make it more fair, being subsequently signed by Spain and other countries.*
  - ✦ The ICAN **disappears in 1946**.

International conventions

- **International Air Navigation Convention of Paris (1919).**
  - ✦ The ICAN defined many **basic concepts** for aviation legislation:
    - ***Airspace sovereignty****: each state "owns" the air on its territory, and this is recognized by other states.*
    - ***Aircraft nationality****: nationality of an aircraft is the state in which it is registered. States are committed therefore to maintain a national registry of aircraft.*
    - ***Airworthiness certificate*** *to fly an aircraft in the country where it is registered. It requires to pass a certifying process that guarantees that it is in good flying conditions.*
    - ***Proficiency certificates*** *for the crew of an aircraft issued by the corresponding country in which the appropriate knowledge and skills are checked.*
    - ***Flight rules****: a core set of common rules that aircraft must obey during flight.*
    - ***Prohibited and restricted cargo:*** *a set of load types were not allowed to transport in civil aviation.*
    - ***State Aircraft****: aircraft used in military, customs and police services shall qualify as state aircraft and require a legislation other than civil aviation.*

International conventions

- **Convention on International Civil Aviation of Chicago (1944).**
  - ✦ It was signed on 12.07.1944 and entered into force on 04.04.1947, after the deposit of the 26th ratification.
    - *Ratified by Spain in BOE 29/12/1969, No. 311.*
  - ✦ It agrees the creation of the **International Civil Aviation Organization** (ICAO / OACI) based in Montreal which currently regulates all aspects of civil aviation in the world.
    - ***Goal of ICAO**: to harmonize the development of air transport and to ensure international cooperation that enables uniformity in regulations and standards, procedures and civil aviation organization.*

International conventions

- **Convention on International Civil Aviation of Chicago (1944).**
  - ✦ **Historical Context**: end of World War II
    - *During World War II the technological development of aviation was spectacular. Also the management and manufacturing of aircraft. U.S. wanted to take advantage of all this potential to reconvert it to peacetime, and argued for a liberalization of international air transport.*
    - *In anticipation of the upcoming end of World War II, U.S. invited 55 states to this Conference on aviation in Chicago with a strongly protectionist stance.*
    - *The Chicago Conference ended with a trade-off between the U.S. position and destroyed and in debt countries. The solution was embodied in the so called* ***Freedoms of the Air****:*
      - *Issues related to* ***non-profit*** *air navigation*: it was very liberal and was granted between all signatories
      - *Issues related to* ***for-profit*** *air navigation:* it was protectionist, leaving each state to decide regulating this issue through bilateral agreements with other states.

International conventions

- **Freedoms of the air**
  - ✦ Transit rights
    - ***1st freedom:*** *is the right to fly over a foreign country without landing*
    - ***2nd freedom:*** *allows technical stops without the embarking or disembarking of passengers or cargo*
  - ✦ Traffic rights
    - ***3rd freedom****: the right to carry passengers, mail and cargo* ***from*** *the country of the the aircraft nationality.*
    - ***4th freedom****: the right to carry passengers, mail and cargo* ***to*** *the country of the the aircraft nationality.*
    - *Almost always granted simultaneously in* ***bilateral agreements*** *between countries.*
  - ✦ Beyond rights
    - ***5th freedom****: the right to carry passengers, mail and cargo to or from* ***third states****.*
    - *...*
  - ✦ Cabotage
    - *Carriage of cargo between two points within a country by a vessel or vehicle registered in another country.*

International conventions

International Traffic Rights
"The Freedoms of the Air"

StartupBoeing

The **Freedoms of the Air** are international commercial aviation agreements (traffic rights) that grant a country's airline(s) the privilege to enter and land in another country's airspace.

They were formulated in 1944 at an international gathering held in Chicago (known as the Chicago Convention) to establish uniformity in world air commerce. There are generally considered to be nine freedoms of the air.

Most nations of the world exchange first and second freedoms through the International Air Services Transit Agreement.

The other freedoms, when available, are usually established between countries in bilateral or multilateral air services agreements.

The third and fourth freedoms are always granted together.

The eighth and ninth freedoms (cabotage) have been exchanged only in limited instances.

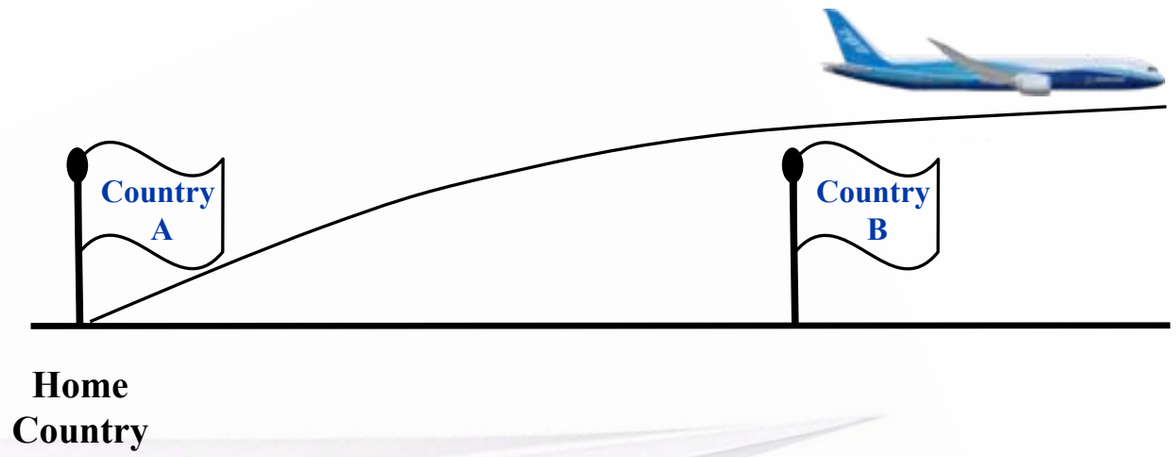
(U.S. law currently prohibits cabotage operations.)

International conventions

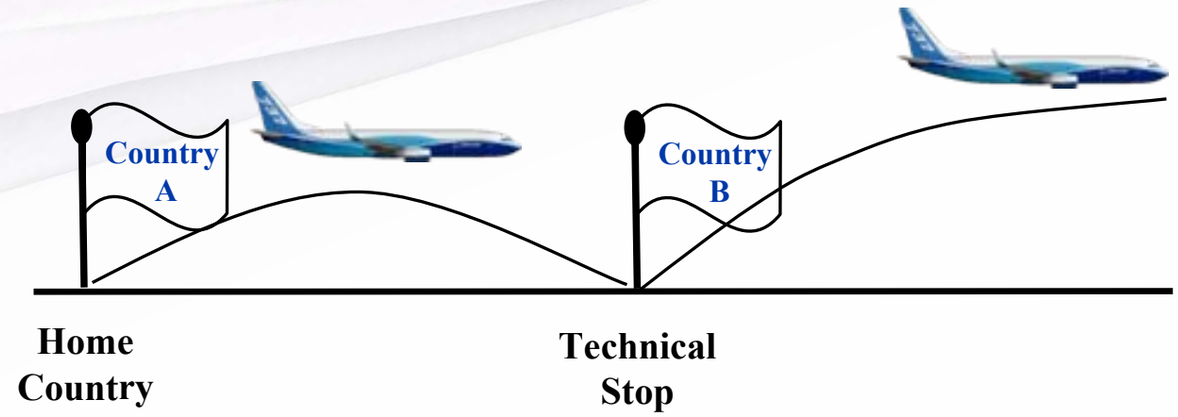
International Traffic Rights
"The Freedoms of the Air"

