



The Faculty of Power
and Aeronautical Engineering



ANK 315 AIRCRAFT MAINTENANCE LECRURE 3

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- 1 INTRODUCTION TO AIRCRAFT MAINTENANCE
- 2 STUDENTS' PRESENTATIONS (INTRODUCING YOURSELF IN A PRESENTATION MAINTENANCE POLICIES)
- 3 AVIATION ORGANIZATIONS, AUTHORITY REGULATIONS;**
- 4 STUDENTS' PRESENTATIONS
- 5 DEPENDABILITY, RELIABILITY, AVAILABILITY, SAFETY, INTEGRITY, MAINTABILITY, RELIABILITY OF SYSTEMS, FMEA/FMECA, FTA, HOMEWORK 1
- 6 DEGRADATION PROCESSES, DAMAGES, RCM, MSG3 , HOMEWORK 2
- 7 INTRODUCTION TO DIAGNOSTICS, NDT, SHM, EHM, HUMS
- 8 MAINTENANCE PROGRAM,
- 9 OPTIMIZATION OF MAINTENANCE PROGRAM, HOMEWORK 3
- 10 HUMAN FACTOR AND FLIGHT SAFETY
- 11 PREPARING TO THE FINAL TEST
- 12 FINAL TEST I
- 13 SUMMARY and CONCLUSION of TEST
- 14 FINAL TEST II
- 15 FINAL SUMMARY AND CONCLUSIONS

Kamila Kustron, Ph. D.





Aviation is the safest form of transport



“ Commercial aviation is the safest form of transportation in the world because of the foresight and perseverance of the delegates from 54 nations that attended the civil aviation conference in Chicago from November 1 to December 7, 1944.... They set in motion the creation of the International Civil Aviation Organization”



<http://seriouslyforreal.com/wp-content/uploads/2013/06/plane-landing-maho-beach-91.jpg>





Second World War: some benefit from worldwide tragedy



Wartime cooperation overcame many political barriers, but there were many obstacles, political and technical, that still had to be overcome if the fruits of the wartime enterprise were to benefit international civil aviation



http://t3.gstatic.com/images?q=tbn:ANd9GcSk9y0v07DG7XVWanvugyGYna3FmgLn7dzYfjpYp5jT8AgtkkrXEr4eT2_O





ISSUES



States needed to decide:

- ↖ The problem of commercial rights
- ↖ What arrangements needed to be made for the airlines of one country to fly into and through the territories of another
- ↖ What could be done to maintain the air navigation facilities installed during the war





PURPOSE OF THE CONVENTION

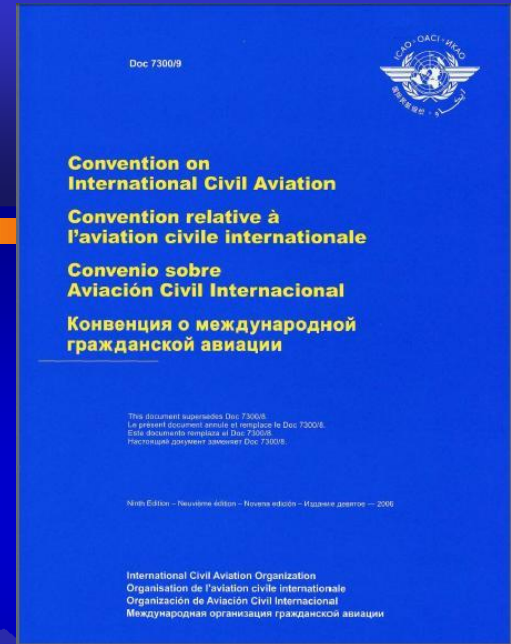


- ↖ *Whereas* the future development of international civil aviation can greatly help to create and preserve friendship and understanding among the nations and peoples of the world, yet its abuse can become a threat to the general security; and
- ↖ *Whereas* it is desirable to avoid friction and to promote that cooperation between nations and peoples upon which the peace of the world depends
- ↖
- ↖ *Have accordingly* concluded this convention to that end





What is ICAO?



