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Federal Aviation Administration
Washington, DC 20591

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In Re:

207-Minute Extended Range Operations
with Two-Engine Aircraft (ETOPS)
Operational Approval Criteria

Docket No. 29547

FAA-99-6717-15

Request for Co-

Comments of Airbus Industrie

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Executive Summary

Airbus Industrie is **pleased** to provide these comments in response to FAA's publication in the April 27, 1999, **Federal Register** of an Air Transport Association of America (**ATA**) proposal to move beyond the **180-minute** maximum diversion time specified for present **ETOPS** operations. The proposed approach would employ an FAA Flight **Standards** Service "policy" letter that would be implemented outside the normal regulatory process.

Airbus Industrie strongly encourages the modernization of **ETOPS** standards, regulations, and operational practices. However, we find that the proposed approach **falls** somewhat short of what we can support at this time. While innovative in its expedience, we believe such an *ad hoc* change to the internationally agreed **ETOPS** practices is inappropriate **for a number of reasons**.

Airbus believes that the time has come to consider what is needed to move away **from** conventional **ETOPS** regulations, and move toward rules of operation **limited** only by specified safety considerations and not only specific diversion times. A good case can be made, given the demonstrated high reliability of the modern gas turbine engine, that the **ETOPS** requirements as presently laid down in **ICAO**, **FAA JAA** and other authorities' regulatory and guidance material are outdated. This is worthy of detailed technical exploration in an attempt to determine whether, and under what conditions, the **ETOPS** regulations **as** presently written could be eliminated, as they were some decades ago for **tri-jets**. **Airbus** stands ready to provide the resources necessary to actively consider these issues in an international forum and to help develop the necessary modernized standards, regulations, guidance, **and training** materials.

It is inappropriate, as suggested in the **ATA** proposal, to waive regulatory limitations recorded on an FAA Type Certificate Data Sheet and implemented, in accordance with international practice, in the Limitations Section of the Airplane Flight **Manual**. **Operation** of an **aircraft** in violation of these **limitations** would appear to be inconsistent with **international** law. We are also concerned that this waiver would only be applied to domestic US airlines, and the limitations would continue to be applied by FAA's **Aircraft Certification** Service to exported airplanes. We do not see any precedent for this action, despite the proposal's comments to the contrary. Before any such action is considered, FAA should provide **its** analysis and position on these issues **for** public review and comment, rather than relying only on an **ATA** proposal which FAA has not endorsed or **otherwise** publicly **analyzed**. We hope that the consideration of such a major step can be **accomplished in an appropriate international forum, with harmonized results, rather than** by unilateral action of one authority. We would expect that implementation of these changes **would** be done by regulation, rather than by informal *ad hoc policy letter*.

The **ATA** raises a number of technical considerations important to the unique North Pacific area of operations. Considerations of passenger well being are different here than in the relatively **more** benign North Atlantic operational area. We do not believe that adequate consideration has been given either to airport communication or to passenger

accommodation requirements for this harsh environment. Before **ETOPS** operational restrictions are **relaxed** for North Pacific **Winter ETOPS** operations, this should be done. We believe it is time to consider actual forecast winds, rather than assuming **still-air** conditions, and that time-limited aircraft systems should be required to function **throughout** maximum forecast diversion times as well. We explicitly recognize that some of the issues we raise in our comments are applicable to any long range operation regardless of the number of engines, and we urge that the modernization we suggest of **ETOPS** regulations takes **all** types of extended range operations into account, not just **twin-engine** operations.

The proposed implementation plan does not discuss **specifically** why the proposed changes to the **ETOPS** rules are sought, nor does it provide adequately for limiting the use of the waivers proposed. The details of additional operational and **training requirements**, both for airlines and inspectors, are not **provided**. Specific **“pass-fail” criteria are not provided** for use in judging the acceptability of the numerical **safety** and reliability analyses discussed.

We provide, in our detailed comments, specific discussion of each of these points as well **as others raised by the ATA proposal. Airbus is anxious to move forward with** modernizing the **ETOPS** regulations, and we urge that this effort be initiated **promptly** on an **international** basis.

General

Airbus Industrie is pleased to provide these comments, as requested in the Federal Register dated April 27, 1999 (pp. 22667-22669), on the request by the Air Transport Association for the FAA to issue a policy for **207-minute ETOPS** operation approval criteria. For further information on any of the points raised herein, please contact Dr. John K. Lauber, Vice President, Safety and Technical Affairs, telephone 202-434-8905.