StartupBoeing

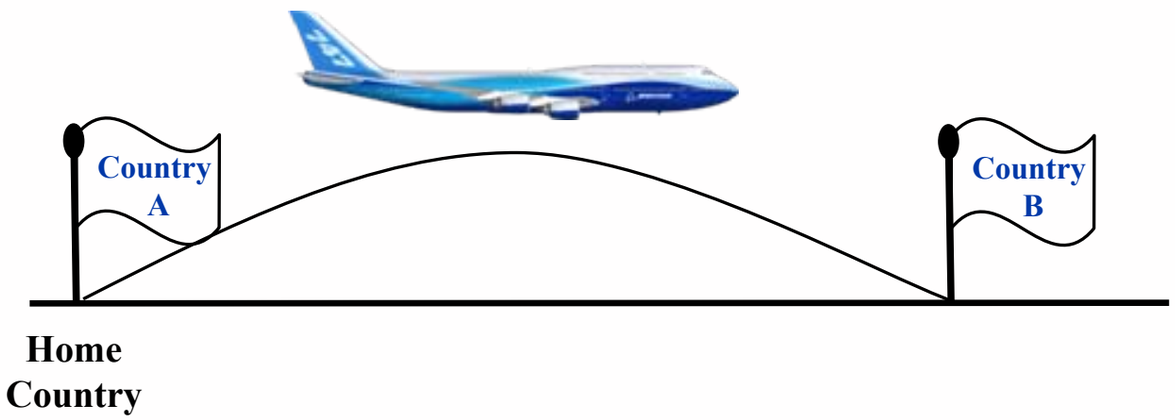
First Freedom The negotiated right for an airline from country (A) to overfly another country's (B) airspace.



Second Freedom The right for a commercial aircraft from country (A) to land and refuel (commonly referred to as a technical stop) in another country (B).



Third Freedom The right for an airline to deliver revenue passengers from the airline's home country (A) to another country (B).

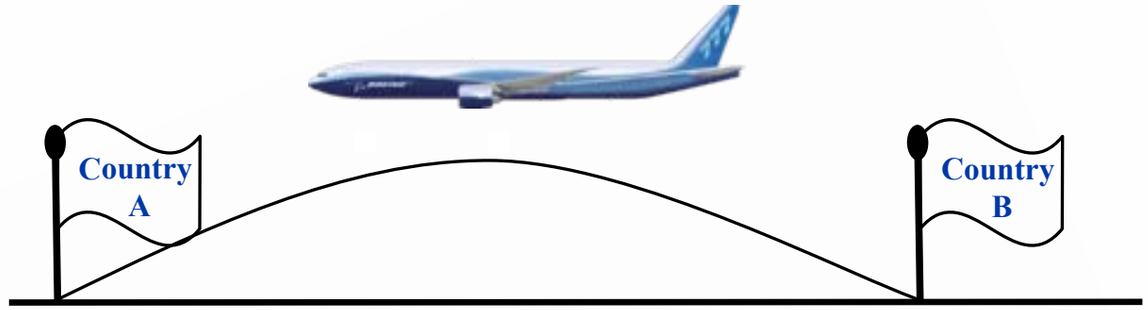


International conventions

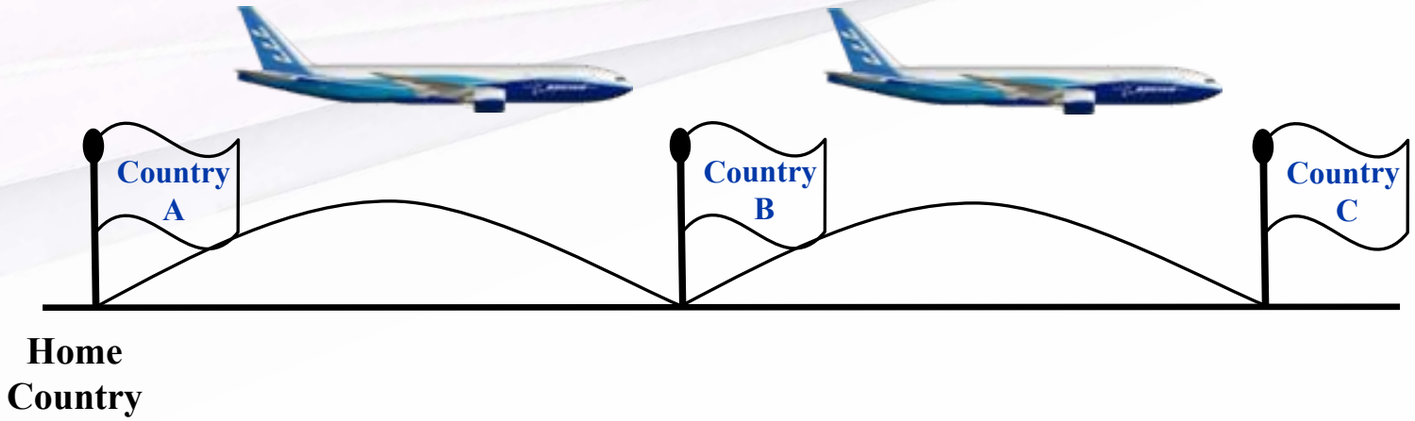
International Traffic Rights
"The Freedoms of the Air"

StartupBoeing

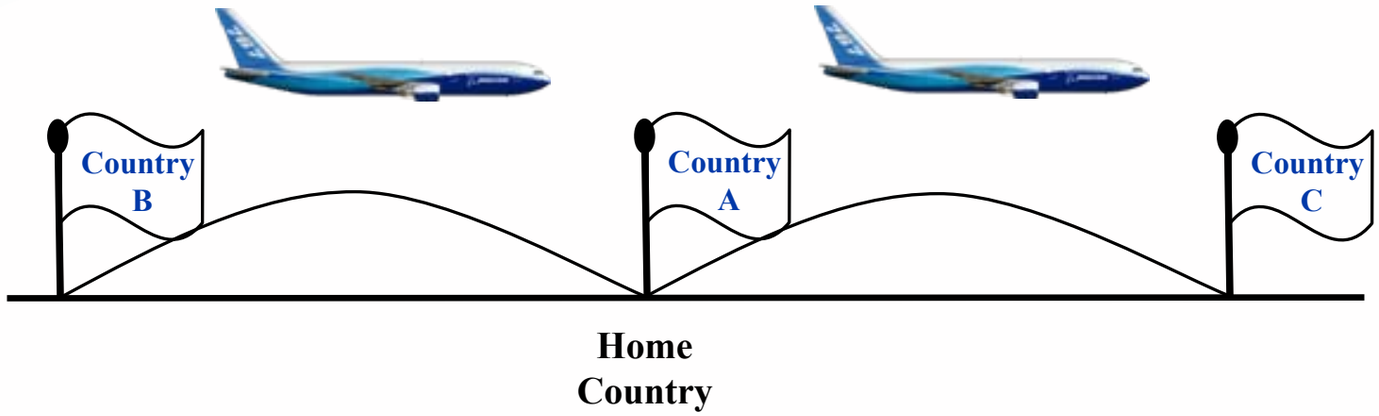
Fourth Freedom The right for an airline to carry revenue passengers from another country (B) to the airline's home country (A).