1944 — the Chicago Convention

- ↖ 11 September, President Roosevelt invites the world to work on a new convention for international aviation
- ↖ ICAO preceded the United Nations





President Roosevelt to the opening plenary session:



As we begin to write a new chapter in the fundamental law of the air, let us all remember that we are engaged in **a great attempt to build enduring institutions of peace.** These peace settlements cannot be endangered by **petty considerations or weakened by groundless fears.** Rather, with full recognition of **the sovereignty and judicial equality of all nations,** let us work together so that the air may be used by humanity, **to serve humanity**





What is ICAO?



What are our strategic objectives?

↖ Safety

↖ Security

↖ Infrastructure and Environment





Aims & Objectives of ICAO



- Insure the safe and orderly growth of international civil aviation throughout the world
- Encourage the arts of aircraft design and operations for peaceful purposes
- Promote safety of flight in international air navigation
- Promote generally the development of all aspects of international civil aeronautics





How does the ICAO work?



- ↖ **SMALL** Secretariat all over the world
- ↖ **LARGE** voluntary workforce
 - ↓ States
 - ↓ International Organizations





How does the ICAO work?



- The voluntary workforce — experts from:
 - States
 - International Organizations
 - IAOPA
 - IFALPA
 - IFATCA
 - IATA
 - IBAC
 - ACI
 - CANSO
 - ICCAIA





CONVENTION



Each signatory State "undertakes to collaborate to secure the highest practicable degree in uniformity of regulations and standards, procedures and organization relating to aircraft, personnel and airways... in which such uniformity would be likely to facilitate and improve air navigation"





The Convention provides for:



- ↖ Standardization
- ↖ Harmonization
- ↖ Cooperation

through the establishment of international
**Standards and Recommended Practices
(SARPs)**





