



*FAA / AAAE*

*Basic Airport Safety & Operations Specialists School*

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***ETOPS, Extended Operations,  
and En Route Alternate  
Airports***

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## *So, What Are These Terms?*

- ETOPS
- Extended Operations
- En Route Alternate Airports

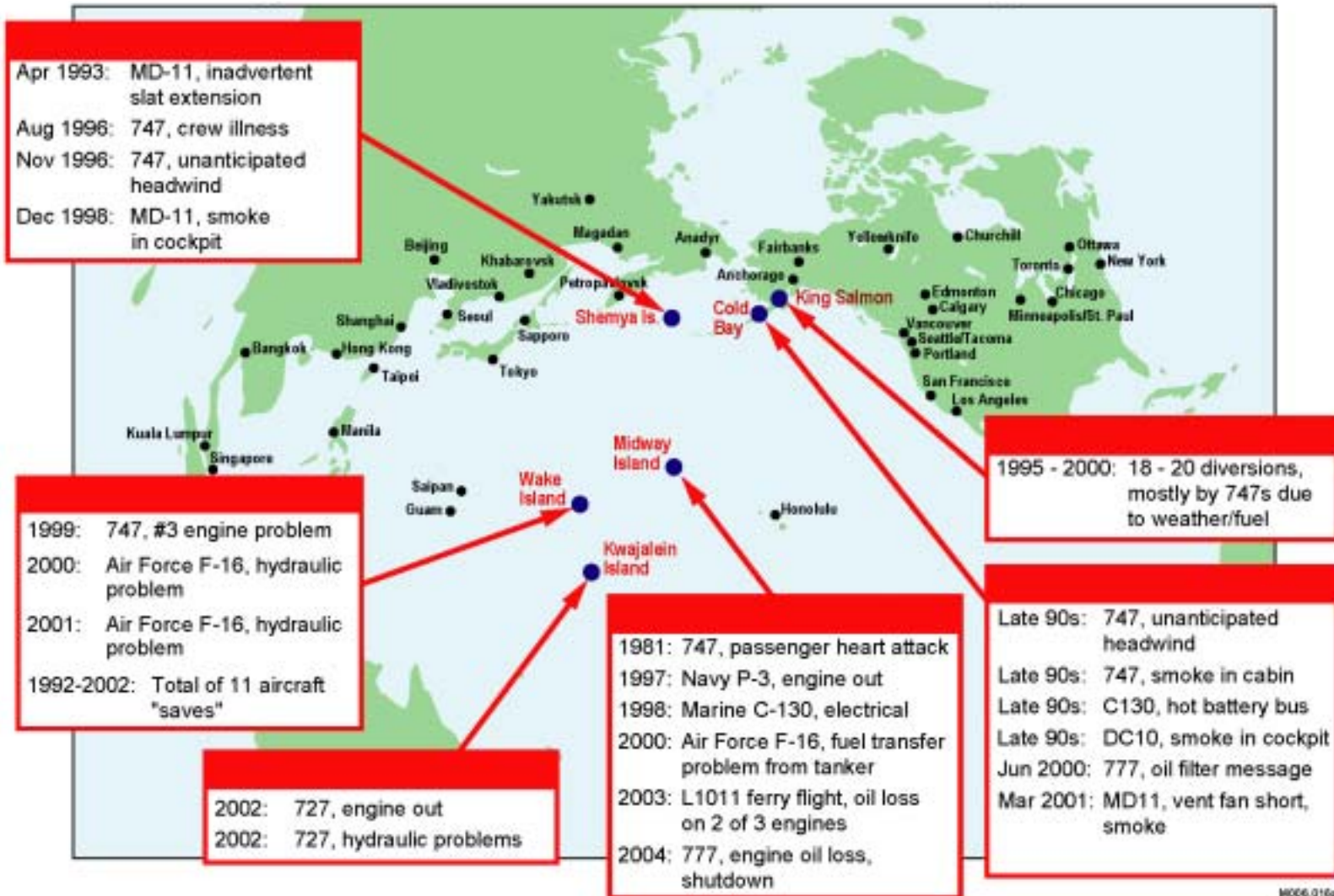


**Midway**



**Wake**

# Diversions Airports are Essential to Aviation Safety







## ***History –***

# ***60 Minute Rule: Not Based on Modern Twins***

Twin-Engine Restrictions Based on Piston Engine Reliability,  
circa 1953



- U.S. Federal Regulations FAR 121.161, adopted 1953
- Imposed restrictions on twin-engine airplanes
- Limited to routes within one hour of an adequate airport
- Recognized opportunities for exceptions on a case-by-case basis

Note: Three-engine jets were also restricted to one hour until 1964.