Fifth Freedom (Sometimes referred to as beyond rights) The right for an airline to take passengers from its home country (A), deposit them at the destination (B) and then pick up and carry passengers on to other international destinations (C).



Sixth Freedom (Combination of Third & Fourth Freedoms) The right for an airline to carry passengers or cargo between two foreign countries (B and C), provided the aircraft touches down in the airline's home country (A).



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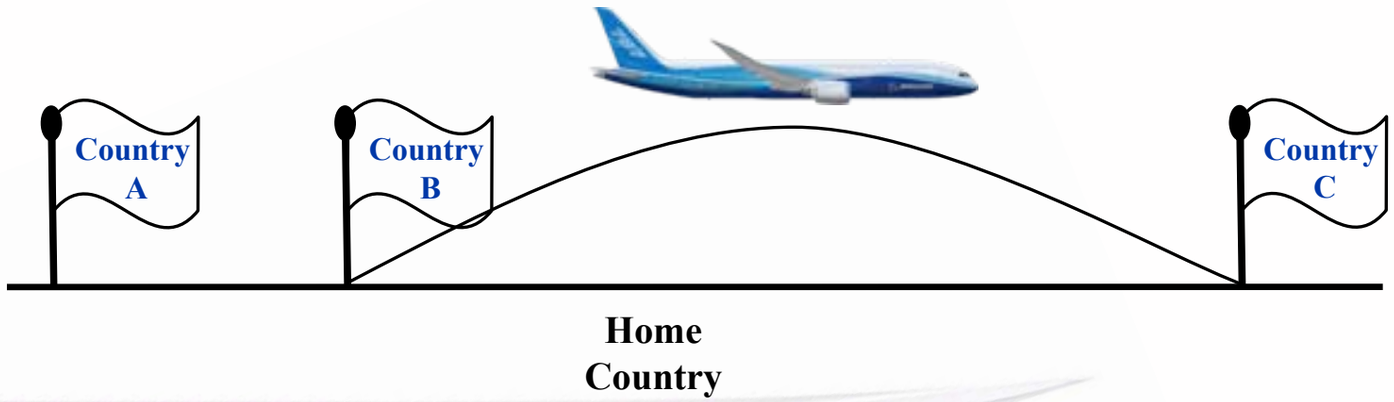
International Traffic Rights

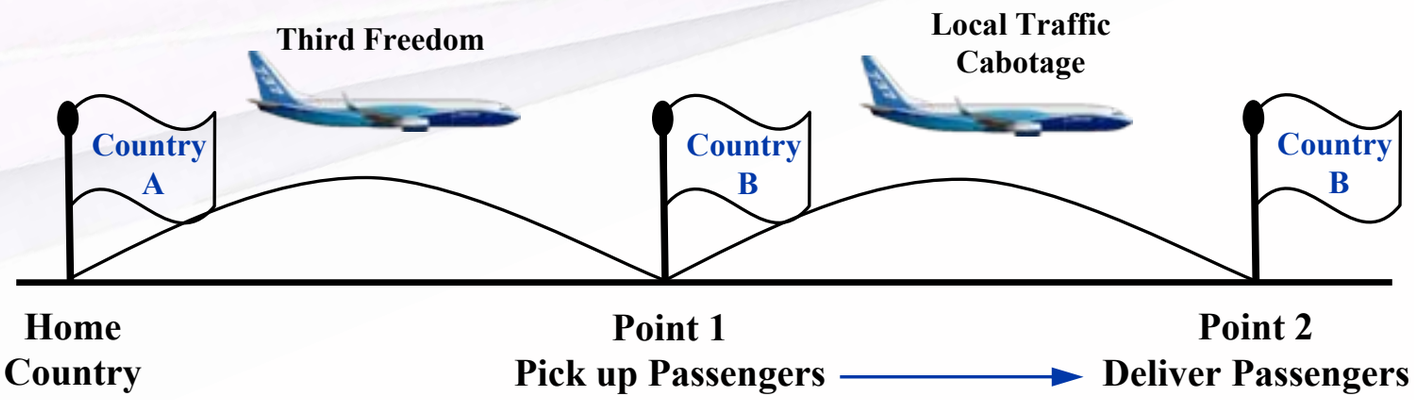
"The Freedoms of the Air"

StartupBoeing

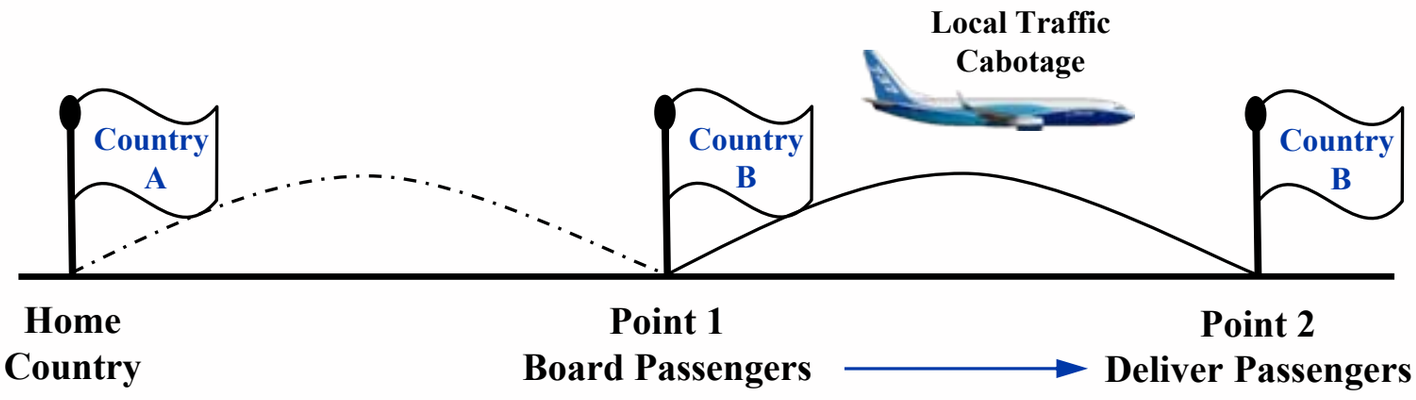
Seventh Freedom The right for an airline to carry on flights that originate in a foreign country (B), bypass its home country (A), and deposit the passengers at another international destination (C).



Eighth Freedom The right for an airline to carry passengers from one point in the territory of a country (B) to another point within the same country on a flight that originates in the airline's home country (A). This freedom is also known as **cabotage**, and is extremely rare outside of Europe.