We have divided our comments into 3 main sections. First, this section provides general comments. The next section provides a detailed review of the **ATA** proposal as published in the Federal Register. Finally, the last section of our comments presents and briefly discusses some additional technical issues that we believe should be considered in any **deliberations concerning** relaxation of the present **180-minute ETOPS** limitations.

(A) Airbus Industrie Position on ETOPS

In 1972 **Airbus Industrie** first **introduced the widebody twin aisle, twinengine aircraft**, which entered revenue service in 1974. It was a decade before similar competitive designs were introduced. **Airbus** developed two **families of widebody twins, first** using conventional technology (**A300B-series, A310, and A300-600 aircraft**), some 700 of which have been produced to date and many of which fly around the world using **ETOPS** authorities issued by a number of Civil Aviation Authorities. In 1988, **Airbus** introduced the **A320 family of twin engine single aisle aircraft**, the first fly-by-wire commercial **aircraft** in service. The **family of aircraft** includes the single aisle **A320 series aircraft**, many of which are operated around the world using **ETOPS** authority. The successful design standards of this **family, including** the common cockpit, have been extended to the wide body **A330**, enabling flight operational commonality across the **product** range. The **widebody A330 family** also enjoys worldwide operation by many airlines who operate under **ETOPS** authorizations granted by their national Civil Aviation Authorities in accordance with **ICAO standards**. Since its inception, **Airbus** has produced some 1800 twin engine **aircraft**, and has unfilled orders for approximately 1200 more.

NO **manufacturer** has longer experience with the operation of “big twins” than **Airbus Industrie**. We have participated **from** the very beginning in the international development and **harmonization of ETOPS** regulations, and continue to participate in discussions of **regulations** development **for ETOPS**. **Airbus** was a pioneer in **introducing** the derivative **assessment technique in the ETOPS approval for the A310-P&W JT9D-7R airplane-engine combination**. **Airbus** was also the first to obtain “180-minute” diversion authority **without previous** direct experience based on this method with such approval **of the A300B4-605R GE CF6-80C2 airplane-engine combination**. **Airbus** airplanes are today **operating** in the US and other countries safely using **ETOPS** authorizations of all types, and we continue to promote progress in the evolution of **ETOPS standards**. Our present and **future customers** will benefit **from** the safe and economical operations provided by today’s **ETOPS** regulations and standards.

Continued and expanded safe **ETOPS operations** of the civil airline **fleet** worldwide *are* important to **Airbus**. We recognize the desire of some to move to the next step, and **relax** the present MO-minute restriction on **ETOPS** maximum diversion time. **Airbus Industrie** is eager to participate in developing an appropriate set of **internationally** harmonized regulatory and guidance **material** which **would** permit safe relaxation of this restriction as much as possible without **adversely** affecting **safety**. These regulatory changes should include necessary changes to both certification and operating rules for all **aircraft**, regardless of the number of engines. **In** addition, it is essential to have written policy and **guidance** material specifically tailored to the needs of **certification** engineers, **operations** and maintenance inspectors, and the operators and manufacturers.

As discussed in more detail in the next section of these comments, the **ATA** proposal falls **short of meeting the needs associated with a prudent step towards moving to the next** level in the evolution of **ETOPS** by relaxing the **ETOPS 180-minute** restriction, and fails **to recognize that any such relaxation may only be appropriate in certain areas of the** world. Adoption of the proposal by FAA would continue a practice of providing *ad hoc*, incremental changes that effectively constitute regulation by policy letter and **draft** advisory material, without **following** the required public notice and comment and **rulemaking process**.

(B) Rulemaking by Advisory Circular and *ad hoc* Policy Letter is Inadequate

In **1985**, **after** several years of careful collaboration with civil aviation authorities, **airlines, manufacturers, pilots and maintenance** technicians **from** a number of countries, FAA issued Advisory Circular **120-42**, which was soon followed by **ICAO Standards** and Recommended Practices, and **JAA** and other authority regulatory material on **ETOPS**. In **1988**, after a similar public **collaborative** process, AC **120-42A** was issued, updating the earlier version and providing **for 180-minute** maximum diversion times.