# ***ETOPS – Current Definitions***

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**FAA Definition:** "Extended Range Operation with Two-engine Airplanes (ETOPS)" and also referred to as "Extended-range Twin-engine Operations (ETOPS)"

**Technical - AC120-42A:** "For the purpose of this AC, extended range operations are those flights conducted over a route that contain a point further than one hour flying time at the approved one-engine inoperative cruise speed (under standard conditions in still air) from an adequate airport."

**ETOPS Portion of Flight -** That portion of a flight that begins the first moment an aircraft is greater than one hour flying time at the approved single-engine inoperative cruise speed (under standard conditions in still air) from the nearest adequate airport, and ends the last moment it is greater than one hour from the nearest adequate airport.



# ***ETOPS Has Been in Place for Over 18 Years***

First FAA Approved ETOPS Flight, 1985

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# *Philosophy – “Preclude and Protect”*

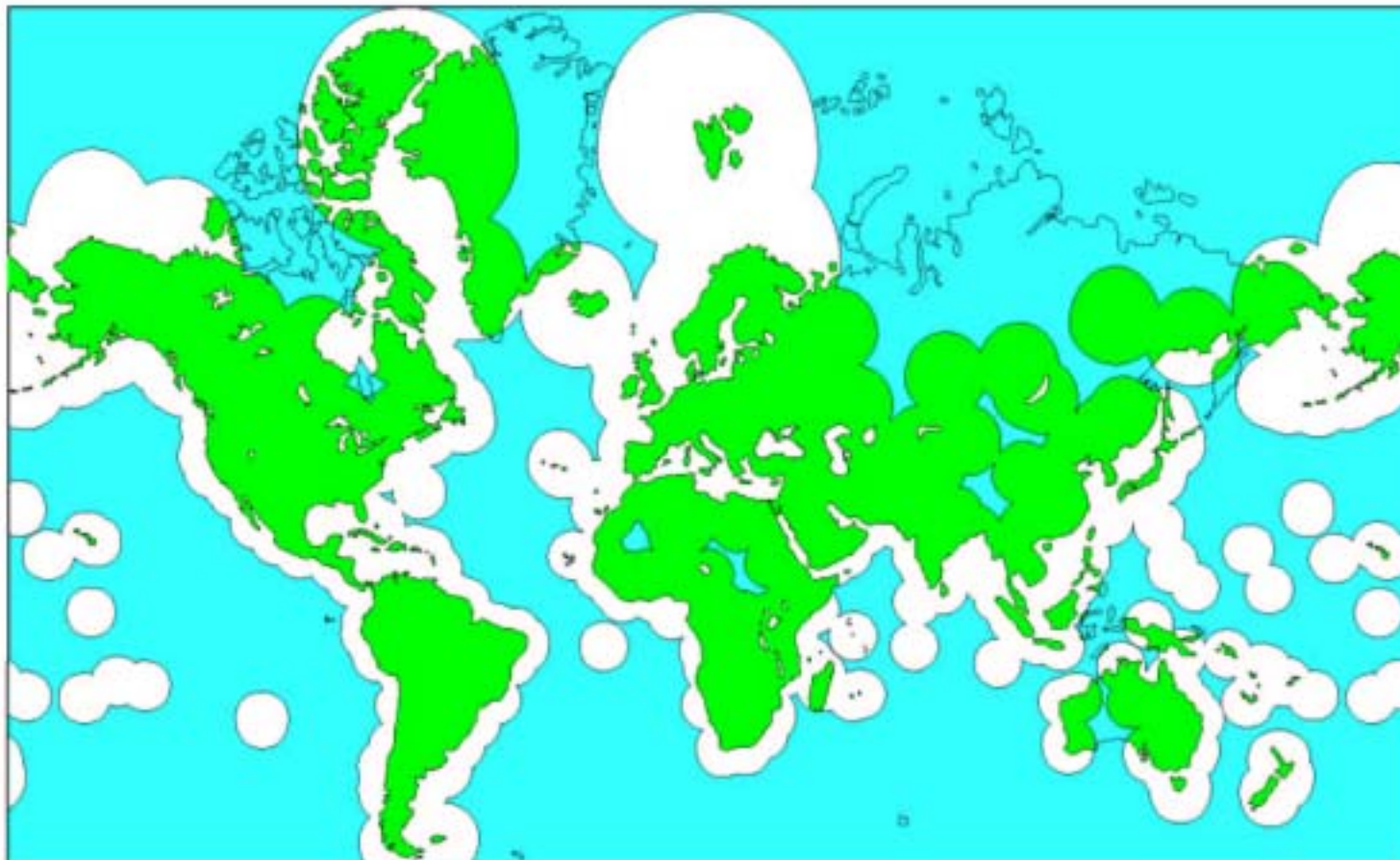
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**Preclude** — ETOPS design enhancements have increased the robustness of airplane systems and driven further gains in the extreme reliability of modern fanjet engines. ETOPS maintenance requirements also reduce diversions through engine condition and oil level/consumption monitoring, the aggressive resolution of reliability issues, and procedures to avoid human error during maintenance of airplane engines and systems.

