



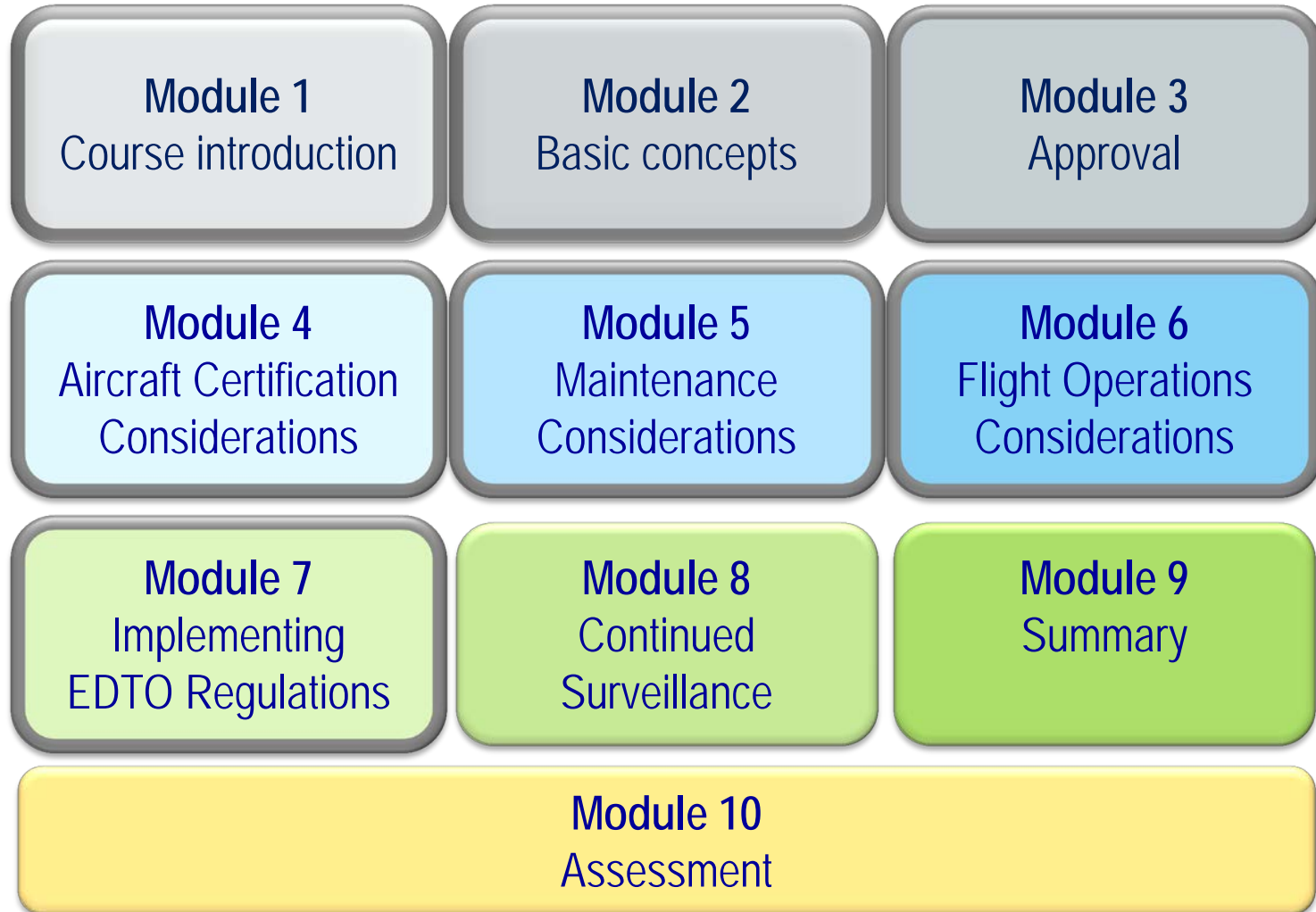
ICAO

UNITING AVIATION

# EDTO Workshop

## Module N° 7 –Implementing EDTO Regulations





- ❖ *At the end of this module, participants will be familiar with the EDTO elements of the SARPs and the evolution of industry Standards*



- ❖ ICAO SARPs
- ❖ Examples of National implementations
- ❖ EDTO Gap analysis check list
- ❖ EDTO resources (e.g. FPFMM, EDTO Manual)

## ❖ ICAO SARPs

### ❖ Example of National and Regional Implementations

- FAA
- LARs
- EASA

### ❖ Implementation job-aid

### ❖ Conclusions



- Initial State Letter circulated in 2008 (SP 59/4-07/47)
  - Many questions from States & Int. Organizations
- EDTO
  - Special Operations Task Force (SOTF)
  - Two meetings over 20 teleconferences
- Fuel
  - OPSP / Fuel SG
  - Three meetings
- Final State Letter Ref. SP 59/4.1-11/8 of June 2011

- **Evolutionary Approach**
  - Evolution based on the original ETOPS concept
  - Separating in ETOPS provisions what applied to all aeroplanes regardless of the number of engines (i.e. Dispatch practices)
- **The Result: a new layout**
  - Operations beyond 60 min to an en-route alternate aerodrome
  - EDTO for all aeroplanes

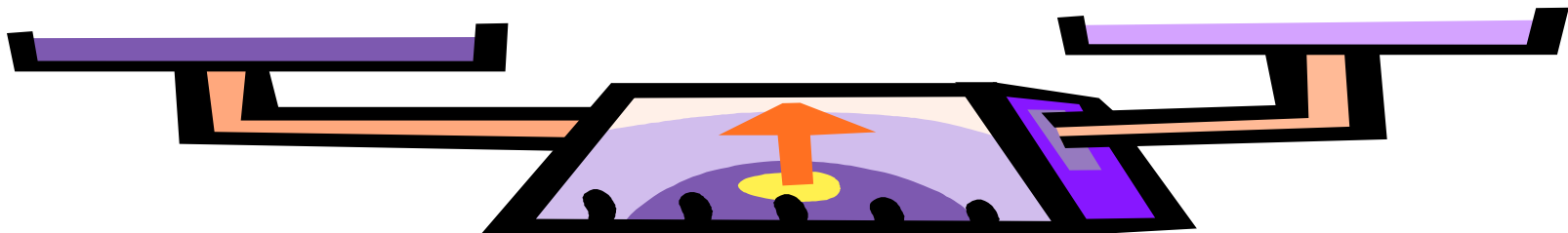
- Develop EDTO SARPs for all aeroplanes
- Maximum Diversion Time needs
- SARPs that supported the aircraft capabilities

### Industry

- Additional constraints supported by:
  - track record
  - operational needs & specificities

### Regulator

- Incorporate ETOPS lessons learned
- New entrants
- Clear & Concise GM





- Requirements for Twins remain the same
- Requirements for Tris and Quads are based on “Industry Best Practices”
  - No change for the vast majority of current long-range operators
- Applies to both Passenger and Cargo aeroplanes

*Operators that operate different to industry best practices may be impacted*

## Annex 6 Part I

- **Most provisions are in § 4.7**

Additional requirements for operations by aeroplanes with turbine engines beyond 60 minutes to an en-route alternate aerodrome including extended diversion time operations (EDTO)

- **Alternate aerodromes**

- **Take-off (§ 4.3.4.1.2, c)**

For aeroplanes engaged in extended diversion time operations (EDTO) where an alternate aerodrome meeting the distance criteria of a) or b) is not available, **the first available** alternate aerodrome located within the distance of the operator's approved maximum diversion time considering the actual take-off mass.

- **En-route (§ 4.3.4.2)**

En-route alternate aerodromes, required by 4.7 for extended diversion time operations by aeroplanes with **two** turbine engines, shall be selected and specified in the operational and air traffic services (ATS) flight plans.

## Annex 6 Part I

- **EDTO critical fuel (§ 4.3.6.3, f) 2)**

allow an aeroplane engaged in EDTO to comply with the EDTO critical fuel scenario as established by the State of the Operator

- **Attachment D.**

Guidance for operations by turbine-engined aeroplanes beyond 60 minutes to an alternate aerodrome including extended diversion time operations (EDTO)

- **Other mentions of EDTO**

- Appendix 2 - Organization and contents of an operations manual
- Appendix 6. Air Operator Certificate (AOC)
  - Operations Specifications



***Alternate aerodrome.*** An aerodrome to which an aircraft may proceed when it becomes either impossible or inadvisable to proceed to or to land at the aerodrome of intended landing where the necessary services and facilities are available, where aircraft performance requirements can be met and which is operational at the expected time of use. Alternate aerodromes include the following:

***Take-off alternate.*** An alternate aerodrome at which an aircraft would be able to land should this become necessary shortly after take-off and it is not possible to use the aerodrome of departure.