The inability to proceed at any reasonable pace in the FAA rulemaking process has resulted, since **1988**, in reliance on *ad hoc* policy **for** the development and approval of evolutionary changes that are **necessary** with any new **regulation**. For example, **ETOPS** authorizations have been issued in accordance with **draft** revisions to advisory **material** for operators who have no previous **ETOPS** experience, contrary to **ETOPS** guidance material issued which was issued after **full** notice and comment opportunity. In addition, the **development** and approval of **ETOPS** authorizations for the use of airplane-engine combinations which have not had the **in-service** proving experience specifically required by the **ETOPS guidance**; the development and approval of “early **ETOPS**” **certification** practices; and the **development** and **issuance** of policy material **providing** for waiver of **120-minute restrictions** contained in the **ETOPS guidance material**, are among other informal changes and exceptions to **ETOPS** rules that have been approved. While all of these operations are being conducted safely, and new operations under existing regulations and policy can be expected to be similarly safe, we do not believe that expansion of the **180-minute** maximum diversion time is prudent outside the normal **rulemaking process**.

Continued safe **ETOPS** operations of airplanes of all types, by operators around the **world**, is too important to **Airbus Industrie** for us to be satisfied with continuing *ad hoc informal* processes. Fourteen years of FAA rulemaking by advisory circular and policy letter, of dealing with **ETOPS** informally, using advisory material that is revised by **draft** modifications which are never adopted, which together are again revised by *ad hoc policy* letters which override even the **draft** changes, is enough. It is time to draw the line and to establish, using normal rulemaking processes, a set of **ETOPS** regulations which comply not only with **ICAO** standards, but are proposed and adopted in accordance with normal **FAA rulemaking procedures**.

Airbus Industrie is willing to devote the resources required to actively support the development of these changes in what we hope will be 3 specific **forums**: harmonization **with the JAA and other interested authorities; the FAA rulemaking process itself; and the ICAO standards** setting process. We would hope that all of the interested parties could agree to **work** together in one international effort in the development of this material, so that the **ICAO** standards, Civil Aviation Authority rules, and the associated industry and inspector **guidance** material could be developed in unison. We urge FAA to **set** the **rulemaking** priority for these needed revisions high enough so that they can be timely proposed and enacted.

(C) Need for Opportunity to Comment on FAA Analysis and Proposal

The publication by FAA of the **full ATA** request for a policy letter permitting inspectors to waive FAA certification and operations limitations on **180-minute ETOPS** is an unusual step. To the extent that FAA by so doing begins an early dialog on this important **safety** issue, FAA is to be commended for its initiative. However, **from** the contents of the **ATA** request, it appears that there is some expectation on their part that FAA will directly act on their request, without further public input.

In its publication, FAA noted that FAA will consider all written data, views or arguments relevant to the matter before taking further action. FAA further stated that its publication of this **ATA** request was without endorsement. Thus, the public has yet to have the benefit of **an FM analysis** of **the** issues involved and alternatives considered in regard to this important **issue**. We urge that, prior to taking any action to adopt the **ATA** request, FAA provide **the** interested public with notice of its analysis **of these** issues and the **opportunity to** comment on its proposed action. As already **noted**, we would hope that FAA action on this request would result in a collaborative, harmonized approach to **any resulting regulatory changes**.

(D) North Pacific ETOPS Operations Differ Greatly From Atlantic

The **ATA proposal** does not **bring** out the vast **differences** between the safe and **successful Atlantic ETOPS** operations of the past **14** years, **and** those in the North Pacific **during winter**. **There are two** very **important facts (not mere possibilities)** that bear on such a comparison. First, despite data presented which implies the contrary the risk of a

single-engine diversion that is **2, 3** or 4 hours or more is many times **greater** in the North **Pacific** than in the Atlantic. **Aircraft-engine** combinations have not been tested nor approved for such long diversion times. Human factors involving both passengers and crew under conditions of extremely cabin cold **temperature**, high vibration levels which might accompany engine windmilling imbalance, etc. have not been adequately addressed to permit confidence that a relaxation to the **180-minute ETOPS** diversion limit is appropriate at this time.