ICAO SARPs



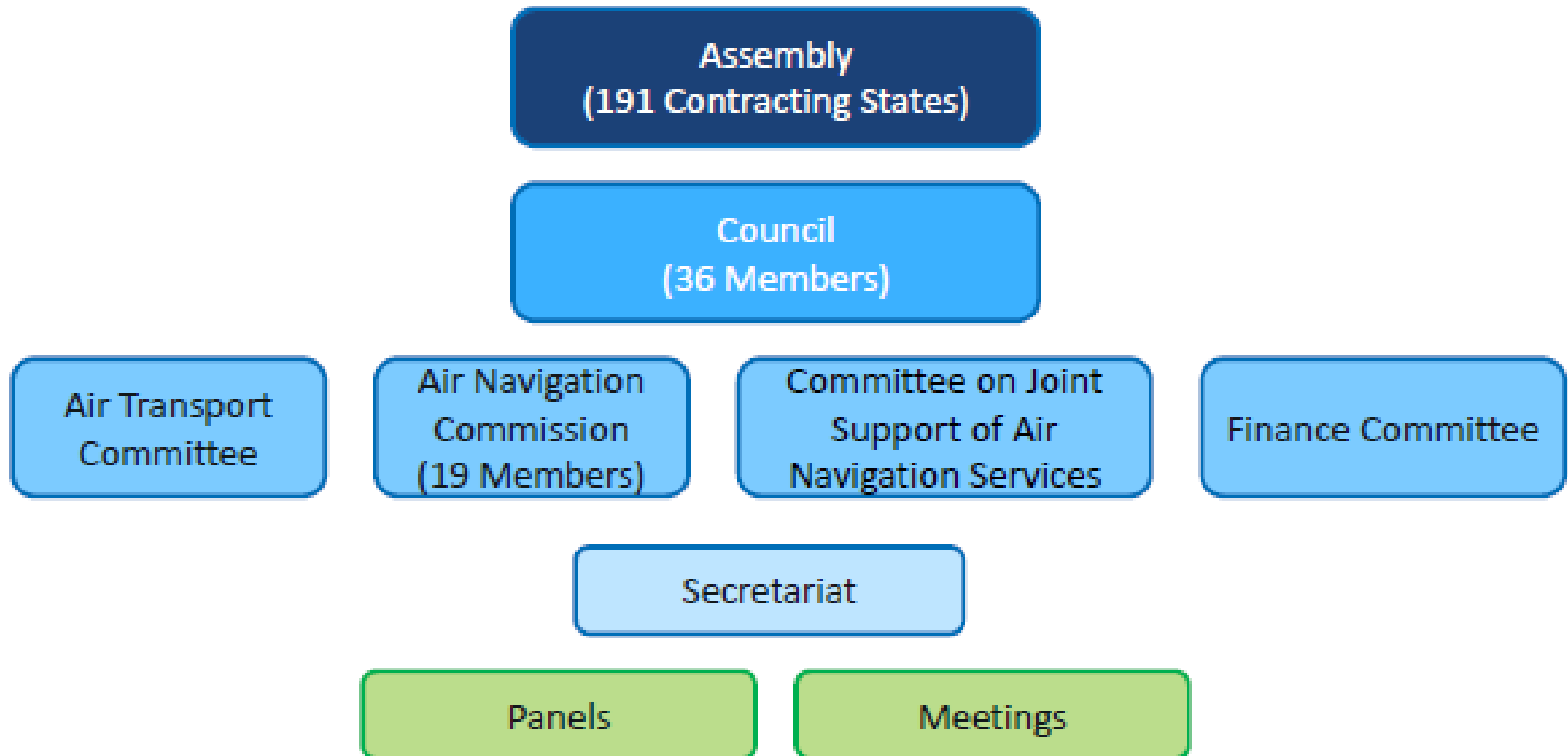
SARPs are incorporated in 19 Annexes

- Annex 1 — Personnel Licensing
- Annex 2 — Rules of the Air
- Annex 3 — Meteorological Service for International Air Navigation
- Annex 4 — Aeronautical Charts
- Annex 5 — Units of Measurement to be Used in Air and Ground Operations
- Annex 6 — Operation of Aircraft
- Annex 7 — Aircraft Nationality and Registration Marks
- Annex 8 — Airworthiness of Aircraft
- Annex 9 — Facilitation
- Annex 10 — Aeronautical Telecommunications
- Annex 11 — Air Traffic Services
- Annex 12 — Search and Rescue
- Annex 13 — Aircraft Accident and Incident Investigation
- Annex 14 — Aerodromes
- Annex 15 — Aeronautical Information Services
- Annex 16 — Environmental Protection
- Annex 17 — Security
- Annex 18 — The Safe Transport of Dangerous Goods by Air
- Annex 19 — Safety Management





ICAO Structure





International Civil Aviation Organization



ICAO Member States (191)