Ninth Freedom The right for an airline from a particular country (A) to originate a flight in a foreign country (B) and carry passengers from one point to another within the foreign country. Also known as **stand alone cabotage**. It differs from the aviation definition of true cabotage, in that it does not directly relate to one's own country.



International conventions

- **Convention on International Civil Aviation of Chicago (1944).**
  - ✦ The Chicago Convention sets the basis mostly consisting of technical rules and standards to provide a common world wide air navigation system. It consists of:
    - ***Preamble***
    - ***Four parts:***
      - **Air navigation**
      - The **International Civil Aviation Organization** (ICAO / OACI)
      - International **air transport**
      - **Final provisions**: includes the minimum number of states needed to ratify the convention to enter into force, the dispute settlement mechanisms, penalties for non-compliance, etc..
    - ***18 Annexes and PANS**: instrumental part containing the Standards and Recommended Practices (SARP), Procedures for Air Navigation Services (PANS), and Aircraft Operations (OPS) that cover all operational and technical aspects.*
      - Given its purely technical nature, they are the most important part of daily global air operations.

International conventions

- **Chicago Convention - Part 1: Air Navigation.**
  - ✦ Sets the conditions related to the following aspects:
  - ✦ Traffic rights and infrastructure.
    - *Acknowledges the absolute sovereignty of airspace of each state.*
    - *Only covers civil aircraft, not state aircrafts (military, police, etc.).*
    - *Each state grants the others the first two Freedoms of the Air (non-commercial).*
    - *Payment for air navigation services fees and airport charges apply to all equally.*
    - *Each state shall notify the others (and ICAO) their international airports (ie, those with Customs).*
    - *Each state has the right to force landing for inspection and registration to any aircraft entering its territory.*
    - *The nationality of an aircraft is the one of its registry. Each state shall maintain a record and will provide it to ICAO.*

International conventions

- **Chicago Convention - Part 1: Air Navigation.**
  - ✦ Facilities, services and systems for air navigation.
    - *Each State is committed to providing air navigation services in its territory.*
    - *The services and facilities will follow the standards of ICAO, and should there be changes with respect to those rules, they must be notified to this organization.*
  - ✦ Documentation required on board the aircraft.
    - *Certificate of registration.*
    - *Valid airworthiness certificate.*
    - *Valid crew licensing.*
    - *Logbook.*
    - *Radio License.*
    - *List of passengers.*
    - *Cargo manifest.*

International conventions

- **Chicago Convention - Part 2: ICAO.**
  - This section defines the structure, functions and objectives of the
    - ***ICAO / OACI**: International Civil Aviation Organization.*
    - *http://www.icao.int*
  - ICAO has its headquarters are in Montreal (Canada), and it is currently a specialized agency under the UN that aims to strengthen the civil aspects of aeronautics and facilitate uniform development of the navigation system.
  - As it is formed by many sovereign states, the majority of ICAO documents have the status of *recommendations*. Even though, But the signatory states are committed to follow these recommendations and to report any discrepancies that may exist. In practice, the recommendations and ICAO standards have the force of law in most countries.

International conventions

- **Chicago Convention - Part 2: ICAO.**
  - ✦ One of the first tasks undertaken by ICAO was the **standardization** of:
    - *The procedures for **air traffic control***
    - *The design and operation of **navaids***
    - *Proper use of the aeronautical spectrum of **radio frequencies**.*
  - ✦ ICAO leads important **projects** and programs seeking to promote the safe, orderly and efficient international civil aviation. Among these projects it is worth mentioning:
    - ***FANS (Future Air Navigation System)**: The Task Force "Future Air Navigation Systems" was created in 1985 with the mission to find a way of **using satellite techniques to improve communications, navigation and surveillance**.*
      - ‣ The development of Galileo by the European Union is a basic point for the development of this program.
  - ✦ It also establishes **Regional Air Navigation Plans** with the requirements of the facilities, services and procedures necessary for navigation in a given region.

International conventions

- **Chicago Convention - Part 3: International Air Transport.**
  - ✦ It establishes that all International **Air Transport companies** of all states must provide annually to ICAO **statistical reports** of:
    - *Air traffic*
    - *Direct Operating Costs: crew, fuel, oil, maintenance, taxes, etc..*
    - *Non-operating Costs: ground passenger service, rentals, reservations, etc..*
    - *Accounting information*
    - *Incomes*
  - ✦ Additionally, ICAO may suggest states modifications to routes, airports and services, and propose the joint operation of airports and air navigation aids.

International conventions

ICAO Annexes

- Purely technical nature. The number of Annexes has been increasing and adapting to technological developments. They are also subject to a continuous review process to ensure its validity:
- **Annex 1** - Personnel Licensing.
- **Annex 2** - Rules of the Air.
- **Annex 3** - Meteorological Services for International Air Navigation.
- **Annex 4** - Aeronautical Charts.
- **Annex 5** - Units of Measurement to be used in Groiund and Air Operations.
- **Annex 6** - Operation of Aircraft
  - *Part I - International **Commercial Air Transport** — Aeroplanes*
  - *Part II - International **General Aviation** — Aeroplanes*
  - *Part III - International Operations — Helicopter*
- **Annex 7**- Aircraft Nationality and Registration Marks

International conventions

- **ICAO Annexes (ii)**
  - **Annex 8** - Airworthiness of Aircraft
  - **Annex 9** - Facilitation.
  - **Annex 10** - Aeronautical Telecommunications.
    - ***Volume I**: Navaids*
    - ***Volume II**: Communication procedures*
    - ***Volume III**: Part I: Communication Systems for Digital Data - Part II: Voice Communication Systems*
    - ***Volume IV**: Surveillance Radar and Collision Avoidance Systems*
    - ***Volume V**: Use of the Aeronautical Radio Frequency Spectrum*
  - **Annex 11** - Air Traffic Services.
  - **Annex 12** - Search and Rescue.
  - **Annex 13** - Aircraft Accident and Incident Investigation.
  - **Annex 14** - Aerodromes.
    - ***Volume I**: Aerodrome Design and Operations*
    - ***Volume II**: Heliports*

International conventions

- **ICAO Annexes (iii)**
  - **Annex 15** - Aeronautical Information Services.
  - **Annex 16** - Environmental Protection.
    - ***Volume I****: Aircraft Noise*
    - ***Volume II****: Aeronautical Engine Emissions*
  - **Annex 17** - Security: Safeguarding International Civil Aviation Against Acts of Unlawfull interference.
  - **Annex 18** - The Safe Transport of Dangerous Goods by Air.
  - **PANS-OPS (Doc 8168)**, Procedures for Air Navigation Services — Aircraft Operations.
    - ***Volume I*** *— Flight Procedures*
    - ***Volume II****— Construction of Visual and Instrument Flight Procedures*