***En-route alternate.*** An alternate aerodrome at which an aircraft would be able to land in the event that a diversion becomes necessary while en route.

***Destination alternate.*** An alternate aerodrome at which an aircraft would be able to land should it become either impossible or inadvisable to land at the aerodrome of intended landing.

*Note.— The aerodrome from which a flight departs may also be an en-route or a destination alternate aerodrome for that flight.*



**Alternate aerodrome.** An aerodrome to which an aircraft may proceed when it becomes either impossible or inadvisable to proceed to or to land at the aerodrome of intended landing where the necessary services and facilities are available, where aircraft performance requirements can be met and **which is operational at the expected time of use**. Alternate aerodromes include the following:

**Take-off alternate.** An alternate aerodrome at which an aircraft would be able to land should this become necessary shortly after take-off and it is not possible to use the aerodrome of departure.

**En-route alternate.** An alternate aerodrome at which an aircraft would be able to land in the event that a diversion becomes necessary while en route.

**Destination alternate.** An alternate aerodrome at which an aircraft would be able to land should it become either impossible or inadvisable to land at the aerodrome of intended landing.

*Note.— The aerodrome from which a flight departs may also be an en-route or a destination alternate aerodrome for that flight.*

**The alternate aerodrome definition incorporates criteria for an adequate aerodrome and its "suitability" for designation at dispatch**



- A take-off alternate aerodrome is required if the aerodrome is **below landing minima** for the operator or if it would **not be possible to return** for other reasons.
- Twins
  - one hour of flight time at a one-engine-inoperative cruising speed\*
- Tris and Quads
  - two hours of flight time at an all engines operating cruising speed\*

\* calculated in ISA and still-air conditions using the actual take-off mass



- For aeroplanes **engaged** in extended diversion time operations (EDTO)
  - the first available alternate aerodrome located within the distance of the operator's approved maximum diversion time\*
- Engaged in EDTO operations implies
  - the aircraft is EDTO capable,
  - the operator is EDTO approved; and
  - all EDTO maintenance and dispatch requirements have been met.
- Operators can use this in non-EDTO flights as long as above EDTO criteria are met

\* Considering the actual take-off mass



- Developed based on Industry best practices
- They include
  - Updated/addition definitions
    - EDTO Critical Fuel
    - Isolated Aerodrome
    - Point of no Return
  - Reinstates and expanded upon previous isolated aerodrome
  - Fuel advisory and emergency broadcasts
  - Performance-based provisions
    - Fuel planning
    - Alternate aerodrome selection criteria
  - Flight Planning and Fuel Management Manual (FPFMM)



- Aerodrome estimated time of use
  - Established by the operator
  - Approved by the State of the operator
- In-flight fuel checks and fuel management
- *One final reserve fuel value for each aeroplane type and variant in their fleet*
- Final reserve concept applied across all Parts of Annex 6.
  - Part II & III applicable Nov 2014



- Provisions for both pilots (Annex 6) and air traffic controllers (PANS-ATM)
- Standard phraseology
  - MAYDAY MAYDAY MAYDAY *fuel*
    - **Nearest** aerodrome where a safe landing can be made
  - MINIMUM FUEL
    - Aerodrome of **intended landing**
  - Key word to clearly describe the problem
    - “free speech” to focus on solutions



- **Taxi**
  - pre takeoff fuel
- **Trip**
  - departure to destination fuel
- **Contingency**
  - compensate for unforeseen factors
- **Destination alternate**
  - missed approach
  - proceed to alternate aerodrome
  - no destination alternate



- **Isolated aerodrome**
  - Reciprocating
  - Turbine
- **Final reserve**
  - Reciprocating – 45 min
  - Turbine – 30 min
  - Minimum fuel upon landing at any aerodrome

- **Additional**

supplementary to proceed to an en-route alternate aerodrome in the event of:

- Engine failure
- Loss of pressurization
- EDTO Critical fuel

- **Discretionary**

extra fuel at PIC discretion

- **Additional**

supplementary to proceed to an en-route alternate aerodrome in the event of:

- Engine failure
- Loss of pressurization
- **EDTO Critical fuel**

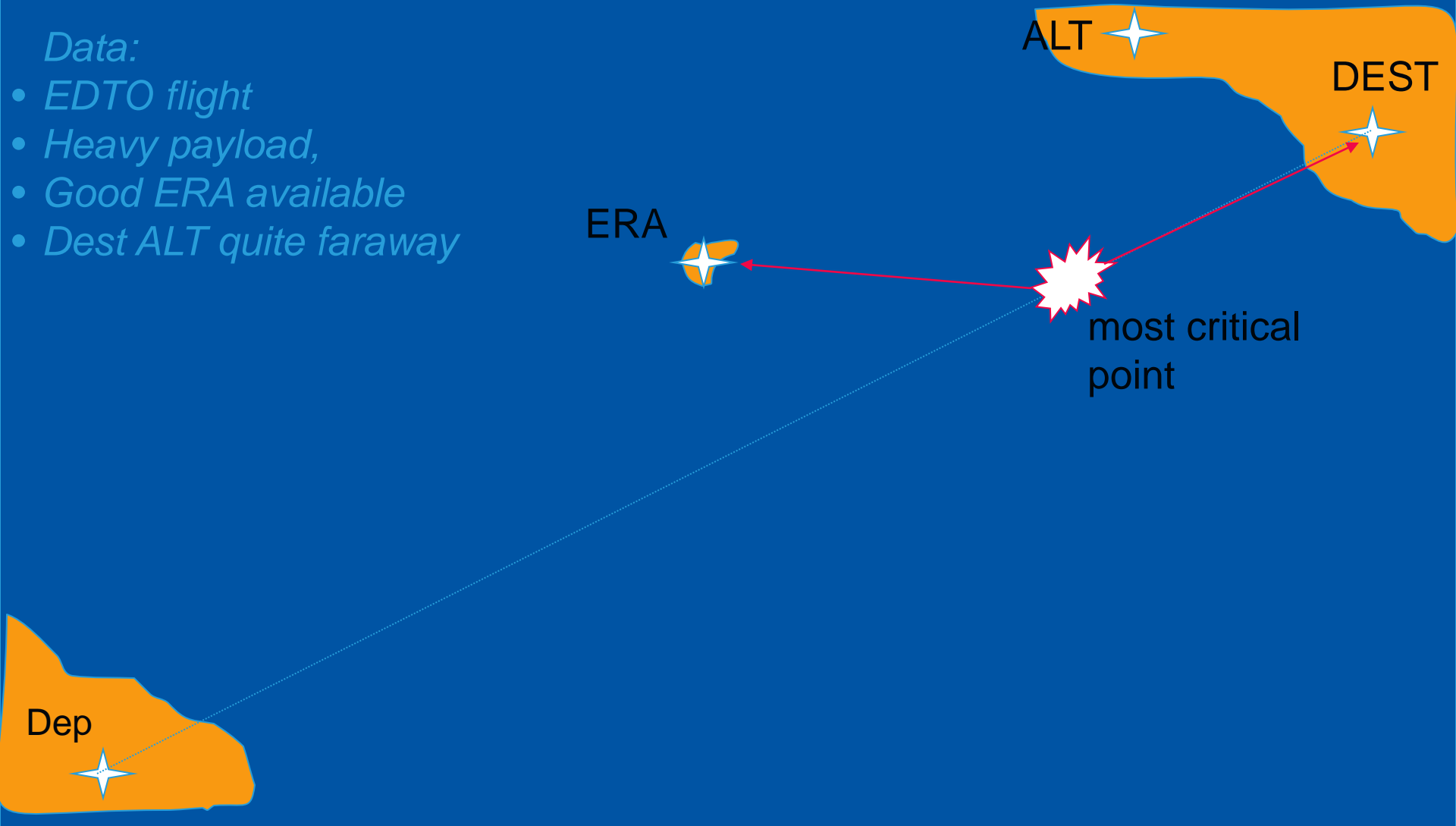
- **Discretionary**

extra fuel at PIC discretion

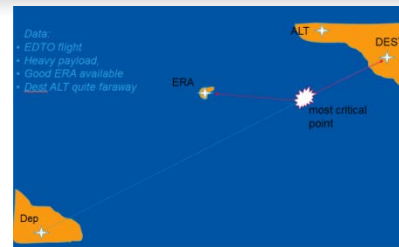


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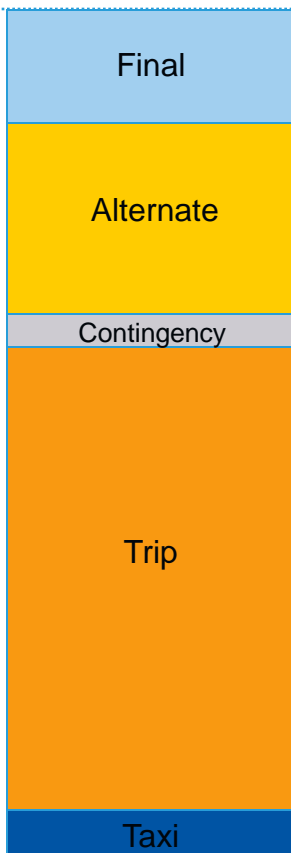
- EDTO flight
- Heavy payload,
- Good ERA available
- Dest ALT quite faraway