ICAO Assembly



ICAO Council

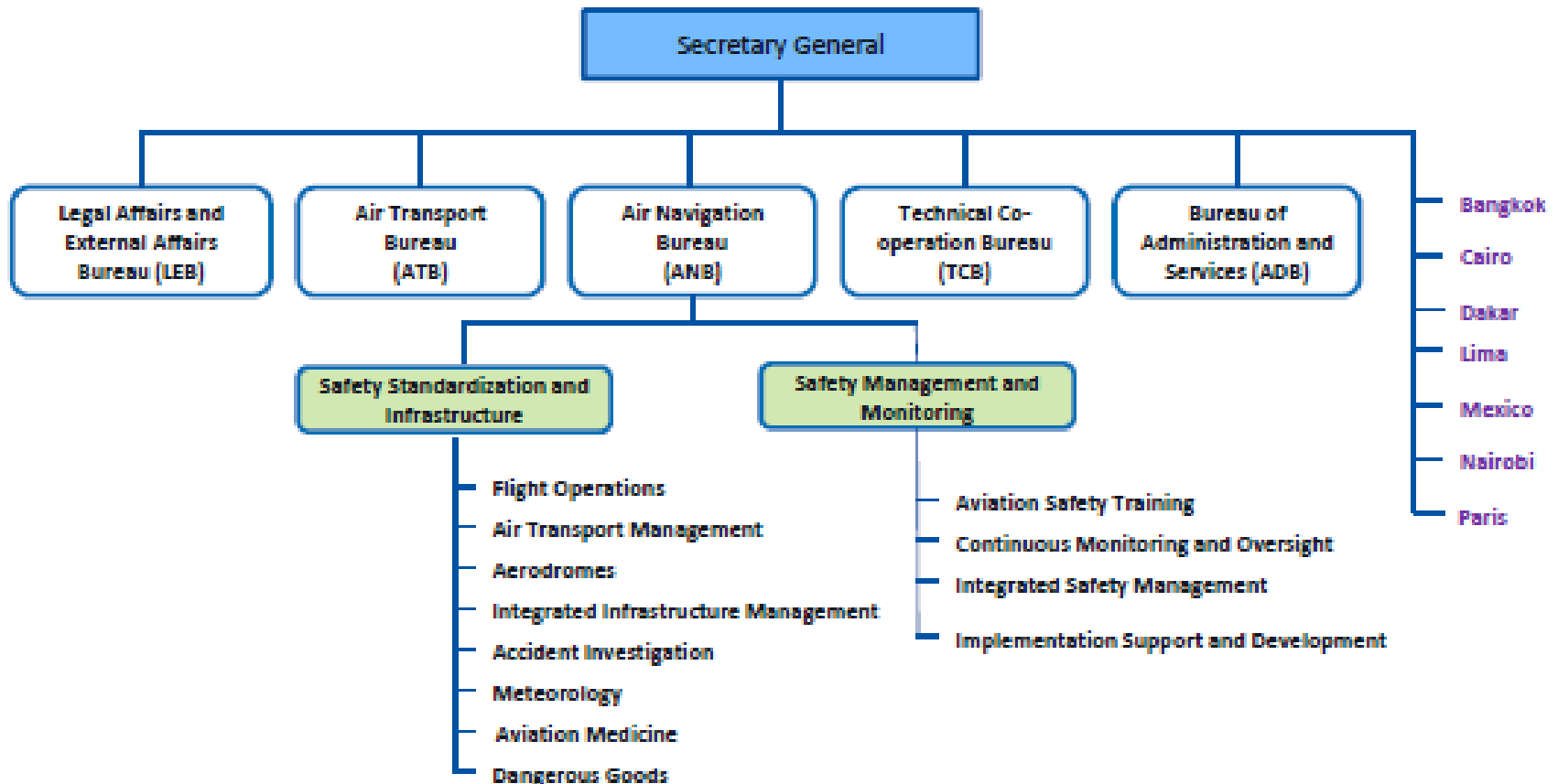


Air Navigation Commission



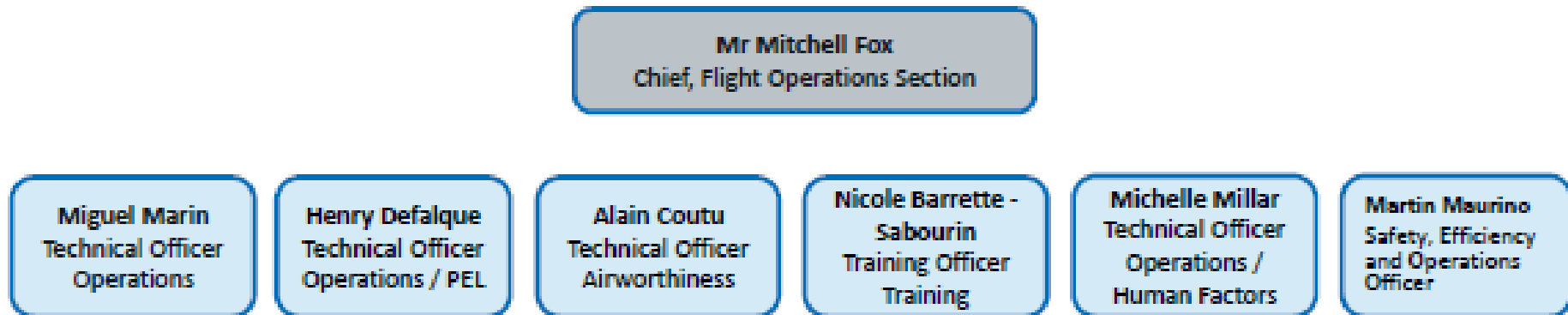


Secretariat Structure