International conventions

ICAO Annexes

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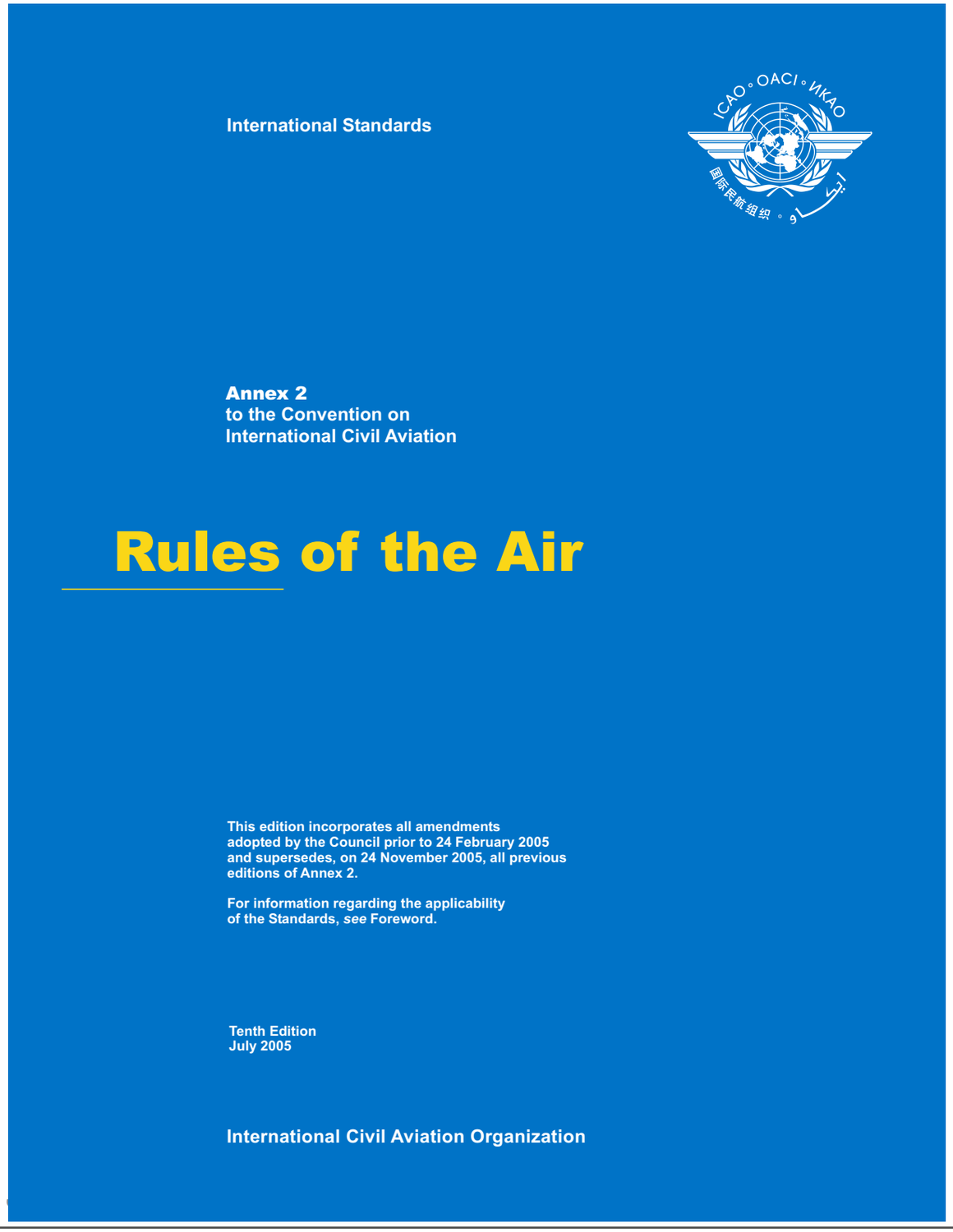
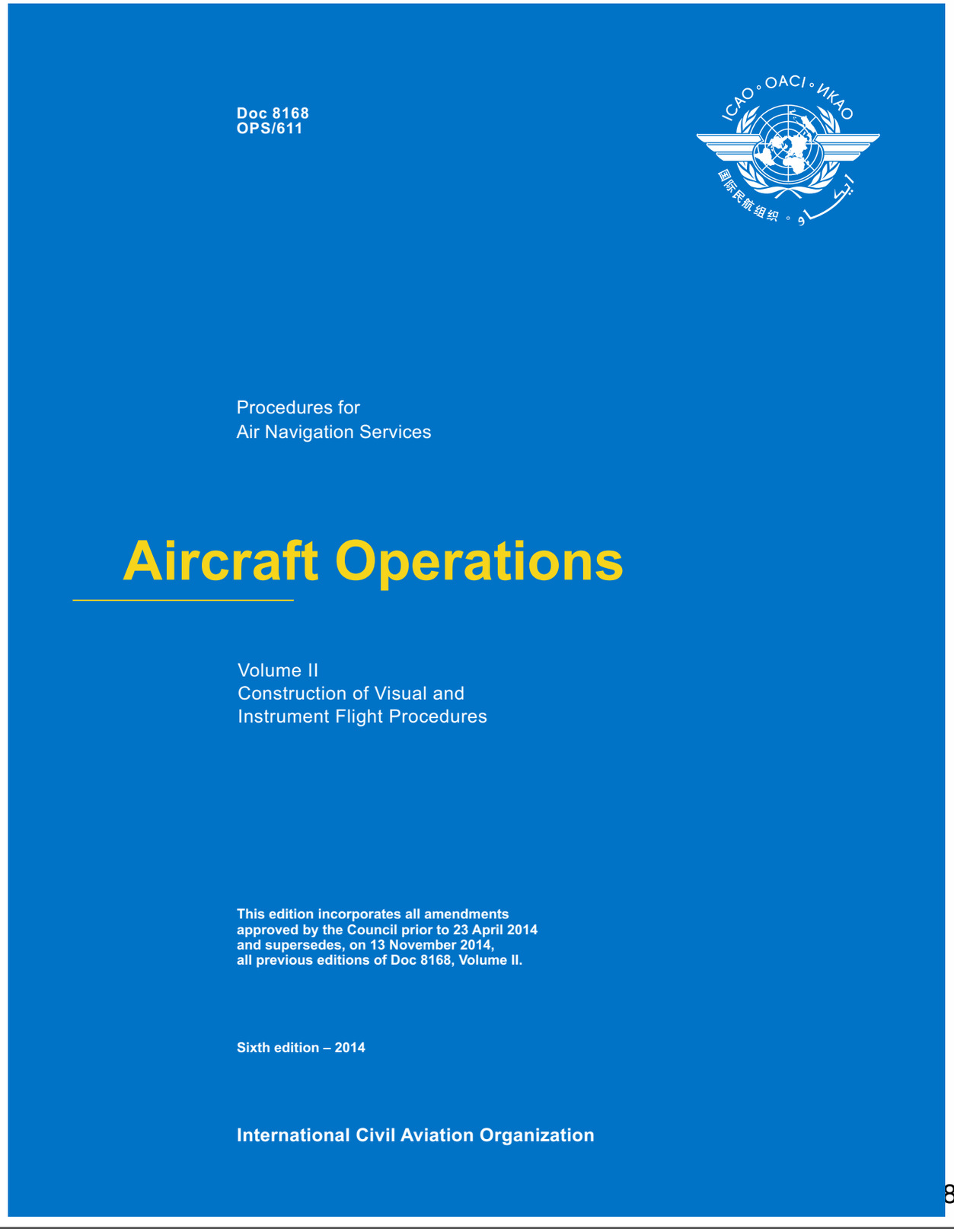
Annex 18	The Safe Transport of Dangerous Goods by Air