**Protect** — ETOPS protects diverting jetliners through safety-enhancing operational requirements such as dispatch, communications, alternate airport weather, fuel.



## The 60-Minute Rule Limits Twin-Engine Route Opportunities

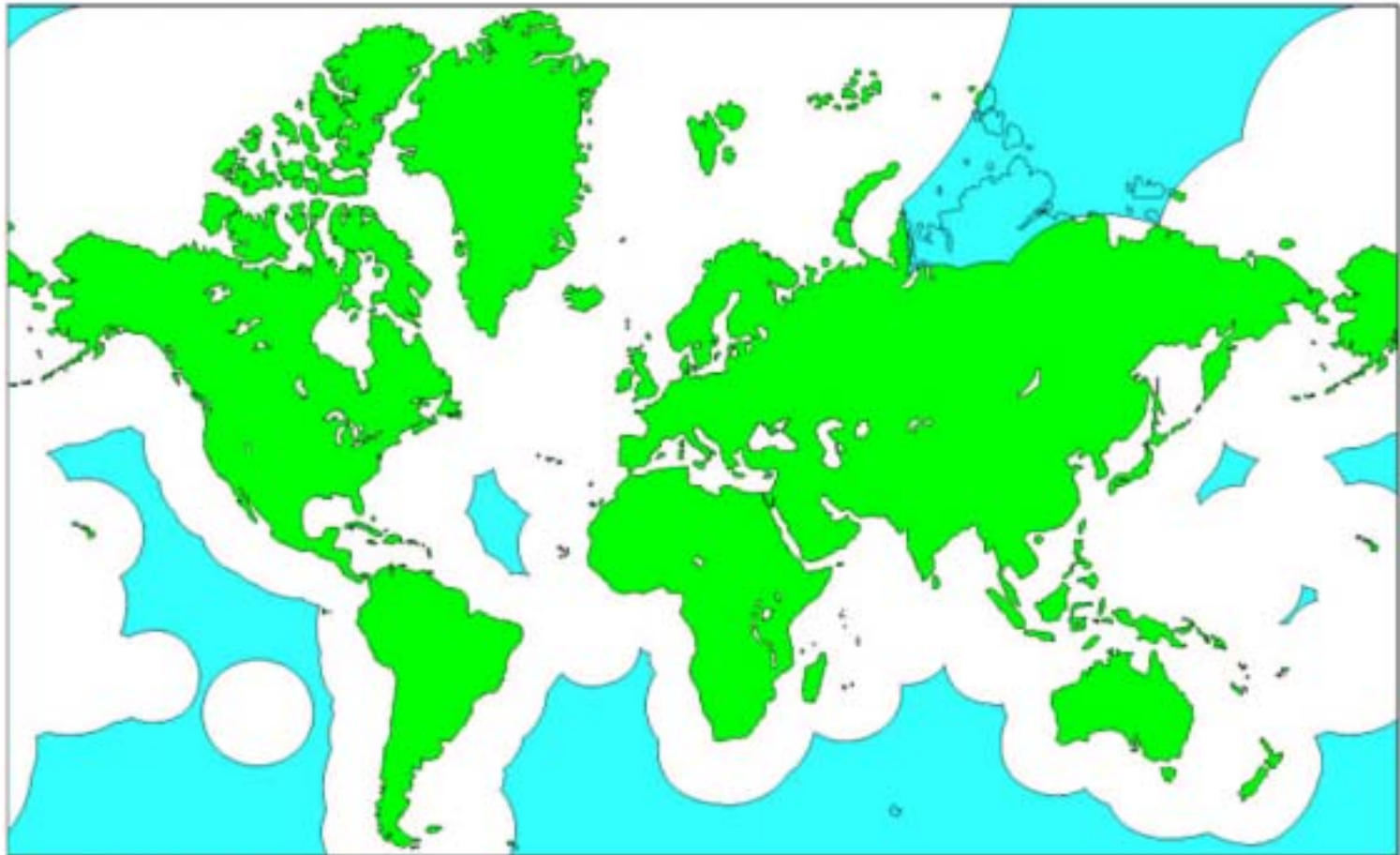


Note: Typical operational range is 400 nmi  
Blue represents regions beyond the 60-minute rule limit.





## 120-Minute ETOPS Rule Greatly Expands Route Opportunities



Note: Typical operational range is 800 n. mi.  
Blue represents regions beyond the 120-minute rule limit.