Flight Operations structure



Annex 1 – Personnel Licensing

Annex 6 – Operation of Aircraft

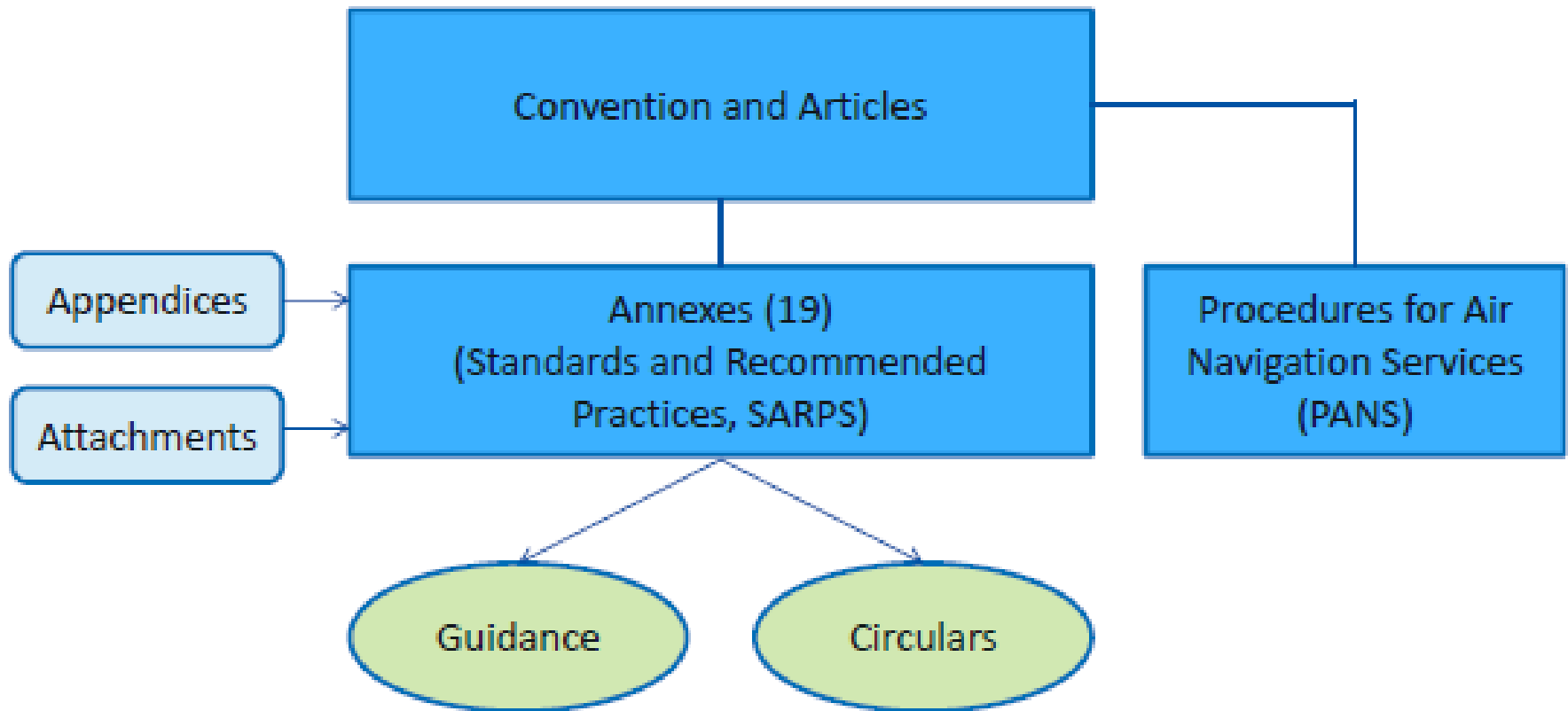
Annex 7 – Aircraft Nationality and Registration Marks