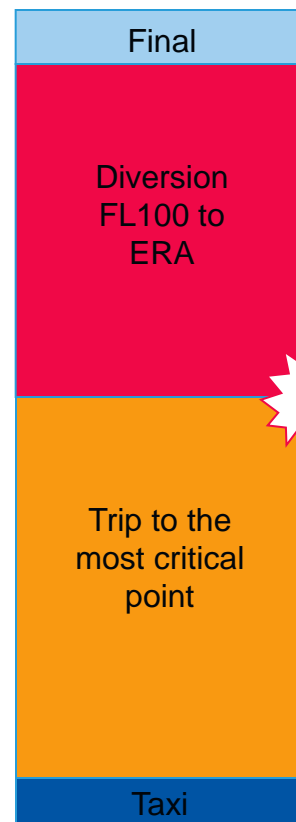
### No need for additional fuel



« Normal » FUEL CALCULATION



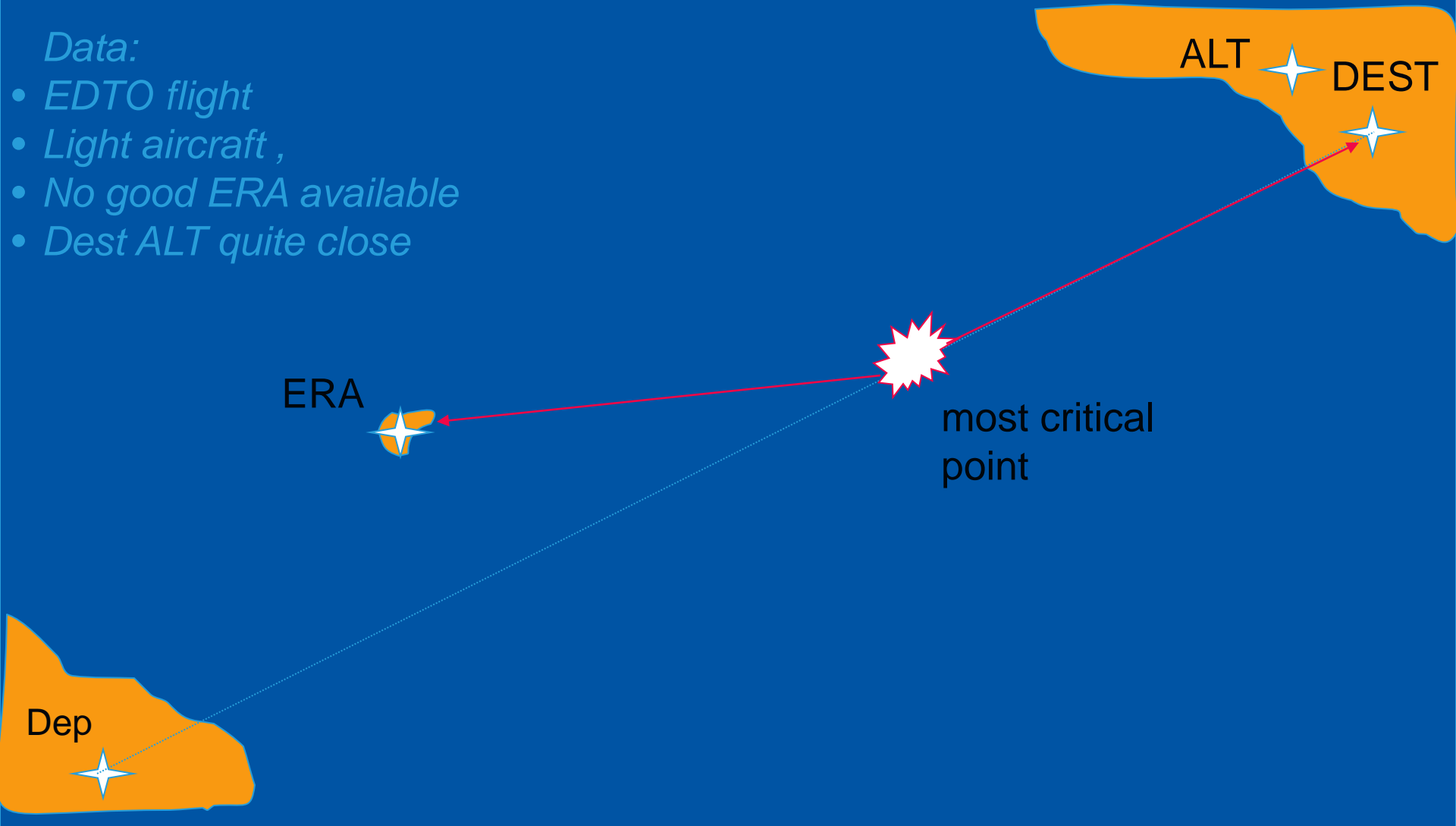
Additional FUEL CALCULATION

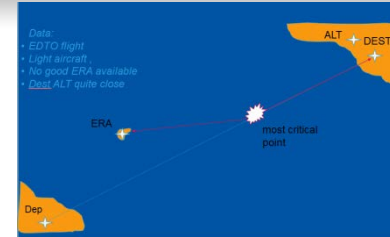




*Data:*

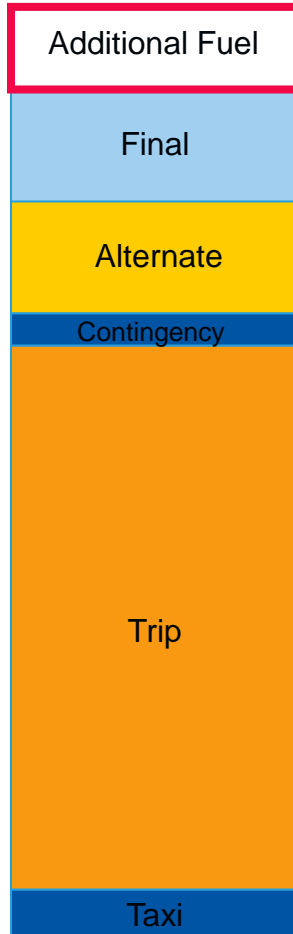
- *EDTO flight*
- *Light aircraft ,*
- *No good ERA available*
- *Dest ALT quite close*





### Additional fuel required

« Normal » FUEL CALCULATION



Additional FUEL CALCULATION





- **Annex 6 Part II**
  - New Section 3.4.3.7\* Additional requirements for operations beyond 60 minutes to an en-route alternate aerodrome
- **Annex 8 – generic not specific**
  - Part IIIA, Chapter 1, Operating limitations
- **Airworthiness Manual (Doc 9760)**
- **Flight Planning and Fuel Management Manual (Doc 9976)**
- **EDTO Manual (under development)**