The extremely long distances involved in the North Pacific, coupled with the geographical realities of the region, expose an aircraft for a much longer period of time to the possibility of an **ETOPS** diversion. In the event of such a diversion, the **aircraft** is **necessarily** exposed in the Pacific to **distances** that must be flown which are many times those of a typical similar event in the Atlantic. Simply stated, it is a **fact** that the **risk** of a very long diversion in the North Pacific is **far** greater than in the Atlantic. As the **ATA** proposal **notes**, we have little actual experience, and almost **no** certification or other experience, with diversions **of these** lengths. Relaxing the present **180-minute limit** on permissible **ETOPS** diversion time increases this already higher risk (**for** the Pacific) by a substantial amount.

A second **fact** that must be carefully weighed is the harsh environment of the North **Pacific** in the winter season. Temperatures **in this** remote and demanding part of the world in winter are typically extreme, and it is not uncommon to see ground temperatures of **30** or more degrees below **zero** on either temperature scale. **Siberian** average winter **minimum temperatures** are about **-42°C**, with **median** temperatures of **some -16°C**. Following a long diversion in which cabin temperatures may have **decreased** substantially because of equipment failure, these temperatures present a real challenge, especially for the elderly or **infirm** who may be in summer clothes, traveling to or from a tropical destination. Most of the remote alternate airports have inadequate facilities for deplaning **and**, once off the **aircraft**, can offer the passengers few (**if any**) accommodations to provide warm shelter, **food**, or medical care.

There are **no guidance** materials that have been developed to deal with passenger **well being under such extreme circumstances**. **These situations are not the same on the** Atlantic, where diversion airfields are more capable of dealing with passengers, and the environment is **far** less hostile to human **habitation**. Simply stated, we must **develop acceptable procedures** to deal with the well being of hundreds of passengers who have **perhaps experienced a 3 or 4 hour diversion in an uncomfortably cold cabin, who are not** clothed **for** winter survival, and who **find** themselves in a bitter **cold** environment without adequate **food, clothing**, shelter or medical care. These conditions present a real **difference** between the past experience in the Atlantic, and what lies ahead **for** North Pacific **ETOPS** operations.

Discussion of Specific Issues Raised by ATA Proposal

This section of **Airbus Industrie's** submittal reviews the specific document published in the Federal Register on April 27 and provides, as requested therein, specific comments on the points raised by **ATA**.

ATA Cover Letter Transmitting the Proposal

(1) Need for FAA Proposal

We applaud the FAA initiative in seeking early public comment on the proposal made by **ATA**. The issue of potential modification of the domestic US and global **ICAO ETOPS** standards raises important **safety** issues, **Airbus Industrie** is fully committed to working with the authorities within an **international framework** to **explore** alternative means to provide appropriate changes to **ETOPS standards** that will ensure that we continue to enjoy the high levels of safety thus **far** demonstrated.

Apparently, FAA has **not** yet had the opportunity to review and analyze the **ATA** proposal, since FAA has **not** endorsed or **otherwise** expressed its intent to adopt the **ATA** proposal. It is our understanding, **therefore**, that this proceeding by definition does **not** constitute public **notice** and the opportunity to comment on an **FAA proposal** to **modify** existing **ETOPS** standards. Such a modification of **existing** standards, were it to be **proposed** by the **FAA**, would be an important action with wide ranging **safety** and regulatory effects. We expect that FAA will provide the **affected** public with conventional **notice** and comment opportunity, and we look forward to participating in that action at some **future** time.

(2) Has FAA Already Made a Decision?

We **note**, however, that the **ATA** letter to FAA indicates that FAA itself has participated in the **development** of this proposal. **ATA** goes on to say that this team “determined the **criteria** to support the establishment of a proposed **15** percent operational extension of **180 minute ETOPS.**” FAA participation in such an activity would **not** appear to be **consistent with the provisions of the** Federal Advisory **Committee** Act **nor with the** FAA **statement** that it is “publishing this request without endorsement.” We assume that the **ATA characterization** is, therefore, somewhat exaggerated when implying that FAA has agreed with the application of these criteria.

(3) North Pacific Area of Operations has Many Associated Issues

ATA notes that “[t]here are many issues associated with **207 minute ETOPS**, especially in the North Pacific area of operations.” **Airbus Industrie** agrees. The lack of **wide availability** of alternate **and emergency** airports in this region; the hostile environment

experienced much of the time in the region; and the lack of medical, **firefighting**, and food and housing accommodations for the hundreds of passengers who would need them in the event of a diversion are also serious issues unique to this area of operation. The resolution of these issues is necessary before expanding **ETOPS** authorizations beyond those presently provided by FAA and **ICAO** standards.