Annex 8 – Airworthiness of Aircraft



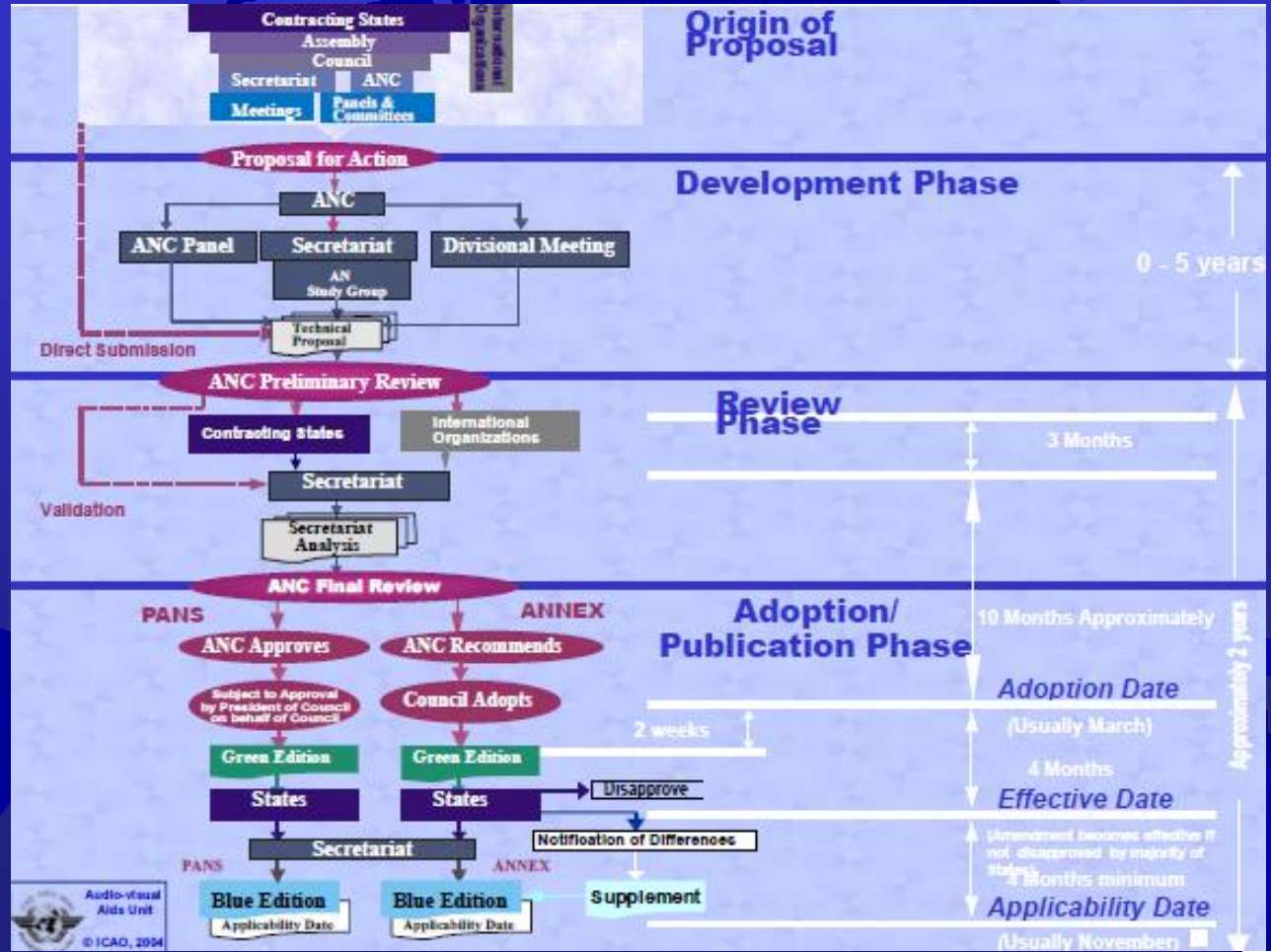
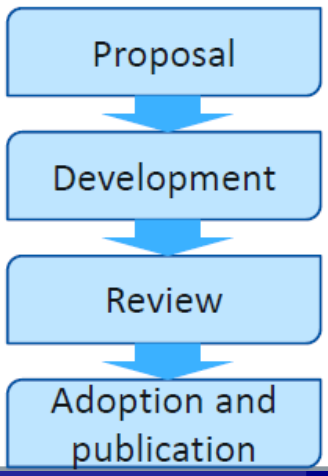


