ETOPS is a hugely successful global program under which the industry has long operated two-engine jetliners on *extended routes* that at some point take the twinjet more than 60 minutes flight time (at single-engine cruise speed) from an alternate airport.

ETOPS flying began over the North Atlantic in 1985.   Today long-range twinjets operating under ETOPS rules fly extended nonstops in all regions of the world, including services on polar routes that link Asia and North America via routes over the North Polar Region.

In 2007 the U.S. FAA and other regulatory authorities implemented ETOPS procedures for multi-engine passenger aircraft on extended routes that take the airplane beyond 180 minutes (at one-engine-inoperative cruise speed) of an alternate airport.

ETOPS benefits airlines through:
- Increased passenger satisfaction.
- Twinjet economics and efficiency
- Simplified long-haul operations
- Increased operational flexibility
- More direct routings
- More reliable operations
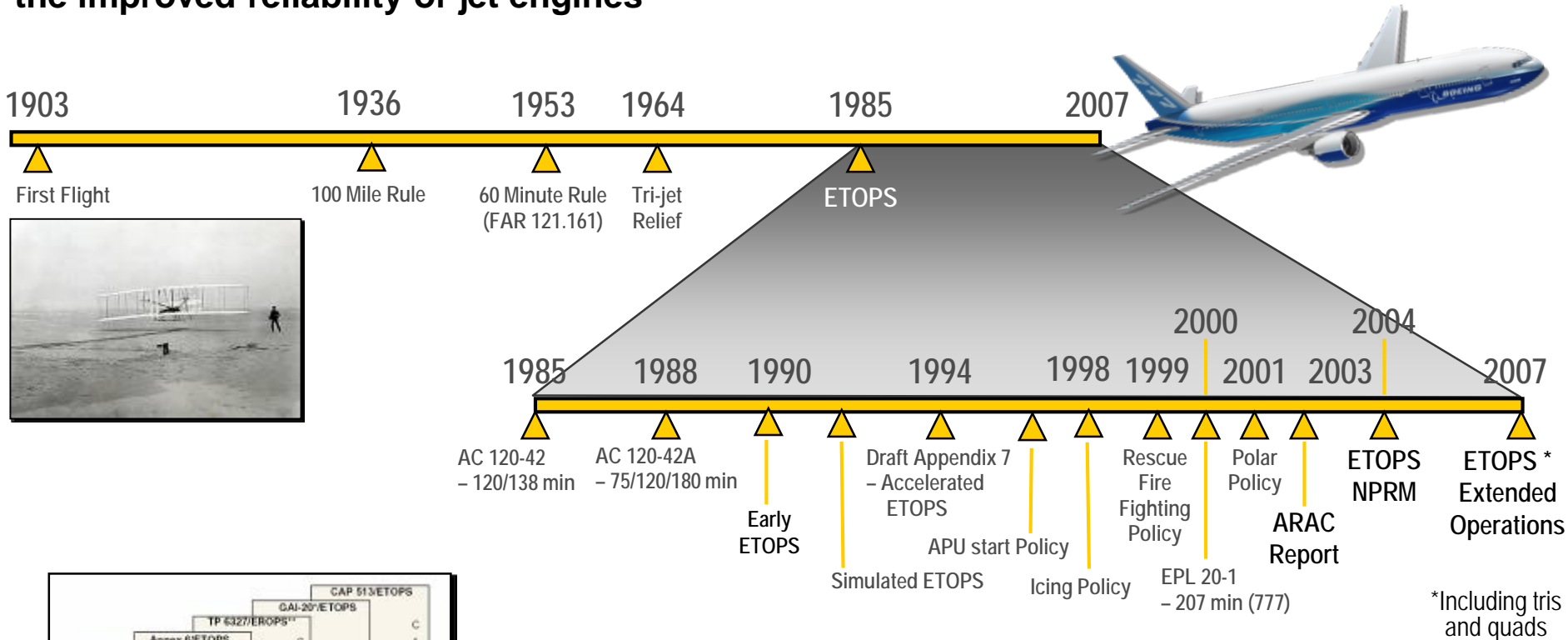- Reduced economic risk

Each airline must work with their regulatory agency in obtaining approval to implement and operate their aircraft on ETOPS routes.