International conventions

ICAO Annexes





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International organizations

- **International organizations**
  - ✦ World top organization
    - ‣ **ICAO / OACI**

ICAO

International organizations

ICAO - Structure

- **Assembly**: sovereign organ that consists of all member states on equal terms (1 state = 1 vote).
  - *Meetings are at least every three years (or sooner, if summoned by the 20% of the Contracting States). It is the decision making and budget approving organ.*
  - *Decisions are taken by simple majority.*
- **Council**: permanent committee that manages ICAO. It is formed by the 33 states with highest air traffic and facilities covering large geographical areas.
  - *It is a standing committee that evaluates the Technical Annexes.*
- **Committees**: responsibles for elaborating and amending the technical annexes, to establish technical subcommittees, and to advise the Council.
  - *Air Navigation*
  - *Air Transport*
  - *Air Navigation Services*
  - *Financial*

International organizations

ICAO - Structure

- **Secretariat**: additionally, ICAO has a group of permanent staff, with the status of UN personnel, who form the secretariat. It centralizes the work of the committees and is responsible for developing the ICAO publications. It is structured in several sections:
  - *Air Navigation*
  - *Air Transport*
  - *Legal Affairs*
  - *Technical Cooperation*
  - *Administrative Services*

International organizations

- **International organizations**

  - **Air Navigation, Aviation Authorities, and Traffic Control:**

    - ***European Union:***
      - **ECAC / CEAC**
      - **EUROCONTROL**
      - **EASA**

    - ***USA:***
      - **FAA**

International organizations

- **European level**
  - ✦ Air navigation

ECAC
political arm of UE

FAA

EUROCONTROL

EUROCONTROL
ATM service provider

EASA
Safety agency

International organizations

- **European Union**
  - ✦ Creation of **Union regulator organisations** and **legislation**.
    - *Directive 93/65 on equipment specifications.*
    - ***ECAC / CEAC*** *- European Civil Aviation Conference* *-* ***Aviation authority****. It has policy initiatives but not technical resources.*
    - ***EUROCONTROL -*** ***Service provider****. Organization with more technical resources.*
    - ***EASA*** *- European Aviation* ***Safety Agency*** *- it promotes the highest common standards of safety and environmental protection in civil aviation.*
  - ✦ Creation of the **Single European Sky SES**: joint management of airspace.
    - *Regulations 549/2004, 550/2004 551/2004 and 552/2004*
    - *Cooperation in air traffic management, moving away from national boundaries to the use of 'functional airspace blocks' in order to provide:*
      - **Safety** as primary objective
      - Higher **efficiency** and **capacity** in the use of airspace.
    - *Integration of civilian and military management*

International organizations

- **European Union**
  - **Single European Sky** SES-II. Focus is here on four areas:
    - *The existing Single Sky legislation is sharpened to deal with performance and environmental challenges.*
    - *The Single European Sky ATM Research (SESAR) programme is to provide the future technology.*
    - *The competence of the European Aviation Safety Agency (EASA) is to be extended to aerodromes, air traffic management and air navigation services.*
    - *The "action plan for airport capacity, efficiency and safety" is to be implemented thus providing ground capacity.*

International organizations

- **ECAC / CECA -** European Civil Aviation Conference
  - ✦ European organization based in Paris and founded in 1955 by the Consultative Assembly of the Council of Europe for coordinating the european air transport system.
    - *Its work program is established so as not to duplicate the ICAO.*
    - *http://www.ecac-ceac.org.*
  - ✦ The birth of ECAC was due to the need to deal with some challenges in air navigation that were specific to Europe:
    - *Many states with small area, which means a higher volume of international traffic than domestic traffic.*
    - *Large number of companies (airlines and aircraft manufacturing) operating in a relatively small area.*
    - *Well developed surface transport (train, car) competing with air transport.*
    - *Interventionist and protectionist government policies.*

International organizations

- **ECAC / CECA -** European Civil Aviation Conference
  - ✦ Most active European institution in addressing air traffic problems.
  - ✦ It has issued some key concepts that currently configure the air navigation framework in Europe. Among these concepts is the formal division between:
    - ***Aviation authorities**, with regulatory and supervisory skills, and*
    - ***Service providers** of air navigation.*
  - ✦ In the second half of the decade of the 80's there was a great expansion of air traffic in Europe (3 times higher than planned), but the support systems to air traffic did not react to the same extent. This led to reach significant traffic delays
    - *Crisis of summer of 1988.*
  - ✦ Because of these problems ECAC first meets in 1988 to adopt common measures to the problems of European air traffic congestion.
    - *They decided to institutionalize the meetings of ministers of transport under the name **MATSE** and*
    - *To create the **Central Flow Management Unit (CFMU)**, to optimize the use of airspace, managing authorizations for takeoff and landing, and aircraft routes.*

International organizations

- **Eurocontrol**
  - **Problem**: solving the enormous problems that excessive compartmentalization of Central European airspace generated on routes crossing this airspace.
  - **Objective**: the unification of services and airspace control in Europe, beyond the limitations imposed by national airspaces. This involves:
    - *The common organization of airspace,*
    - *The joint exploitation of ATC services (traffic) in the upper airspace*
    - *Facilities' and infrastructure planning*
    - *The standardization of equipment and staff training*
    - *Charging and payment for the use of navaids*

International organizations

- **Eurocontrol**

  - **Main offices**:
    - ***CFMU*** *- Central Unit for Flow Management*
    - ***CODA*** *- Central Office for Delay analysis*
    - ***CRCO*** *- Central Route Charges Office*
    - ***EATMP*** *- Development of the European Air Traffic Management Programme*
    - ***IANS*** *- Institute of Air Navigation Services*
    - *...*

International organizations

- **Eurocontrol**
  - ✦ **Main achievements**:
    - ***Performance measurement system****: that sets performance levels required for all actors of ATM in key areas such as safety, environment, capacity and profitability.*
    - ***European Network Manager****. It carries out the main ATM functions, such as: the design of routes at European level, the management of frequencies and radar codes, the management of traffic flows (ATFM).*
    - ***Definition of Functional Airspace Blocks (FAB)*** *based on operational requirements, particularly in traffic flows rather than national borders.*

International organizations

Eurocontrol: history

- Created on 13/12/1960 by West Germany, France, UK, Belgium, Holland, and Luxembourg through the Eurocontrol convention which takes effect in 1963. Gradually Eurocontrol has spreaded to all the other countries of Europe.
  - *http://www.eurocontrol.int*
- In the 70's some countries (UK, FR and partially DE) vetoed the Eurocontrol Convention withdrawing its ability to manage its *upper airspace*.
  - *During this period the main activities of Eurocontrol became the standardization of equipment and charging fees.*
  - *However, despite the differences, it was possible to create the first European Control Center in Maastricht.*
- The Eurocontrol Convention was revised in 1997 and Eurocontrol splitted into:
  - *The **Agency**, which is a technical organ that ellaborates standards and developes the programs assigned to EUROCONTROL.*
  - *The **Assembly** and the **Council**, political organs that adopt measures affecting aviation. This way they are assigned part of the tasks assigned to the ECAC.*