\* Amendment 33 adopted in March 2014 Applicable November 2014

## ❖ ICAO SARPs

### ❖ Example of National and Regional Implementations

- LARs
- FAA
- EASA

### ❖ Implementation job-aid

### ❖ Conclusions

## The SRVSOP Latin American Aeronautical Regulations (LARs)



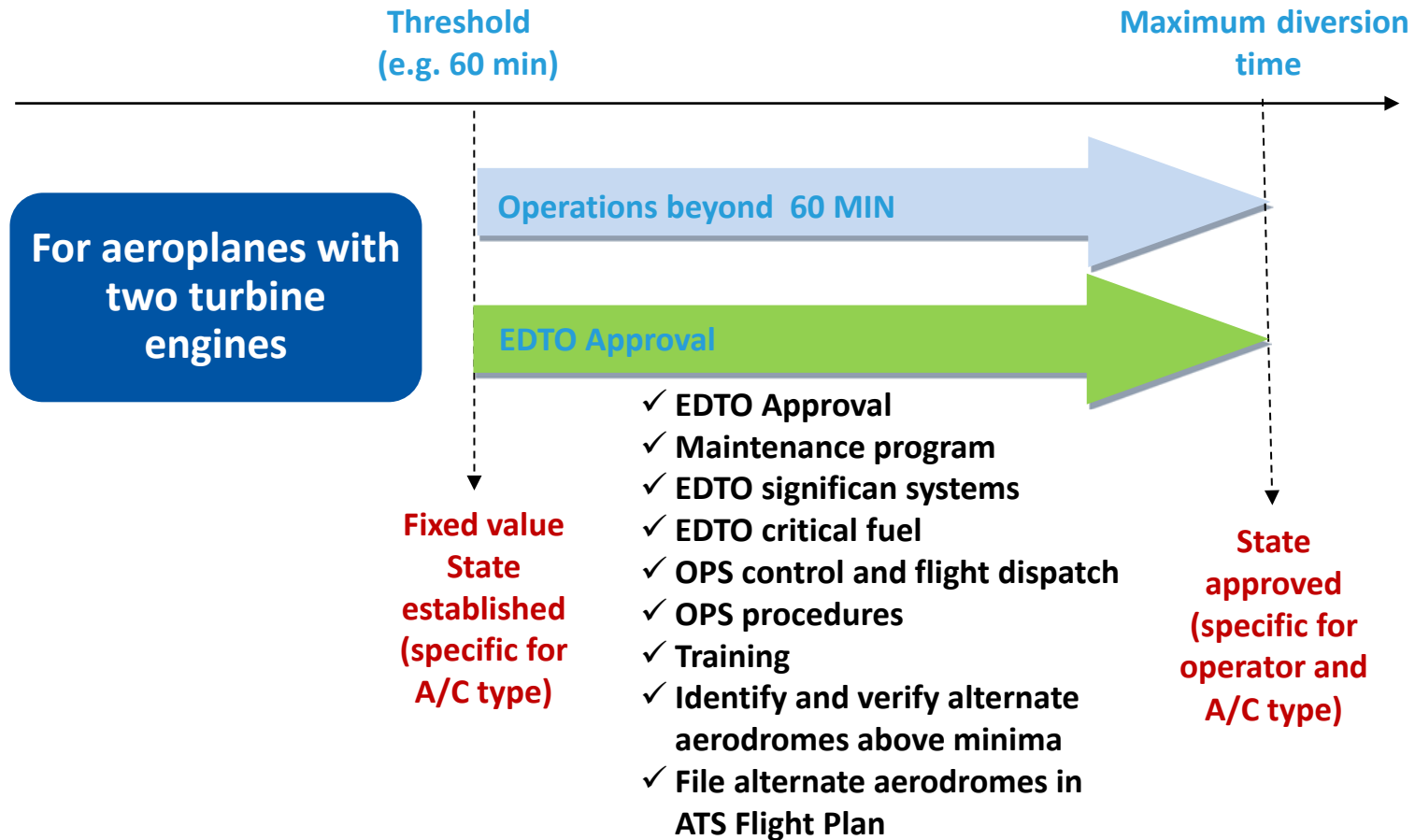
SRVSOP: Regional Safety Oversight Cooperation System

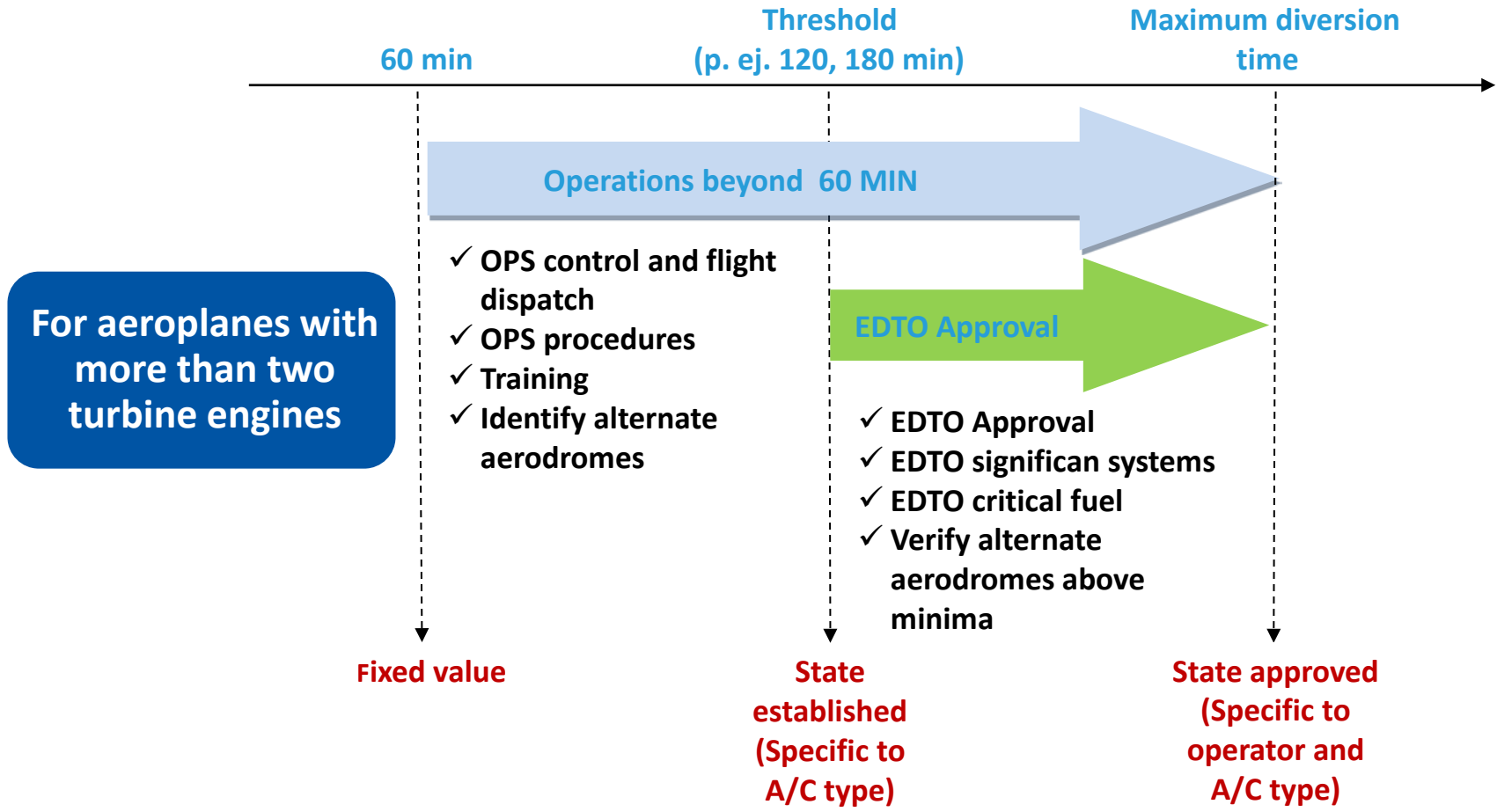


<p>Sistema Regional de Cooperación para la Vigilancia de la Seguridad Operacional</p> <p><b>Reglamento Aeronáutico Latinoamericano</b></p> <p><b>LAR 121</b> Requisitos de operación: Operaciones domésticas e internacionales regulares y no regulares</p> <p>ENMIENDA 4 Enero 2014</p>	<p>Regional RLA/99/901 Reglamento Aeronáutico Latinoamericano</p> <p><b>LAR 135</b> Requisitos de operación: Operaciones internacionales regulares y no regulares</p> <p>ENMIENDA 4 Enero 2014</p>
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## Requirements for:

- ❖ Operations by turbine engine aeroplanes beyond 60 minutes to an en-route alternate aerodrome; and
- ❖ EDTO operations for aeroplanes with:
  - two (2) turbine engines; and
  - with more than two turbine engines





## ❖ EDTO alternate aerodromes

- Enough EDTO alternate aerodromes
- Remain within the maximum EDTO diversion time
- consider all the adequate aerodromes
- Alternate minimums specified in the operator's OpSpecs

## ❖ Weather minima for EDTO alternate aerodromes

- At or above weather minima specified in the operator's OpSpecs



- ❖ Original dispatch or flight release, re-dispatch or amendment of dispatch or flight release
  - Beyond EDTO entry point
    - ✓ Alternates aerodromes at or above weather minima
    - ✓ Review all alternate aerodromes within EDTO maximum diversion time
    - ✓ Amend the dispatch or flight release to include other alternates

## ❖ Considering time-limited systems in planning EDTO alternates

- For operations up to and including 180'
- For operations beyond 180'