The attached pages describe the two approval methods and provide checklists for Maintenance and Flight Operations.
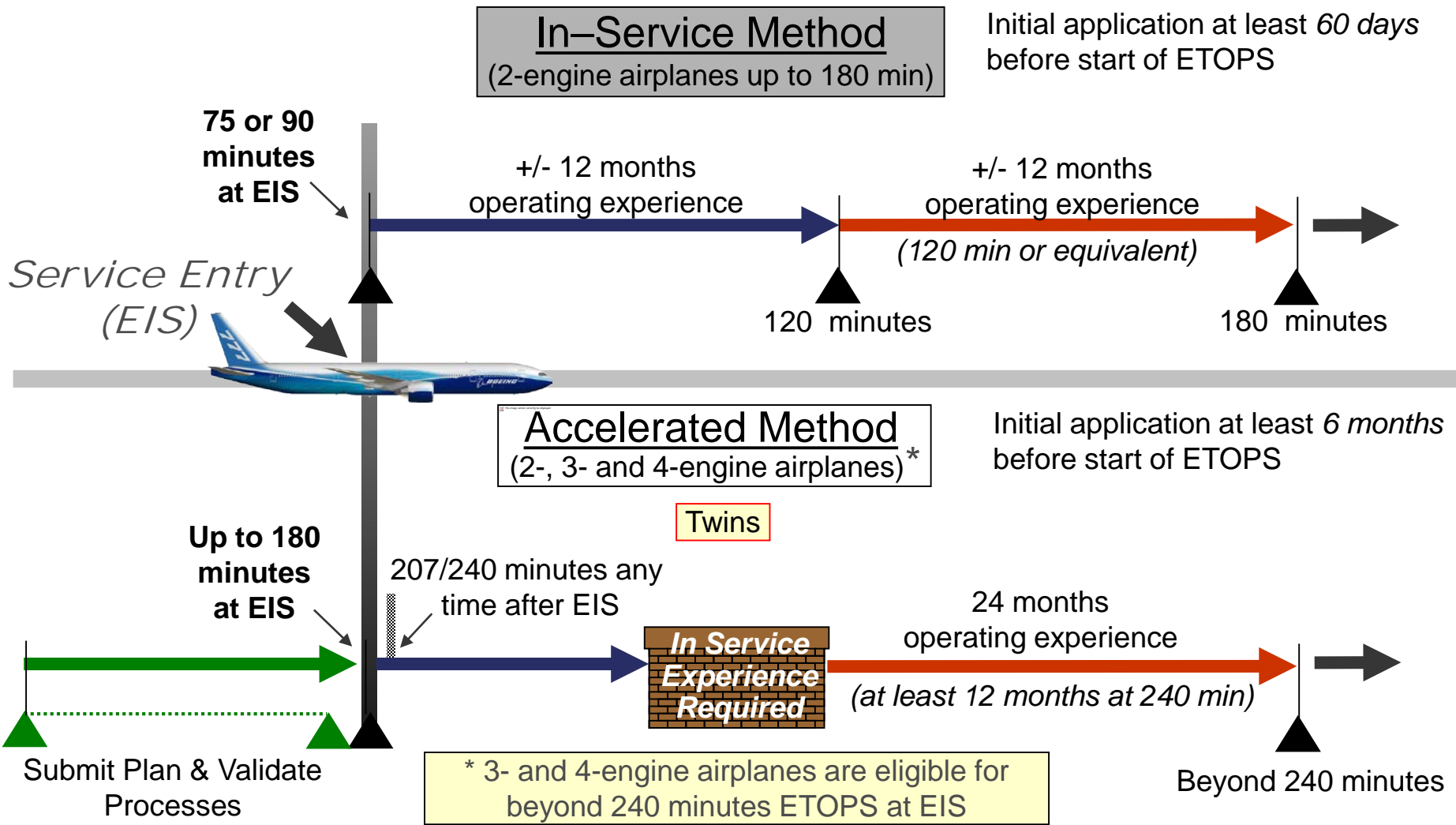
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The Evolution of ETOPS

Twin-engine airplane capabilities have evolved based on the improved reliability of jet engines

1903	1936	1953	1964	1985	2007
First Flight	100 Mile Rule	60 Minute Rule (FAR 121.161)	Tri-jet Relief	ETOPS	

1985	1988	1990		1994		1998	1999	2000	2001	2003	2004	2007

- AC 120-42 – 120/138 min
- AC 120-42A – 75/120/180 min
- Early ETOPS
- Simulated ETOPS
- Draft Appendix 7 – Accelerated ETOPS
- APU start Policy
- Icing Policy
- Rescue Fire Fighting Policy
- EPL 20-1 – 207 min (777)
- Polar Policy
- ARAC Report
- ETOPS NPRM
- ETOPS * Extended Operations

*Including tris and quads

Worldwide ETOPS standards share a common intent and many common requirements.