## 180-Minute ETOPS Rule Further Expands Route Opportunities

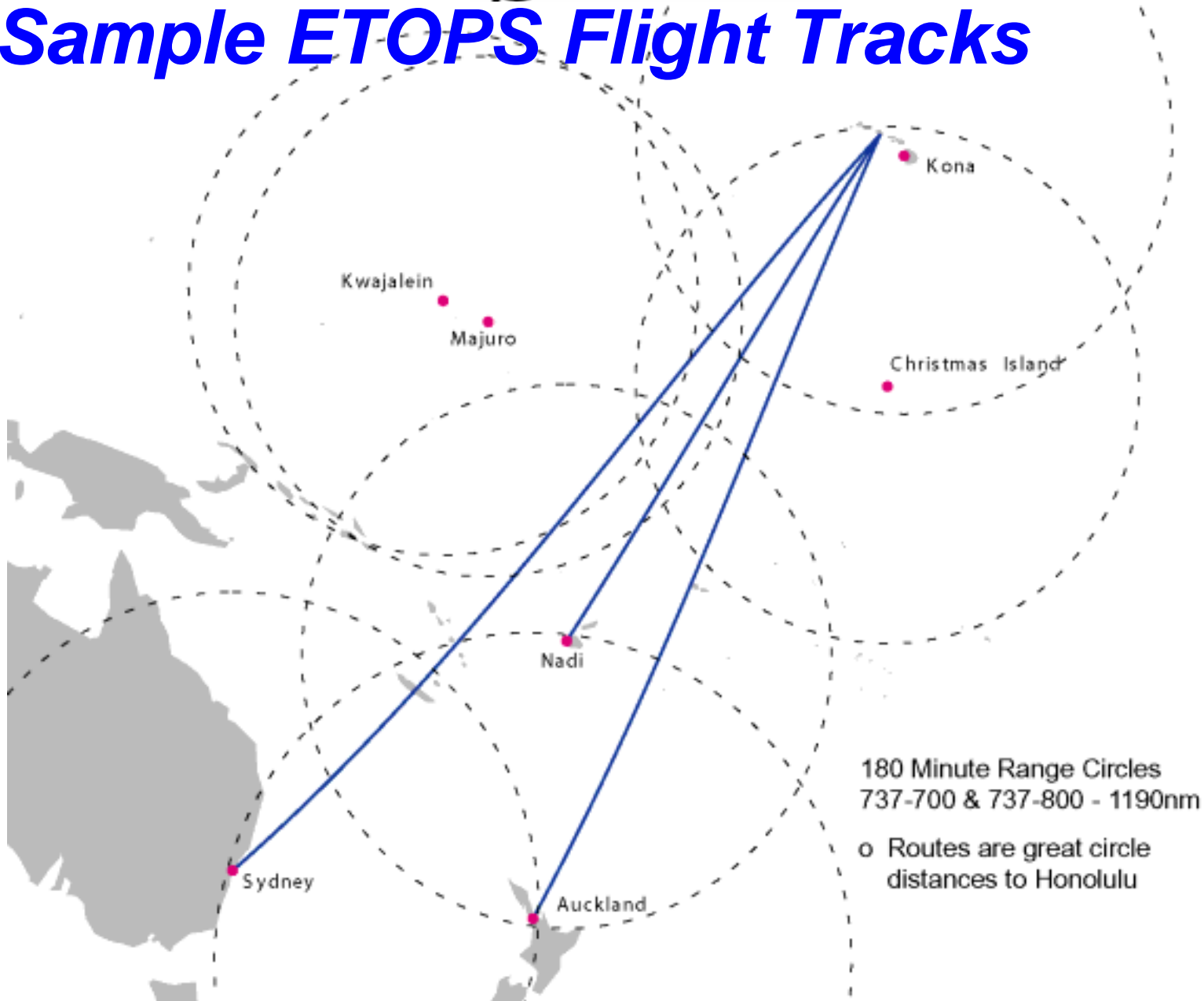


Note: Typical operational range is 1,200 n.mi.  
Blue represents regions beyond the 180-minute rule limit.

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# Sample ETOPS Flight Tracks