While it is admirable that **ATA ETOPS** operators have conducted some airport visits in the **area**, and are establishing some plans to deal with these issues, these actions do not appear adequate to resolve the issues. We cannot responsibly endorse **ETOPS** expansion beyond present safety limits until these potentially critical issues are examined, and criteria for their resolution are agreed and established by the international aviation community.

We are especially concerned that there does **not** today exist an internationally accepted set of **criteria** that establishes the minimum standards for passenger **safety** and well being for these kinds of operations. Unlike the North Atlantic, which in itself is relatively more generally forgiving and well developed regarding weather conditions and passenger **facilities for accommodation** of diversions, the North Pacific area of operations imposes **far** more severe demands, especially in winter. Most of the alternate airports which are available for the kinds of **flights** contemplated in this proposal are completely **bereft** of passenger accommodations in the event of a diversion, and present criteria for alternate airports do **not** address the extreme winter conditions found at high latitudes. **Without** adequate **facilities for passenger accommodation**, evacuees simply **could not** survive the winter temperatures commonly experienced at **Siberian** airports, which can easily range **from -30 to -50°F**. Even **normal** deplaning **from** modern large **aircraft** cannot be effected without special airport vehicles, which do **not** exist at these airports.

It is important to note that some of the multitude of “risk factors” which themselves are deterministic in time (by varying around the year) **exhibit covariance** (or act in concert) to compound risk during certain times of the year. Thus a **simple** probabilistic analysis would underestimate the overall risks involved. For example, the typical winds on winter routes drive **aircraft** to high latitudes, where diversion airports with good **facilities to accommodate aircraft and passengers do not exist, and winter temperatures on the ground** are dangerously **low**. (Ironically, the **low-latitude** summer routes dictated by **ETOPS constraints lead one to rely on Midway** airport, which has a serious bird problem **which** is worst during that **season**.) Before expanding **ETOPS** operations to provide for more flying in areas where a life **threatening** ground environment can be expected in event of a diversion, it is important to develop specific appropriate internationally harmonized safety and passenger well being criteria for airports to be used as diversion **alternates**. The **fact** that the operators are establishing **plans**, while necessary, is **not sufficient** to permit expansion of operations beyond what is presently permitted.

ATA Draft Proposal dated February 4, 1999

“Discussion” Section of ATA Proposal

(4) No Specific Need Cited

ATA's proposal states that “[it] has been determined by the FAA that a need exists for an additional **ETOPS** authority beyond **180** minutes.” We **note** that nowhere in this document does there exist any specific discussion of this “need.” There are **no** statistics provided which demonstrate the type of need that exists, for what routes, by what operators, under what conditions. The assertion of need is unsupported, and it is essential that such a need be articulated by FAA prior to taking action of the type requested by **ATA** so that the risks and alternatives may be **fairly** weighed. As **noted** earlier, **ETOPS safety** criteria are critical **safety standards** which **affect** all **ETOPS** operations, **not** just those at the extremes of the authorizations. The international aviation **community** needs to carefully review the technical and operational data that suggest the need to change the internationally accepted standards that have worked so well for over **14** years. FAA should make a decision based on its review and analysis of that **data**, and supporting **information**, rather than accept an unsupported assertion of need. Put another way, *economic desirability* of the proposed change does **not** constitute *need*.

Indeed, elsewhere in the proposal, the **ATA notes** that **ETOPS** operations are presently being conducted in the North Pacific area, and three more airlines intend to initiate operations in that area this year. Those operations are today being conducted using the present FAA and **ICAO ETOPS standards**. We can only speculate that, given the present operations in accordance with existing safety standards, the desire to **relax the** existing **ETOPS** criteria must be based on an anticipation of improved operational **economics**, since **no** other rationale has been provided. We **cannot** accept such a weak rationale as the basis for an “accelerated processing of this proposal,” as requested by **ATA**, in light of the serious safety issues that are involved