OPERATIONS SPECIFICATIONS (subject to the approved conditions in the operations manual)				
ISSUING AUTHORITY CONTACT DETAILS <sup>1</sup>				
Telephone: _____ Fax: _____ E-mail: _____				
AOC# <sup>2</sup> : _____ Operator name <sup>3</sup> : _____ Date <sup>4</sup> : _____ Signature: _____				
Dba trading name: _____				
Aircraft model <sup>5</sup> : _____				
Types of operation: Commercial air transportation <input type="checkbox"/> Passengers <input type="checkbox"/> Cargo <input type="checkbox"/> Other <sup>6</sup> : _____				
Area(s) of operation <sup>7</sup> : _____				
Special limitations <sup>8</sup> : _____				
SPECIAL AUTHORIZATIONS	YES	NO	SPECIFIC APPROVALS <sup>9</sup>	REMARKS
Dangerous goods	<input type="checkbox"/>	<input type="checkbox"/>		
Low visibility operations				
Approach and landing	<input type="checkbox"/>	<input type="checkbox"/>	CAT <sup>10</sup> : _____ RVR: _____ m DH: _____ ft	
Take-off	<input type="checkbox"/>	<input type="checkbox"/>	RVR <sup>11</sup> : _____ m	
RVSM <sup>12</sup> <input type="checkbox"/> N/A	<input type="checkbox"/>	<input type="checkbox"/>		
EDTO <sup>13</sup> <input type="checkbox"/> N/A	<input type="checkbox"/>	<input type="checkbox"/>	Threshold time <sup>14</sup> : _____ minutes Maximum diversion time <sup>14</sup> : _____ minutes	
Navigation specifications for PBN operations <sup>15</sup>	<input type="checkbox"/>	<input type="checkbox"/>		<sup>16</sup>
Continuing airworthiness	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<sup>17</sup>	
Other <sup>18</sup>	<input type="checkbox"/>	<input type="checkbox"/>		



- LARs provide the basic framework
- States should establish a Threshold Time for twins and more than two engine a/c
  - Is not intended to be area, operator or aeroplane type specific.
  - A baseline threshold time should be determined (e.g. 60 min for twins and 180 min for more than two engine a/c)
  - The ICAO SARPs allow flexibility to accommodate variations from the baseline for specific situations (e.g. domestic specificities, established operations)
- States should determine the criteria for approving Maximum Diversion Time
  - Assessment of the Operator's EDTO programme compliance
  - Criteria for specific diversion times
  - Area of operation
  - EDTO capabilities of the Operator's fleet
- SRVSOP will develop guidance for Latin American States



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# Examples of national and regional

United States





## *Prompted by 207-Minute EDTO Public Comments*

- Industry Aviation Rulemaking Advisory Committee (ARAC) chartered by FAA to:
  - Review existing EDTO policies and requirements
  - Develop comprehensive EDTO airworthiness standards for 14 CFR Parts 25, 33, 121 and 135
  - Develop EDTO requirements for operations in excess of 180 minutes up to whatever extend may be justified
  - Develop standardized requirements for extended range operations for all airplanes, regardless of number of engines.



## *Preclude and Protect*

- Preclude - Avoid diversions:
  - Enhanced airplane/engine design standards
  - Enhanced airline maintenance practices
- Protect - Ensure that diversions are safe
  - Enhanced airplane/engine design standards
  - Enhanced airline dispatch planning
  - Enhanced crew training and awareness





## *Diverse International Group of Industry Experts*

### Airlines

#### **U.S.**

American Airlines, American Trans Air, Continental Airlines, Delta Air Lines, Northwest Airlines, United Airlines, UPS, US Airways

#### **Non-U.S.**

ANA, British Airways, KLM, and SAS representing Association of European Airlines (AEA)

### Associations

European Association of Aerospace Industries (AECMA), General Aviation Manufacturers Association (GAMA) International Civil Aviation Organization (ICAO), National Business Aviation Association (NBAA), Air Transport Association (ATA), National Air Transportation Association (NATA) National Air Carriers Association (NACA), International Federation of Air Line Dispatchers' Associations (IFALDA)

### Manufacturers

#### **Airframe:**

Airbus, Boeing, Bombardier, Cessna Gulfstream

#### **Engine:**

General Electric, Pratt & Whitney, Rolls-Royce

### Pilots' Associations

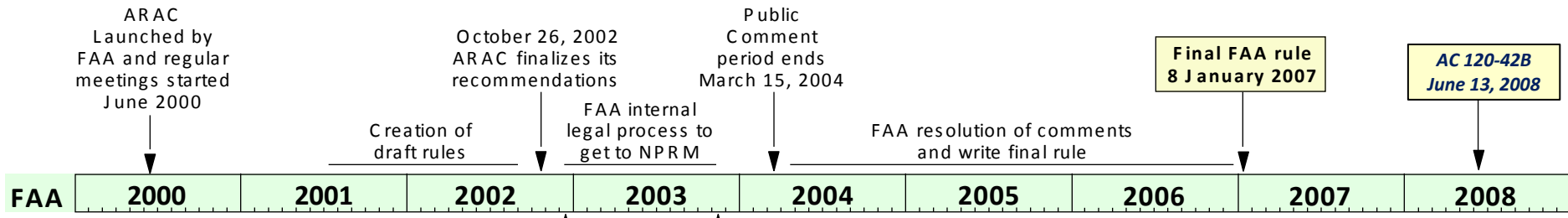
Air Line Pilots Association (ALPA), Independent Association of Continental Pilots (recently merged with ALPA), Allied Pilots Association (APA), Coalition of Airline Pilots Associations (CAPA), International Federation of Air Line Pilots' Associations (IFALPA)

### Regulators

U.S. Federal Aviation Administration (FAA), Transport Canada, Joint Aviation Authorities (JAA) of Europe represented by the UK Civil Aviation Authority (CAA) and DGAC France, CASA Australia

### Other Participants

Air Crash Victims Families Association (ACVFA)



Public comment period ends March 15, 2004

August 2004 First FAA prediction of final publication date (April 29, 2005)

January 2006 FAA signs off rule and sends to Department of Transportation

DOT sent signed rule to OMB on 29 August 2006. Final publication predicted in December 2006



Predicted final publication dates

- April 29, 2005
- June 10, 2005
- Sept. 13, 2005
- Oct. 17, 2005
- Dec. 6, 2005
- Feb. 5, 2006
- Feb. 14, 2006
- May 15, 2006
- May 30, 2006
- June 26, 2006
- Aug. 24, 2006
- Oct. 5, 2006
- Dec. 4, 2007
- Jan. 4, 2007
- Jan. 8, 2007

**FAA released new rule on 8 January 2007**



## *EDTO = Extended Operations*

- EDTO type design and operational standards codified into FARs
  - AC 120-42B provides expanded operational guidance
  - Previous AC and Policy Letters suspended
- Early EDTO Type Design Approval up to system design limit
- EDTO for passenger airplanes with more than two engines
- Operational requirements for legacy and extended diversion times
  - 75, 90, 120, 138, 180, 207, **240 and beyond 240 minutes** (*twins*)
  - **Beyond 180 minutes** (*tris/quads*)
- Accelerated EDTO Operational Method Formalized (*AC 120-42B*)
- Polar ops included in operational rules and guidance



**FAR 25.1535**

**Appendix K**

**K25.1 Design Requirements**

**Comply with Part 25 considering EDTO**

**K25.2 Two-Engine Airplanes**

**K25.2.1 Service Experience Method**

**K25.2.2 Early EDTO**

**K25.3 Airplanes with more than two engines**

**K25.3.1 Service Experience Method**

**K25.3.2 Early EDTO**



- K25.2.2(a) Relevant Experience \***
- K25.2.2(b) Propulsion Design**
- K25.2.2(c) Maintenance and Operations Validation \***
- K25.2.2(d) Propulsion 3000 Cycle Ground Test**
- K25.2.2(e) New Technology Testing \***
- K25.2.2(f) APU 3000 Cycle Ground Test \***
- K25.2.2(g) Airplane Demonstration Flight Test \***
- K25.2.2(h) Problem Tracking and Resolution \***
- K25.2.2(i) Acceptance Criteria (Type and Frequency of Problems)**

**\* Also applicable to K25.3.2**



## 14 CFR Part 121

Definitions	121.7
Passenger Protection and Recovery*	121.97, 121.135, 121.415
Communication facilities*	121.99, 121.122
Rescue and fire fighting service*	121.106
Airplane limitations: Type of route	121.161
EDTO type design approval basis	121.162
EDTO maintenance program (2 engine):	121.374
EDTO Alternate Airports	121.624, 121.625, 121.631
Engine Inoperative: Landing; reporting	121.565
Time limited systems*	121.631
En-route fuel supply	121.646
Dispatch/flight release	121.687, 121.689
Appendix P, Section I:	EDTO Approval: Airplanes with two engines*
Section II:	EDTO Approval: Passenger airplanes with more than two engines
Section III:	Polar Operations Approval