International organizations

- **EASA -** European Aviation Safety Authority
  - ✦ Created in 1999 on the initiative of the European Union Commission
    - *http://www.easa.eu.int*
  - ✦ **Objective**: To promote the highest common standards of safety and environmental protection in civil aviation.
    - *Nevertheless, national authorities (like **AESA** or CEANITA in Spain) still take on most operational tasks, such as certification of aeronautical products, granting private pilots' licenses, analysis of incidents and accidents.*
    - *The Agency develops environmental standards at European level, **supervises the uniform application** of standards through inspections in member states and provides specialized technical expertise and training when needed.*

Europe → **Spain**

EASA European Aviation Safety Agency

AESA AGENCIA ESTATAL DE SEGURIDAD AÉREA

International organizations

- **International organizations**

  - Standardization and certification of **aircraft and equipment**:

    - ***European Union:***
      - **JAA**
      - **EUROCAE**
    - ***USA:***
      - **FAA**
      - **RTCA, ARINC**

International organizations

- **International organizations**
  - ✦ **Aircraft and equipment** standardization

Europe

JAA

Standardization
certification

USA

FAA

Everything...

International organizations

- **JAA -** Joint Aviation Authorities
  - ✦ Associated to ECAC to unify the *airworthiness certification* criteria in response to the needs of industry (Airbus).
    - *http://www.jaa.nl*
    - *Focuses more on aircrafts and crews than on service providers.*
    - *It dictates the requirements applicable to companies and aircraft and avionics industries.*
  - ✦ **JAR - Joint Aviation Requirements** (JAR): a set of common *aviation requirement* issued by the JAA, intended to minimise **Type Certification problems** on joint ventures, and also to facilitate the export and import of aviation products.
    - ***JAR:*** *set of rules that determine the required* ***performance requirements*** *and* ***equipments*** *to be used by aircraft to be considered airworthy.*
    - ***JAR-FCL****: Flight Crew Licensing*
    - ***JAR-OPS****: Flight Opertaions*
    - *Inspired by the U.S. FAR and they are compulsory in Europe since 1993.*

International organizations

- **International organizations**

Europe

EUROCAE

USA

Private companies

RTCA
THE AVIATION GOLD STANDARD SINCE 1935

Advisory commitee
on critical aviation modernization issues

ARINC

Standards
on avionics

International organizations

- **RTCA -** Radio Tecnical Commission for Aeronautics
  - ✦ Private, not-for-profit association founded in 1935
  - ✦ RTCA has provided the **foundation** for virtually every modern technical advance in aviation, specially **electronic equipment** onboard.
  - ✦ Utilized as a FAA advisory commitee, RTCA works in response to requests from the Federal Aviation Administration (FAA) to develop comprehensive, industry-vetted and endorsed recommendations.
  - ✦ It publishes Standards & Guidance Materials:
    - ***MASPS*** *- Minimum Aviation System Performance Specification*
    - ***MOPS*** *- Minimum Operational Performance Specification*

International organizations

- **EUROCAE -** European Organization for Civil Aviation Equipment
  - ✦ Created to satisfy the need to harmonize **electronic equipment** onboard.
  - ✦ It is the European forum for the discussion of technical issues between national administrations, airlines and industry.
  - ✦ It sets the minimum requirements to be met by embedded systems (in cooperation with the American **RTCA** *Radio Tecnical Commission for Aeronautics*).

International organizations

- **ARINC -** Aeronautical Radio, Incorporated
  - ✦ It is a private company whose shareholders are a consortium of companies including airlines, aircraft manufacturers and other aviation companies
  - ✦ It is a provider of engineering systems for 8 types of industries: aviation, airports, defense, government, healthcare, networks, security and transportation.
  - ✦ ARINC fundamental activity is **standardization**.
    - ***AEEC*** *(Airlines Electronic Engineering Committee) formulates the standards for electronic equipment and systems for airlines.*
    - ***ARINC*** *publishes the standards defined by the AEEC.*
  - ✦ The objective of ARINC specifications are:
    - *Indicating the requirements for the new equipment to manufacturers of electronic equipment based on the opinion of the technical experts of the airlines.*
    - *Influencing the design of new equipment for maximum possible standardization of the physical and electrical characteristics.*

International organizations

- **ARINC main standards:**
  - **400 Series**: describe guidelines for installation, wiring, data buses, and databases.
    - ***ARINC 424*** *- international standard* ***file format for aircraft navigation data****.*
    - ***ARINC 429*** *- the most Widely used* ***data bus standard for aviation****. Electrical Characteristics and data format are defined for a two-wire serial bus With One transmitter and up to 20 receivers.*
  - **600 Series**: are reference standards for the predominate avionics introducing the avionics standard packaging Modular Concept Unit (MCU)
    - ***ARINC 653*** *- Standard on* ***Real Time Operating System (RTOS)*** *interface for partitioning of computer resources in the time and space domains.*
    - ***ARINC 660*** *- define functional avionics allocation and* ***recommended architectures for CNS / ATM avionics****.*
    - ***ARINC 661*** *- defines the data structures used in an interactive* ***cockpit display system (CDS)****, and the Communication between the CDS and User Applications. The GUI definition is completely defined in binary definition files. The CDS software Consists of a kernel capable of creating a hierarchical GUI specified in the definition files. The concepts used by ARINC 661 are similar to Those used in user interface markup languages .*
    - ***ARINC 664*** *- defines the use of a* ***deterministic Ethernet network as an avionic databus*** *in modern aircraft like the Airbus A380, Sukhoi Super Jet 100 and the Boeing 787 Dreamliner.*
  - **800 Series**: comprises a set of aviation standards for aircraft, including fiber optics used in high-speed data buses.
  - etc. ..