ICAO Documentation structure





Making of a ICAO Standard

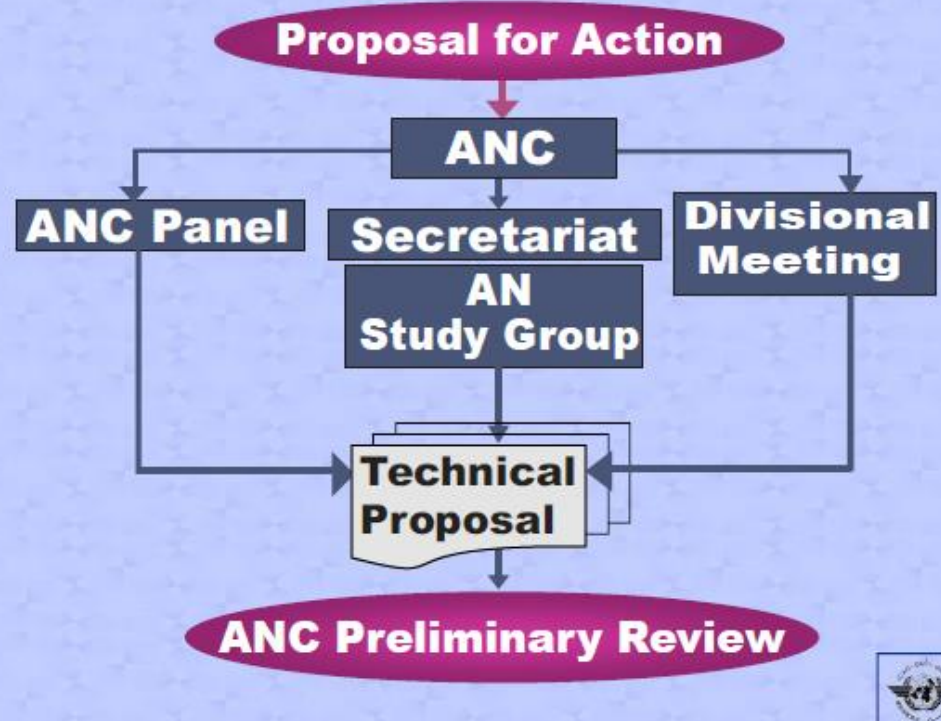




Origin of Proposal



Development Phase





Review Phase

ANC Preliminary Review

Contracting States

International Organizations

Secretariat

Secretariat Analysis

ANC Final Review

Adoption / Publication Phase

ANC Final Review

ANC Recommends

Council Adopts

Green Edition

States

Secretariat

Blue Edition

Applicability Date

Disapprove

Notification of Differences

Supplement

ANNEX

Adoption Date

(Usually March)

4 Months

Effective Date

(Amendment becomes effective if not disapproved by majority of States)

4 Months (minimum)

Applicability Date

(Usually November)

2 weeks

ANNEX



Audio-visual Aids U

1710





Identify, with reference to the ICAO Doc 9760:

- the structure of an Airworthiness Organization and its airworthiness responsibilities
- the roles and responsibilities of the *State of Registry*, *State of the Operator* and *State of Design and Manufacture*





ICAO Doc 9760 AIRWORTHINESS MANUAL



What is Airworthiness/Airworthy?





STANDARD CERTIFICATE OF AIRWORTHINESS ?