\* Specific provisions included for twin EDTO beyond 180 minutes



- Chapter 1: General**
- Chapter 2: Background on EDTO**
- Chapter 3: Requirements for EDTO Authorization**
- EDTO Maintenance Requirements (*Two Engine EDTO*)
  - EDTO Flight Operations Requirements
- Chapter 4: Applications to Conduct EDTO**
- Chapter 5: FAA EDTO Approval**
- Chapter 6: Polar Operations**
- Appendix 1: Definitions**
- Appendix 2: EDTO Approvals**
- Appendix 3: EDTO Approval Methods**
- Service Experience Method (*Two Engine Airplanes*)
  - Accelerated Method



## Advisory Circular

**Subject:** Extended Operations (ETOPS and Polar Operations)

**Date:** 6/13/08

**AC No:** 120-42B

**Initiated by:** AFS-220

**Change:**

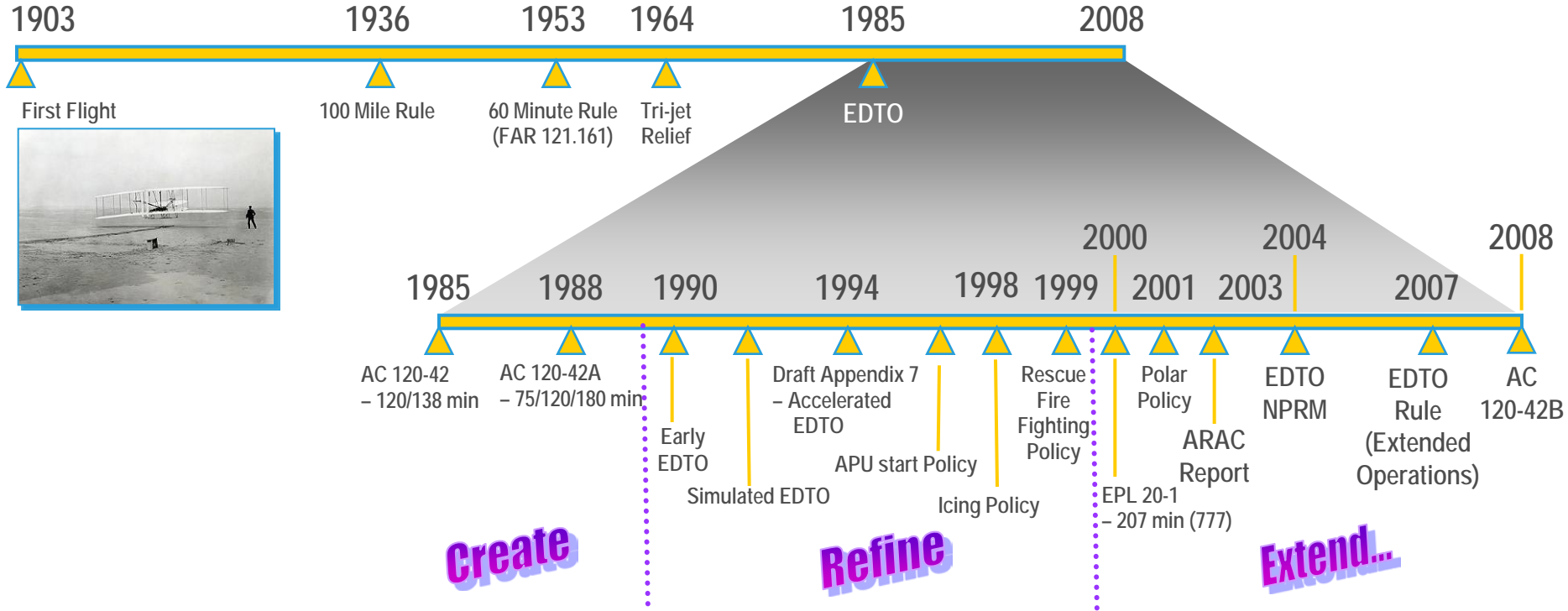


- FAR Part 121, Appendix P  
*Requirements for EDTO and Polar Operations*
  - Operational approval criteria for all airplanes (twins, tris, quads)
  - Specific considerations for each diversion time  
75, 90, 120, 138\*, 180, 207\*, 240 (north)\*, 240 (south), beyond 240
- Advisory Circular (AC) 120-42B
  - Chapter 3: Requirements for EDTO Authorization
  - Chapter 4: Applications to Conduct EDTO
  - Chapter 5: FAA EDTO Approval
  - Chapter 6: Polar Operations
  - Appendix 2: EDTO Approvals
  - Appendix 3: EDTO Approval Methods

*\* Applied on a flight by flight exception basis*



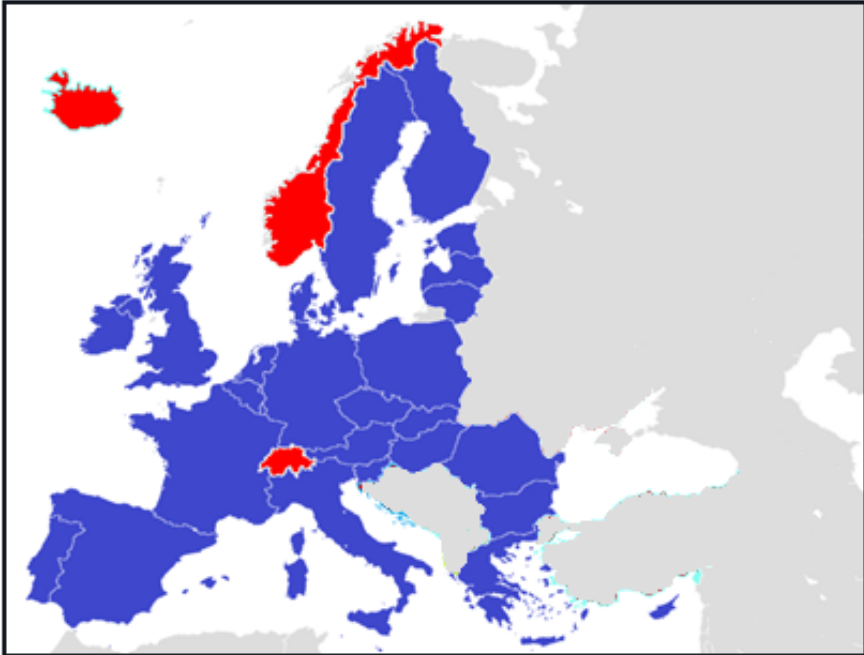
## Preclude and Protect






**European Aviation Safety Agency**
  
**EASA**

- |   |  |
|---|--|
|  <b>Austria</b>        |  <b>Lithuania</b>   |
|  <b>Belgium</b>        |  <b>Luxembourg</b>  |
|  <b>Bulgaria</b>       |  <b>Malta</b>       |
|  <b>Croatia</b>        |  <b>Netherlands</b> |
|  <b>Cyprus</b>         |  <b>Poland</b>      |
|  <b>Czech Republic</b> |  <b>Portugal</b>    |
|  <b>Denmark</b>        |  <b>Romania</b>     |
|  <b>Estonia</b>        |  <b>Slovakia</b>    |
|  <b>Finland</b>        |  <b>Slovenia</b>    |
|  <b>France</b>         |  <b>Spain</b>       |
|  <b>Germany</b>        |  <b>Sweden</b>     |
|  <b>Greece</b>        |  |
|  <b>Hungary</b>      |  |
|  <b>Italy</b>        |  |
|  <b>Ireland</b>      |  |
|  <b>Latvia</b>       |  |