ETOPS Operational Approval Comparison -
In-Service and Accelerated Methods

In–Service Method
(2-engine airplanes up to 180 min)

Initial application at least *60 days* before start of ETOPS

75 or 90 minutes at EIS

+/- 12 months operating experience

+/- 12 months operating experience

(120 min or equivalent)

Service Entry (EIS)

120 minutes

180 minutes

Accelerated Method *
(2-, 3- and 4-engine airplanes) *

Initial application at least *6 months* before start of ETOPS

Twins

Up to 180 minutes at EIS

207/240 minutes any time after EIS

24 months operating experience

In Service Experience Required

(at least 12 months at 240 min)

Submit Plan & Validate Processes

Beyond 240 minutes

* 3- and 4-engine airplanes are eligible for beyond 240 minutes ETOPS at EIS

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ETOPS Operational Approval Checklist
– *Flight Operations*

1) Define ETOPS routes that will be covered by application.

2) For each route, establish a list of Adequate En-route Alternate Airports.

3) Determine the ETOPS diversion times required and ETOPS single engine speed.

4) Establish ETOPS Area of Operations.

5) Establish a system for obtaining ETOPS flight plan data,
   - ETOPS en-route alternates, calculation of Equal Time Points and the ETOPS Critical Fuel Scenario.

6) Arrange to obtain weather data for ETOPS en-route alternates.

7) Ensure there is a method of communication between the airplane and the airline during the flight (flight following).

8) Review ETOPS provisions in the FAA approved MMEL to establish the airline's MEL.

9) Establish a method to check APU in-flight start reliability.

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ETOPS Operational Approval Checklist

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10) Designate an ETOPS Check Airman.

11) Establish and document airline operating procedures for ETOPS.

   Note: If the airline plans to change Boeing FCOM procedures, determine if changes need to be re-validated.

12) Revise the airlines flight crew guidance material to include ETOPS practices and procedures.

13) Train flight dispatchers and flight crew on ETOPS requirements, performance data, MEL and airline unique ETOPS processes.

ETOPS Operational Approval Checklist
– *Maintenance*

1) **Configuration Maintenance & Procedures** - ensure the airframe/engine to be used on ETOPS routes complies with the ETOPS CMP configuration requirements.

2) **ETOPS Supplemental Maintenance Program** – this 14-point ETOPS maintenance program is a supplement to an operators existing and approved Continuous Airworthiness Maintenance Program (CAMP) and therefore must be added.

   1. ETOPS Maintenance Document - document airline ETOPS practices and procedures.

   2. ETOPS Pre-departure Service – unique check before each ETOPS flight.

   3. Limitations on Dual Maintenance – avoidance of human factors errors.

   4. Verification Program – ensure that all ETOPS significant faults are analyzed and corrections made.

   5. Task Identification – identify ETOPS specific procedures or tasks that must be accomplished or verified by ETOPS qualified personnel.

   6. Centralized Maintenance Control Procedures – establish and document procedures for centralized Maintenance Control related to ETOPS.

   7. Parts Control Program – ensure that only approved components are used on ETOPS configured aircraft.

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8. <u>Reliability Program</u> - develop an event-driven reliability program that ensures reporting of ETOPS significant events to regulatory authority.

9. <u>Propulsion System Monitoring</u> – track in-flight engine shut downs.

10. <u>Engine Condition Monitoring</u> – ensure engines have adequate margins.

11. <u>Oil Consumption Monitoring</u> – engine/APU oil servicing and usage analysis.

12. <u>APU In-flight Start Program</u> - ensure that APUs used on ETOPS aircraft will perform reliable in-flight starts.

13. <u>Maintenance Training</u> – train maintenance personnel on the airline ETOPS practices and procedures.

14. <u>Procedural Changes</u> – changes to the maintenance or training procedures must be submitted to the Certificate Holding District Office (CHDO) and approved before adopted.