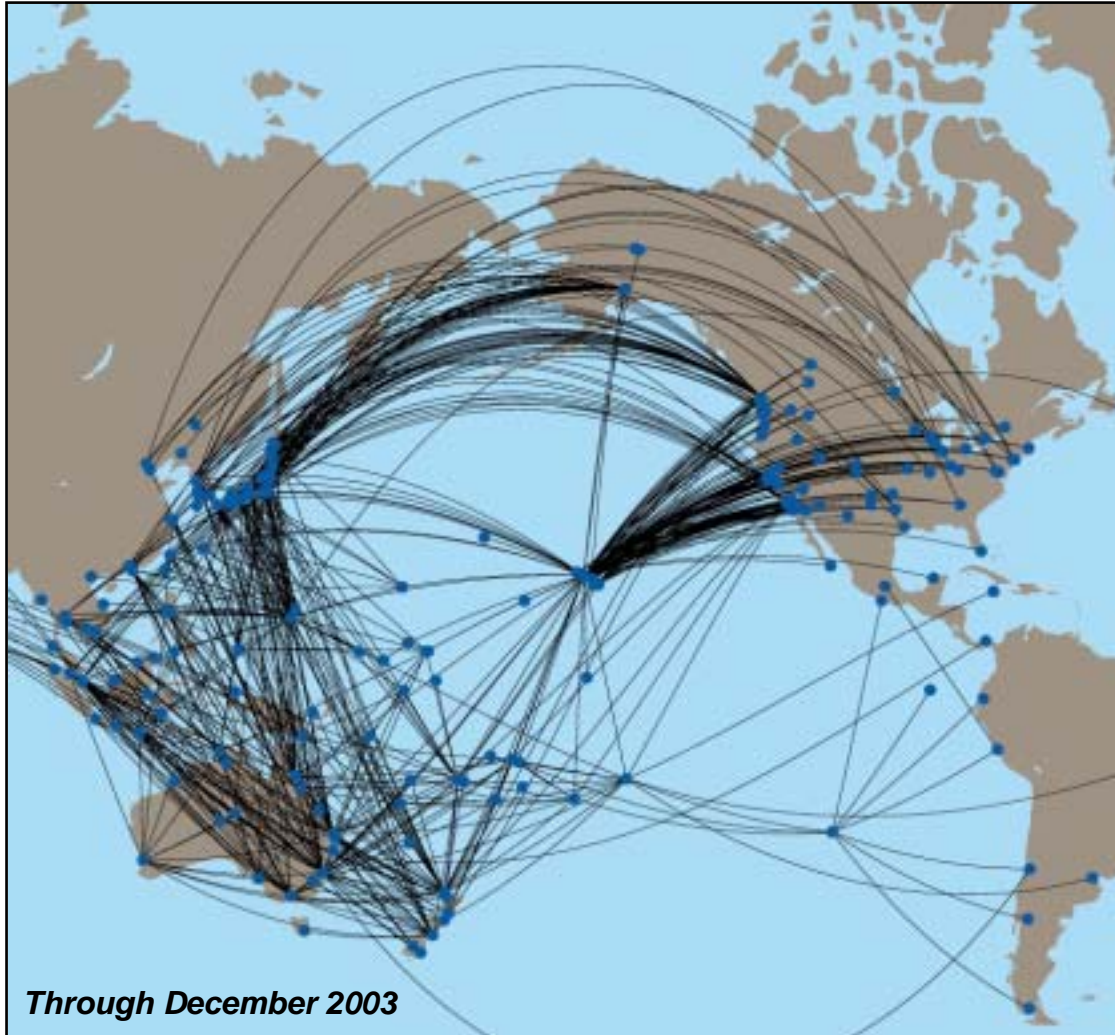






# Market Evolution - Pacific

## ETOPS is Firmly Established in the Pacific



### 737 Operators

Aircalin  
Air Nauru  
Air New Zealand  
Air Pacific  
Air Vanuatu  
Aloha Airlines  
Ansett Australia  
Asiana Airlines  
China Airlines  
Continental Micronesia  
Freedom Air  
Miami Air  
Polynesian Airlines  
Qantas Airways  
Royal Tongan Airlines  
Solomon Airlines  
TACA

### 757 Operators

Air 2000  
Air Holland  
American Airlines  
American Trans Air  
Britannia Airways  
Canada 3000 Airlines  
Condor  
Continental Airlines  
Monarch Airlines\*  
North American Airlines  
Omni Air International  
Royal Airlines  
Royal Brunei Airlines\*  
TAESA  
Trans World Airlines  
United Airlines

### 777 Operators

Air China\*  
All Nippon Airways  
American Airlines  
Asiana Airlines  
British Airways  
Cathay Pacific\*  
China Southern Airlines  
Continental Airlines  
Egyptair

### 767 Operators

Air Caledonie (Aircalin)  
Air Canada  
Air China\*  
Air Europa  
Air New Zealand  
Air Niugini  
Air Pacific  
Air Tours Int'l\*  
All Nippon Airways  
American Airlines  
Ansett Australia  
Asiana Airlines  
Balkan Bulgarian  
Britannia Airways  
British Airways  
Canadian Airlines Int'l  
Condor\*  
Continental Airlines  
Delta Airlines  
Egyptair\*  
EVA Airways  
Gulfair\*  
Hawaiian Airlines  
Japan Airlines  
LAN-Chile Airways  
Lauda Air  
Lufthansa-Sued\*  
Malev Hungarian\*  
North American Airlines  
Polynesian Airlines  
Qantas Airways  
Royal Brunei Airlines\*  
Trans World Airways  
United Airlines  
United Parcel Service  
Varig Airlines

Emirates\*  
Korean Airlines  
Japan Airlines  
Lauda Air\*  
Malaysian Airline System\*  
Singapore Airlines\*  
Thai Airways\*  
United Airlines

\*These operators flew ETOPS only in the Southeast Asia - Australian portion of this map.





# ***ETOPS in the 21<sup>st</sup> Century***

FAA ETOPS Working Group (ARAC) Findings:

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- **Preclude and Protect Philosophy has Been Successful**
- **Principles are appropriate to all airplanes and operations**
- **A new look at long-range requirements is appropriate**



## ***Extended Operations – New Definition***

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Reflecting the FAA's Aviation Rulemaking Advisory Committee (ARAC) proposal, the FAA NPRM published on Nov 14, 2003 states that ETOPS requirements be applied more broadly to embrace *all* extended operations, regardless of number of engines, the ARAC further proposes that the ETOPS acronym be redefined as *extended operations*. Shifts guidance material to regulatory.

Under this revised definition, ETOPS flying would begin when the airplane is more than 60 minutes (for twinjets) or 180 minutes (for three- and four-engine jets) flying time from an adequate airport at an approved one-engine-inoperative cruise speed under standard conditions in still air.



# Alternate Airports

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## Current Term:

***Suitable En Route Alternate*** — This word currently has an ETOPS-applicable meaning (if used with reference to an en route airport, it denotes that this airport is above the required weather minimums and thus available for use as an ETOPS alternate). With the updating of ETOPS now proposed by the FAA NPRM, this ETOPS-specific meaning will go away and be replaced by *ETOPS Alternate* (see below). Once this rule takes effect, whenever *suitable* appears in the ETOPS regulations and associated guidance and advisory material, therefore, it should be interpreted according to its broadly accepted everyday definition.

## New Term:

***ETOPS Alternate*** — An airport that meets stated requirements for planned diversion use and at which the weather conditions are at or above operating minimums specified for a safe landing. This new ETOPS-specific term replaces *suitable* (see immediately above).