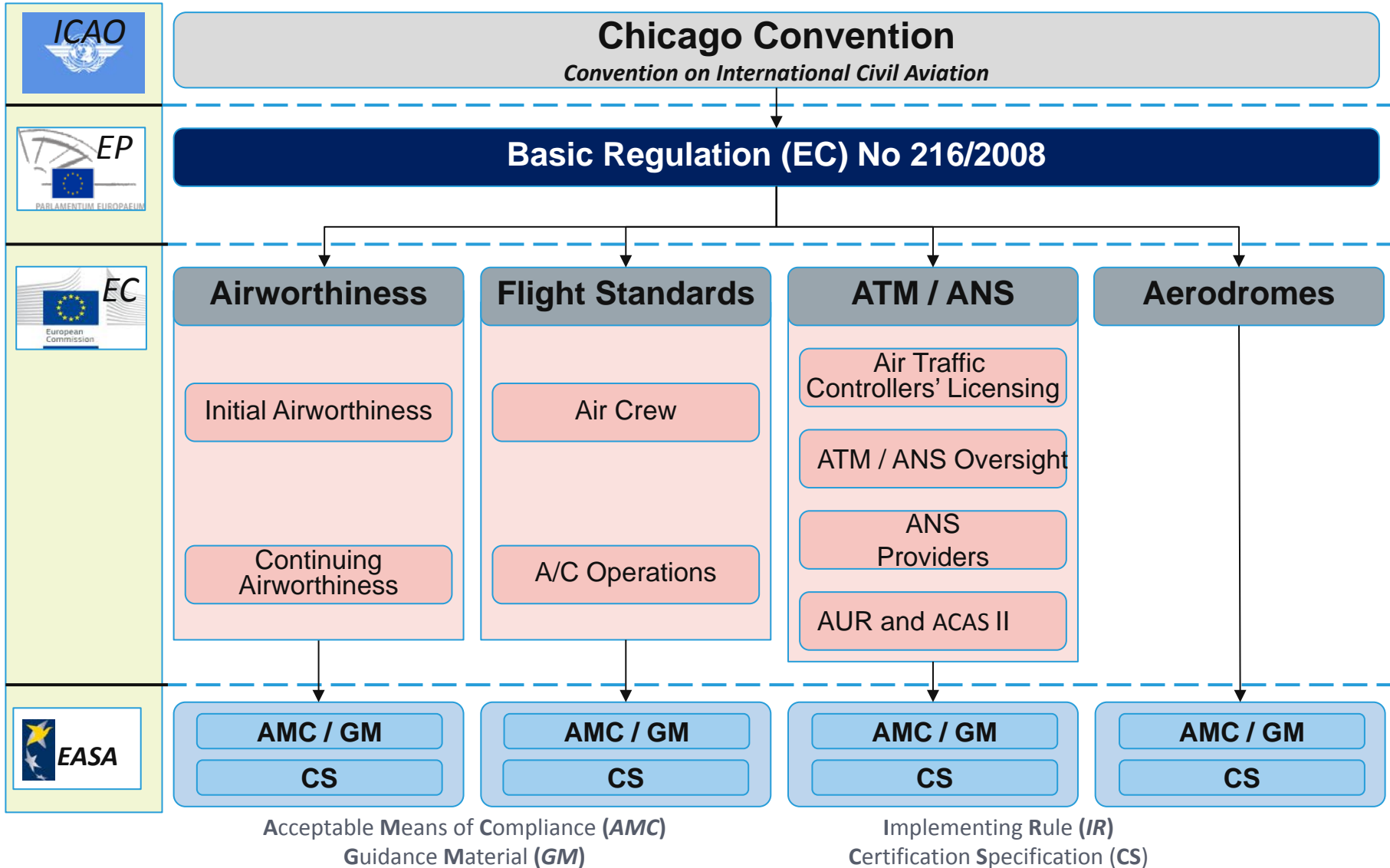
- |  |  |
|--|--|
|  <b>UK</b>            |  <b>Norway</b>      |
|  <b>Iceland</b>       |  <b>Switzerland</b> |
|  <b>Liechtenstein</b> |  |

Blue: EASA Member and EU Member  
 Red: EASA Member but not EU Member



## *European Aviation Safety Agency EASA*

- Formally established in September 2002
  - Basic EU Regulation
- Agency active since September 28, 2003
  - Headquarters: Cologne (Germany)
- EASA has gradually superseded JAA and a proportion of activities and responsibilities of European National Aviation Authorities
  - Uniform rules and implementation in all EU Member States





**Council Regulations**  
Binding by law








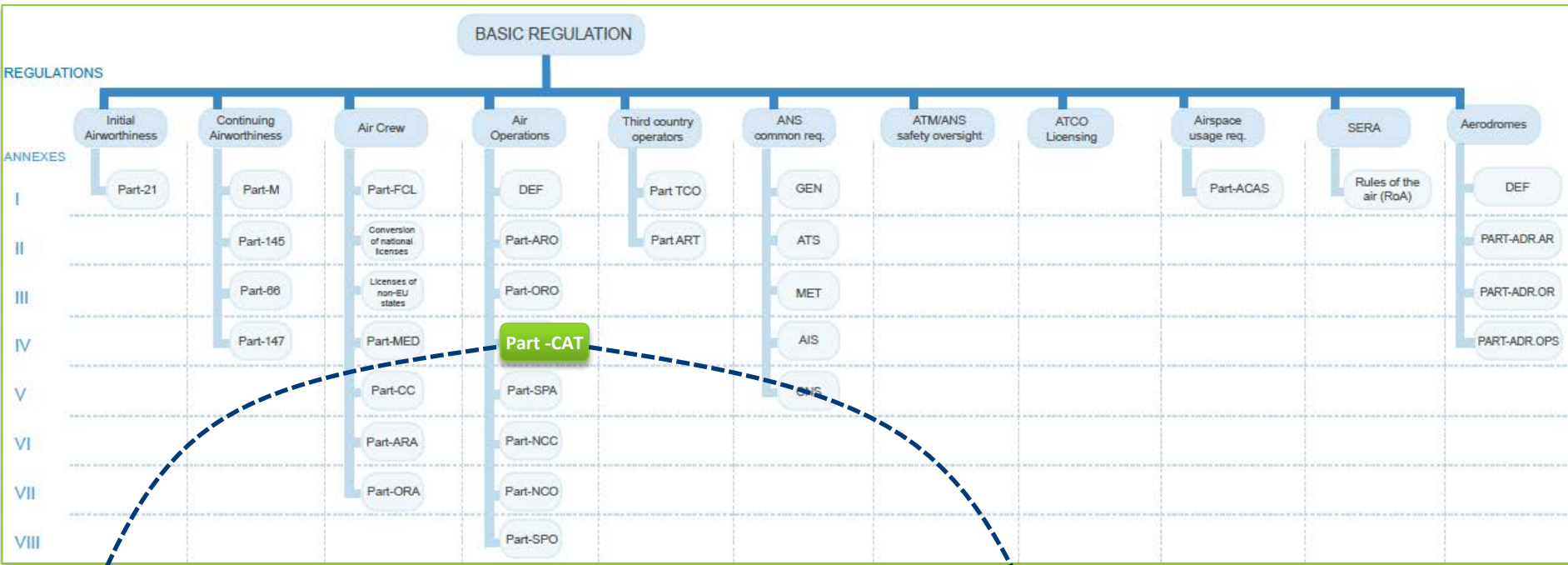
**Commission Regulations**  
Binding by law



**EASA Decisions**  
*Standard means to show compliance with EC Regulations*

### EASA & National Authorities (EU Member States) Role Sharing

	ACTIVITY	RULEMAKING	ISSUANCE OF APPROVALS & SUPERVISION
	Aircraft Design	EASA	EASA
	Production	EASA	NAA (EASA for Airbus POA)
	Maintenance	EASA	NAA (EASA for Airbus MOA)
	Operations & Licensing	EASA	NAA
	ATC & Airports	EASA	NAA