AIRWORTHINESS



**INITIAL AIRWORTHINESS
MANAGEMENT OF AIRWORTHINESS**



CONTINUING AIRWORTHINESS – Functions & Responsibilities

State Regulatory Authority³

- File Differences with ICAO – against SARPs
- Issue & Control – Legislation/Regulations/Requirements/Codes of Practice/Acceptable Means of Compliance & Proposed Amendments (NPRM/NPA)⁴
- Issue – Aircraft/Engine Type Certificates (TC) & (TCDS)⁵
- Issue/Revoke – Certificates of Registration, Airworthiness & Export
- Issue Approval – Design (OEM) & MRO Organisations
- Issue – Air Operators Certificates (AOC)/Approve – Operations Manuals
- Approve – Modifications (eg STC – Supplementary Type Certificates)
- Approve – Airworthiness Directives (ADs) & Service Bulletins (SBs)
- Issue – Maintenance Personnel Licences/Approvals (eg DER)⁶
- Issue – Airworthiness mandatory/guidance/procedures (eg AC)⁷
- Approve – Maintenance Programmes
- Approve – Ageing aircraft and systems programmes
- Issue – Requirements – Occurrence Reporting, analysis & Feedback Schemes
- Approve – Engineering Personnel Training (Basic & Type)
- Establish State Occurrence Reporting, Analysis and Feedback Scheme
- Establish – Accident/Incident Investigation Board (eg NTSB, AAIIB)⁸
- Respond – Accident/Incident Investigation Board Recommendations (eg FAA, CAA)
- Auditing/Monitoring – Certification, MRO and AOC standards
- Control – MSG/MRB procedures⁹
- Issue Requirements & Approve – Extended Range Operations (ETOPS)
- Approve – Master Minimum Equipment List (MMEL)/Operator MEL¹¹
- Issue & Control – Authority Internal procedures

ICAO

ICAO

- Definition – Member State responsibilities (Convention 1944)
- Issue – International Standards & Recommended Practices (SARPs)¹
- Issue – Technical Guidance Publications²

STATE REGULATORY AUTHORITY
(an Agency)

CONTINUING AIRWORTHINESS

CERTIFICATED AIR OPERATOR/CARRIER (AOC)

APPROVED CERTIFICATION ORGANISATIONS
Aircraft Related Products & Parts (OEM)

APPROVED MRO

Certificated Air Operator/Carrier (AOC)

- Control – AOC standards (Operations & Maintenance)¹⁰
- Control – Flight Operations Manual
- Issue & control Organisation Technical/Procedures (eg Technical Log)
- Establish & control – Quality Assurance/Auditing procedures
- Establish & control – Maintenance & Training records
- Prepare and control – Minimum Equipment List (MEL)¹¹
- Control – In-service Airworthiness Flight Testing¹²
- Control standards – Extended Range Operations (Ops & Maintenance)
- Establish – Occurrence Reporting/Investigation & Follow-up scheme¹³
- Control – Aircraft/Crew Loading standards
- Training – (Flight Crew/Maintenance)
- Establish – AOC Safety Committee

Approved Certification Organisation – Aircraft Related Products & Parts (OEM)

- Control – Type Certification standards (Design and/or Production)¹⁴
Generic title: Original Equipment Manufacturers (OEM)
- Establish – Airworthiness Office – control Certification Procedures
- Issue & control – Organisation Technical/Procedures
- Prepare & control – Safety Assessments and Analyses¹⁵
- Prepare & control – Flight Manual
- Prepare & control – Type Certificates & Type Certificate Data Sheets
- Control – Certificate of Airworthiness/Modifications Flight Testing
- Prepare & control – Master Minimum Equipment List (MMEL)¹¹
- Prepare & control – Extended Range Operations standards (eg ETOPS)
- Prepare & control – ADs and SBs and STCs
- Establish – Occurrence Reporting/Investigation & Follow-up scheme
- Control – MSG/MRB programmes/development
- Issue – Product Technical Manuals (eg Maintenance/Repair/Parts)
- Issue – Safety & Guidance Information for Products
- Establish & control – Quality Assurance /Auditing procedures

Approved Maintenance, Repair & Overhaul Organisations (MRO)

- Control Maintenance standards (Incl Sub Contractors)
- Control – Maintenance/Reliability Programmes
- Control – Maintenance Planning & Technical Manuals¹⁴
- Control – Additional Maintenance Standards (eg ETOPS)¹⁴
- Issue and control – Authorised Personnel Approvals
- Approval (Specific) – Design of Modifications (Incl STCs)
- Incorporation – ADs and SBs & Approved Modifications (eg STC)¹⁷
- Establish & control – Quality Assurance/Audit programmes
- Certification – Maintenance/Release to Service
- Control – Maintenance Records (Incl Sub Contractors)
- Control – Maintenance Personnel Training & Records
- Establish – Occurrence Reporting/Investigation & Follow-up scheme
- Issue & Control – Organisation Technical/Procedures
- Training – Maintenance Engineer Type/Procedures¹⁸
- Implement – Ageing Aircraft Structural and Systems Programmes

OPERATOR SAFETY REVIEW BOARD