## ***Proposed RFF For ETOPS Alternates***

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For dispatch, the minimum rescue fire fighting capability requirements are as follows:

- For ETOPS up to 180 minute diversion length, alternates must have rescue fire fighting capability equivalent to that specified by ICAO Category 4.
- For Two-Engine, 207 Minute operations, alternates must have rescue fire fighting capability equivalent to that specified by ICAO Category 4. In addition, at least one adequate airport within the 207 minute diversion time must have rescue fire fighting capability equivalent to that specified by ICAO Category 7.
- For all other ETOPS operations beyond 180 minutes, alternates must have rescue fire fighting capability equivalent to that specified by ICAO Category 7.
- If the necessary equipment and personnel are not immediately available at the airport, a 30 minute response time is deemed adequate if the initial notification to respond can be initiated while the diverting aircraft is en route. Such equipment must be available on arrival of the diverting airplane and should remain as long as their services are needed.



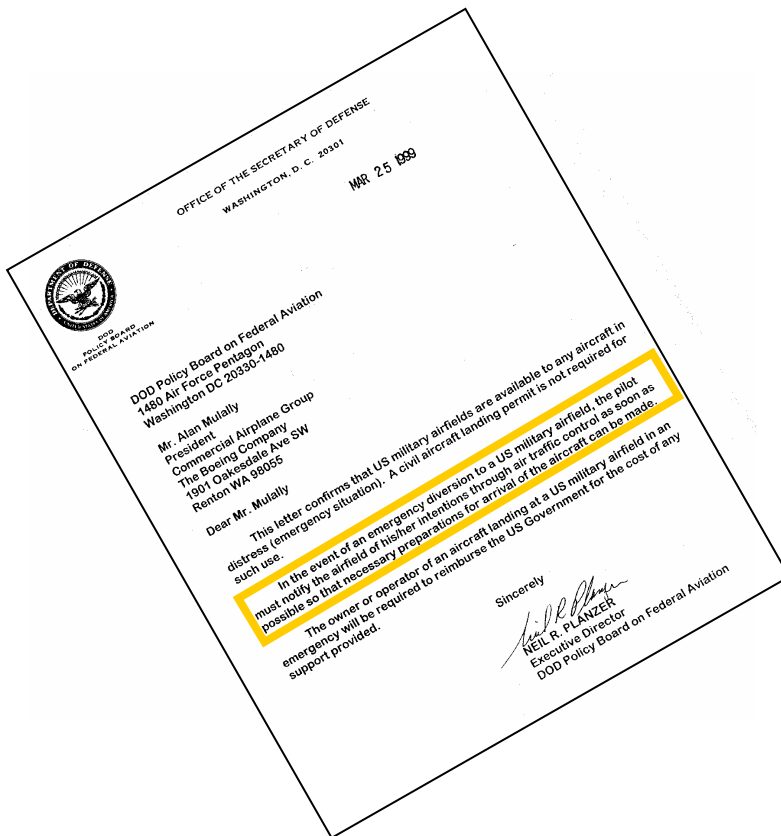
# Military bases can be used as en route alternates

## Typical Policy Statement for Remote US Military Airports:

"The US Navy advises that NSF Diego Garcia may be identified as an Extended Range Twin Engine Operations (ETOPS) emergency landing site (en route alternate) for flight planning purposes. This is consistent with US government policy that an aircraft can land at any US military airfield if the pilot determines there is an in-flight emergency that would make continued flight unsafe. However, as NSF Diego Garcia is a military facility, it is incumbent on aircraft operators to continuously monitor NOTAMS which may temporarily restrict the use of the airfield, even for emergency diversions. It is imperative that aircraft diverting to NSF Diego Garcia comply fully with all air defense procedures, as non-compliance could be misconstrued as a hostile act.

Further, it is understood there are published criteria for ETOPS airfields, and our policy concerning emergency use is not agreement or certification that this airfield meets those criteria. NSF Diego Garcia is a remote location with resources (accommodations, medical, hangars, crash/fire/rescue, etc) limited to levels essential for support of assigned personnel and the military mission. The airfield is available "as is" for emergency use only as indicated above."

- Policy Statement for NSF Diego Garcia, 2002





## ***Remote Airports Play A Key Role In Aviation Safety For All Aircraft Operations***

- All operators value the availability of en route diversion airports....



- Airlines typically include diversion planning because it enhances safety....