**CAT.OP.MPA.140** Maximum distance from an adequate aerodrome for two-engined aeroplanes without an ETOPS approval

**CAT.OP.MPA.180** Selection of aerodromes — aeroplanes

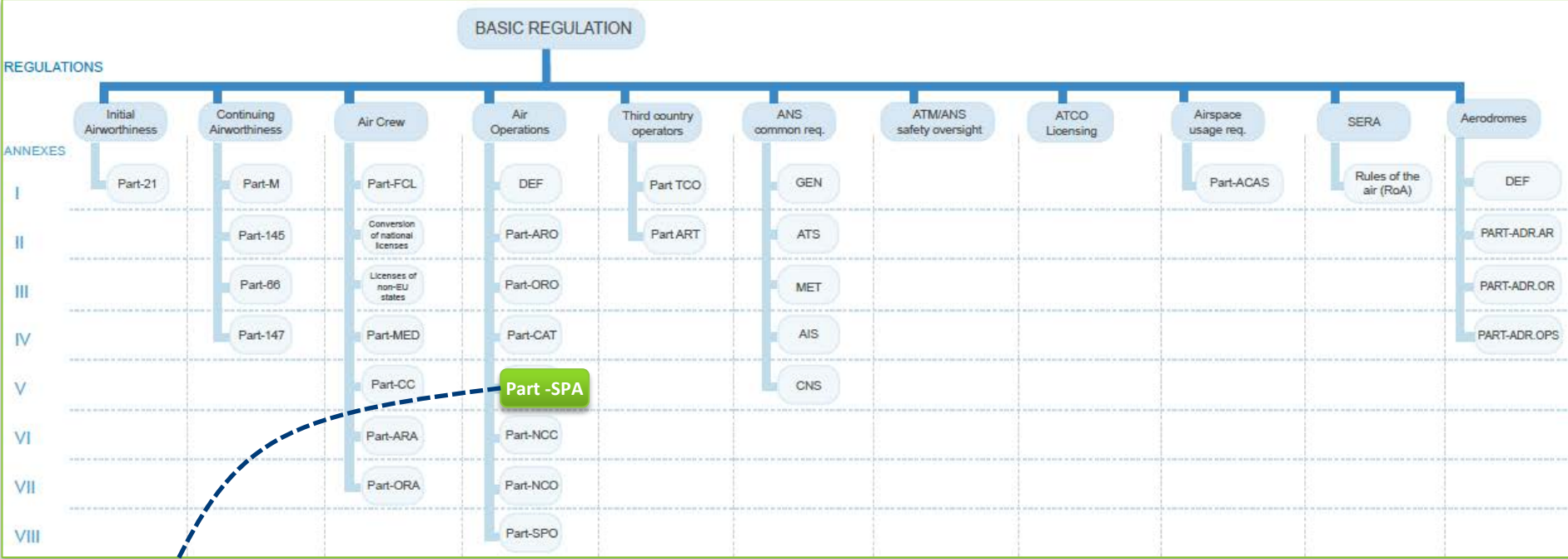
- *Applicable to twins only*
- *Sets the maximum distance for non-EDTO ops*
- *Defines OEI speed*
- *Refers to Annex V (Part-SPA), Subpart F, for EDTO operational approval*
- *Selection of take-off alternates for EDTO aeroplanes*



**SUBPART F**

**EXTENDED RANGE OPERATIONS WITH TWO-ENGINE AEROPLANES (ETOPS)**

- SPA.ETOPS.100 ETOPS : sets requirement for EDTO operational approval
- SPA.ETOPS.105 ETOPS operational approval : defines main criteria for EDTO operational approval
- SPA.ETOPS.110 ETOPS en-route alternate aerodrome : sets criteria for designated EDTO ERA
- SPA.ETOPS.115 ETOPS en-route alternate aerodrome planning minima : sets planning minima for EDTO



**Acceptable Means of Compliance (AMC) and Guidance Material (GM) to Part-SPA**

**GM1 SPA.ETOPS.105 ETOPS operational approval**  
 AMC 20-6  
 AMC 20-6 provides further criteria for the operational approval of ETOPS.

➤ *GM1 SPA.ETOPS.105* : refers to AMC 20-6 for means of compliance for EDTO approval

- AMC 20-6 was initially published in Nov. 2003
  - Content was based on previous JAA IL20 from 1995, similar to that of AC 120-42A
  - Revision of AMC 20-6 was initiated in 2006, further to FAA ETOPS ARAC WG activities
  
- AMC 20-6 revision 2 was issued in December 2010
  - Main changes are the incorporation of criteria for ETOPS>180 min
  - **AMC 20-6 Rev 2 applies to twins only**
  
- Layout of AMC 20-6 is improved in order to better separate the requirements for Type Design Approval (Chapter II) and Operational approval (Chapter II)
  - Criteria common to both approval processes are gathered in Chapter I

AMC 20-6 rev. 2

AMC 20-6 rev. 2 Effective: 23/12/2010  
Annex II to ED Decision 2010/012/R of 16/12/2010

AMC 20-6 rev. 2  
Extended Range Operation with Two-Engine Aeroplanes ETOPS Certification and Operation

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## Chapter I, General Considerations

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- Introduces main concepts and provides definitions

## Chapter II, Type Design Approval Considerations

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- Criteria for EDTO (ETOPS) certification of the aeroplane
- Section 6 defines the methods of approvals (“in-service” or “Early EDTO”)
- Appendix 1 and 2 provides further guidance for reliability assessment of engine and aircraft systems

## Chapter III, Operational Approval Considerations

- Criteria for EDTO (ETOPS) operational approval of the airline
- Section 4 defines the methods for obtaining EDTO Operations Approval
  - Section 5 details the “Accelerated EDTO Approval” and Section 6 the “In-Service EDTO Approval”
- The Section 7 lists the EDTO Approval Categories and their associated criteria
  - Section 7.1: Common Requirements (all approval categories)
  - Section 7.2.1: 90 Minutes or Less Diversion Time
  - Section 7.2.2: Above 90 Minutes up to 180 Minutes\*
  - Section 7.2.3: Above 180 Minutes *\*(Also includes provisions for a 15% operational extension)*
- Appendix 3 to 8 provides further guidance related to EDTO Operational approval:
  - Appendix 3: Operational Limitations (area of operations, approved diversion time)
  - Appendix 4: Flight preparation and In-flight procedures (fuel supply, communication, ...)
  - Appendix 5: En-route alternate aerodromes (selection, dispatch minima)
  - Appendix 6: ETOPS Training program
  - Appendix 7: Typical ETOPS Operations Manual supplement
  - Appendix 8: Continuing Airworthiness (Maintenance program, Service Check, Reliability Prgm, ...)

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## ❖ ICAO SARPs

## ❖ Example of National and Regional Implementations

- LARs
- FAA
- EASA

## ❖ Implementation job-aid

## ❖ Conclusions

## A guide to that can be used to compare National Regulations with new EDTO SARPs and LARs.

EDTO SARPS FROM ANNEX 6 PART 1	STATE ( _____ ) IMPLEMENTATION			
	LAR Reference	NO	YES	Regulation Reference
4.7.1 Requirements for operations beyond 60 minutes to an en-route alternate aerodrome	LAR 121.2581			
4.7.1.1 Operators conducting operations beyond 60 minutes from a point on a route to an en-route alternate aerodrome shall ensure that:  a) for all aeroplanes:  1) en-route alternate aerodromes are identified; and  2) the most up-to-date information is provided to the flight crew on identified en-route alternate aerodromes, including operational status and meteorological conditions;	LAR 121.2581 (a) (1)  LAR 121.2581 (a) (1) (i)  LAR 121.2581 (a) (1) (i) A.  LAR 121.2581 (a) (1) (i) B.			
4.7.1.1 b) for aeroplanes with two turbine engines, the most up-to-date information provided to the flight crew indicates that conditions at identified en-route alternate aerodromes will be at or above the operator's established aerodrome operating minima for the operation at the estimated time of use	LAR 121.2581 (a) (1) (ii)			
4.7.1.2 In addition to the requirements in 4.7.1.1, all	LAR 121.2581 (a)			

## ❖ ICAO SARPs

## ❖ Example of National and Regional Implementations

- LARs
- FAA
- EASA

## ❖ Implementation job-aid

## ❖ Conclusions



- Natural evolution from ETOPS,
- Applies to all commercial aeroplanes
- Addresses systems that would force aeroplanes to divert;
  - Engines (for twins),
  - Loss of pressurization,
  - Time limited systems.
- Critical fuel scenario
- Performance-based provisions for time limited system limitations
- Extensive guidance material in Attachment “D”

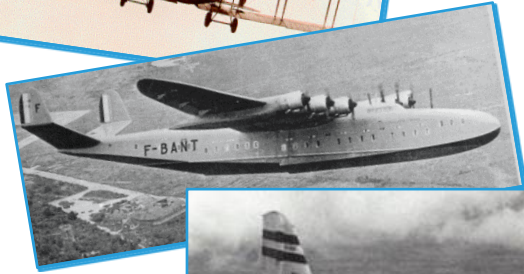


- States need to translate EDTO ICAO SARPs into National regulations and policies. Additional guidance is available in:
  - Annex 6 Part I, Attachment D
  - EDTOM (under development)
  - FPFMM (Doc 9976)
  - Airworthiness Manual (Doc 9760)
- States should establish a Threshold Time for twins and more than two engine a/c
  - Is not intended to be area, operator or aeroplane type specific.
  - A baseline threshold time should be determined (e.g. 60 min for twins and 180 min for more than two engine a/c)
  - The ICAO SARPs allow flexibility to accommodate variations from the baseline for specific situations (e.g. domestic specificities, established operations)
- States should determine the criteria for approving Maximum Diversion Time
  - Assessment of the Operator's EDTO programme compliance
  - Criteria for specific diversion times
  - Area of operation
  - EDTO capabilities of the Operator's fleet

# Module 7

## EDTO Implementing EDTO Regulations





Thank You !!