International organizations

IATA - International Air Transport Association

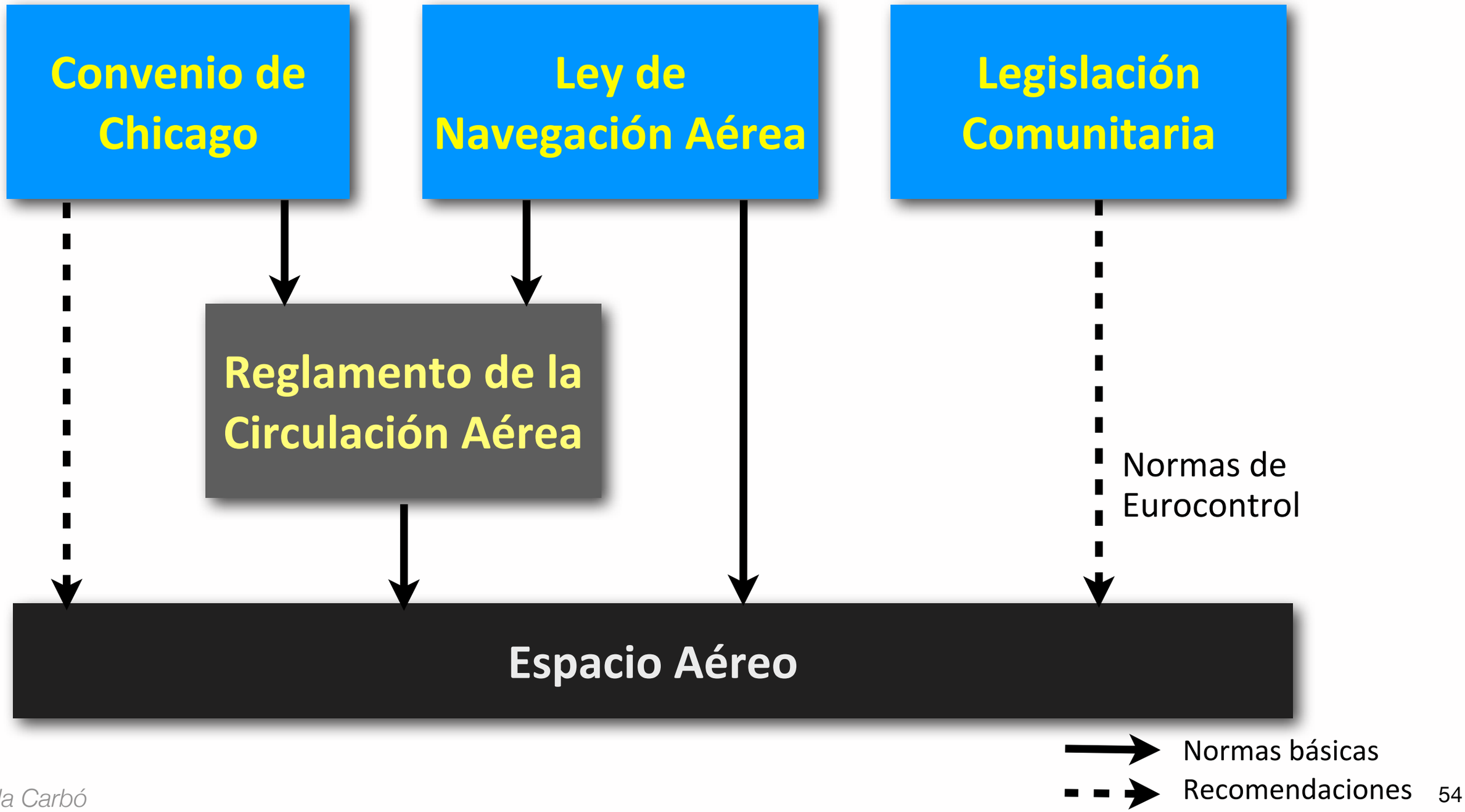
- Created in the convention of Havana (1945) is the instrument for **cooperation between airlines**, promoting safety, reliability, and confidence in air transport economics economic benefit of private shareholders.
  - *IATA represents 260 airlines that result in 94% of international air traffic schedules.*
- **Objectives**:
  - *Helping airlines simplifying processes and increasing the desirability of financial flow of income while reducing costs and increasing efficiency.*
  - *Simplify travel and transport processes, keeping costs low.*
  - *To allow airlines to operate safely, efficiently and economically, under rules defined.*
  - *For governments, IATA seeks to ensure that they can be well informed about the complexities of the aviation industry.*
- It has its own **airport codes** of three letters designating each airport in the world (other than ICAO).

- **Introducción**
- **Convenios internacionales**
- **Organismos internacionales**
- **Marco jurídico e institucional en España**
  - In Spanish (intentionally).

Marco jurídico e institucional

Marco jurídico

- Las normas aplicables en España a la navegación aérea en el ámbito civil son:



Marco jurídico e institucional

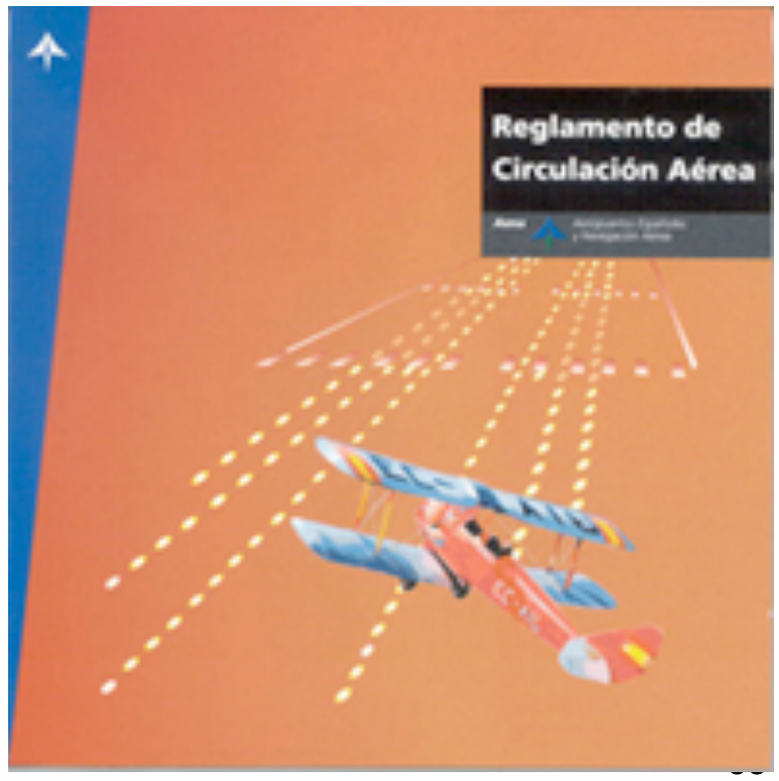
TNyCA
Grado Aeroespacial

Marco jurídico en España

- Ley 48/1960 de 21 de Julio sobre Navegación Aérea
  - *Marco territorial, órganos administrativos, definición aeronaves a las que se le aplica, requisitos para poder operar, , características del soporte aeroportuario, requisitos exigibles al personal aeronáutico, normas de operación, responsabilidades en caso de accidente, principios de circulación.*
- Ley 209/1964 Penal y Procesal de la Navegación Aérea
- Ley 21/2003 sobre Seguridad Aérea

Reglamento de Circulación Aérea

- La Circulación Aérea y, en consecuencia, las actividades de los controladores aéreos están reguladas por:
  - ***Reglamento de Circulación Aérea*** *(RCA): R.D. 57/2002.*
  - ***Regulación de la Circulación Aérea Operativa*** *(RCAO): R.D. 1489/1994 de 1 de julio, modificado por Orden Presidencial 2167/2002.*



Marco jurídico e institucional

- **Marco institucional en España**

Marco jurídico e institucional

- **Marco institucional en España**

Marco jurídico e institucional

Proveedores de servicios

- Las organizaciones proveedoras de servicios (como AENA, ENAIRE) han de tener una doble personalidad:
  - ***Capacidad tecnológica*** *para desarrollar y mantener una infraestructura capaz de proporcionar el soporte CNS*
  - ***Soporte operativo****: organización muy estructurada de profesionales muy específicos y cualificados responsables de prestar los servicios de tránsito e información.*