(5) Rapid ETOPS Growth Deserves Cautious Changes to Rules

It is precisely because **ETOPS operations** are growing so rapidly that we ask for caution in **relaxing** US domestic and **ICAO ETOPS standards**, and urge that this be done only **after full internationally harmonized agreement on such changes can be reached**. **This is** simply too important an issue to accept a rush to judgment. The **fact** that **ETOPS** operations of both Boeing and **Airbus** airplanes are **now** widely accepted as **safe** under present criteria in crossing the Atlantic does **not**, in and of **itself**, provide a basis for relaxing these standards and applying the proposed relaxed **standards** to the significantly more harsh environment of the North Pacific. One simply **cannot compare** either the underlying airport environments, the **ETOPS** diversion **distances required**, the time at risk of an **ETOPS** diversion, the number of airports available for diversion, or the inherent diversion risks of the two types of operation. Indeed, the **ATA** proposal itself

characterizes **North** Pacific operations as “remote and demanding,” as opposed to the relatively more benign environment of the Atlantic.

(6) Some Issues **Apply** to **3-** and **4-engine** Aircraft as Well

Airbus Industrie agrees that many of the issues regarding diversion airports, their ability to safely and adequately accommodate passengers, the need **for** adequate crash-rescue firefighting, and so on are applicable to **3-** and **4-engine** transports as well as twins. **Airbus** stands ready to actively work with the international aviation community in developing **standards** for extended range operations of all types, applicable to all large **transport aircraft**.

However, it is **clear that the** need for these standards is substantially greater when twin engine operations are conducted than for **3-** or **4-engine aircraft** operations. Simply stated, Federal Aviation Regulations and international **standards** and practices **specifically** provide **for immediate**, mandatory diversion to the nearest suitable airport in the event of an engine failure on a twin. These rules also explicitly recognize that the pilot in command may, **after** appropriate consideration of all relevant safety **factors**, overfly suitable airports which do **not** provide for passenger **safety** and well being for whatever reason in the event of an engine **failure** in a **3-** or **4-engine aircraft**. In making these rules and setting these international standards, the FAA and **ICAO** recognized differences in **the risks of operation of twins on the one hand, and 3- or 4-engine aircraft on the other**. Management of these inherent risks is the reason that **ETOPS** standards were developed **and** adopted. The existence of these **risks** is why **modification** of these standards must be done only **after** a thorough data based review and consideration of need and alternatives, which has not yet **been** done.

(7) **Regulations**, Not Informal Policies, are Needed

Airbus Industrie agrees with **ATA** that the existing **180-minute ETOPS** authority is adequate **for** almost all the heavily traveled routes in the world (including, we believe, those that are **currently** being operated in the North Pacific). **After 14** years of operations under advisory material and ad hoc policy letters, it is time that FAA develop, as **JAA** has done, specific regulations which deal with **ETOPS**, as well as regulations that provide for early **ETOPS certification**, accelerated **ETOPS** approval **for** operators, **138-minute ETOPS** authorizations and all the other relevant issues which have been for years the subject of **informal** policy and draft advisory material. Doing so would “clean up” many **of the** pending amendments to the existing advisory material+ and also permit rational, systematic consideration of the kinds of **updates** proposed by **ATA**. **Continuing** to deal with these matters outside the **normal** regulatory process is **not**, we believe, appropriate **nor** does it appear to comply with the **Administrative** Procedure Act.

This is especially important when looking at the US responsibilities under **ICAO standards**. As the state of **manufacture**, FAA establishes type design **limitations** in

accordance with certification standards. FAA has established, **for** the existing **ETOPS** approved **airplanes**, “special conditions” following **normal** public rulemaking procedures and in accordance with Part **21** of the Federal Aviation Regulations. In part these special conditions deal with the **ICAO** requirements that the airplanes used in **ETOPS** operations receive appropriate airworthiness certification. Accordingly, as part of the certification process, **ETOPS** maximum diversion time limitations are imposed on aircraft by FAA. The **B-777 aircraft** has, for example, been limited to **180-minute** extended range operation, according to Type Certificate Data Sheet **T00001SE**, note **7**.

Regulators of many nations rely upon the FAA certification of US produced airplanes in their approval of the operation of these airplanes by airlines **from** their country. It is unreasonable, perhaps even discriminatory, for FAA to explicitly limit its airworthiness approval of exported aircraft to **180** minutes while simultaneously permitting US operators to exceed that **expressed** limitation on routes which may in fact be directly competitive with **non-US airlines**.

Resolving this inequity requires that FAA modify the limitations it has **placed** on the Type Certificate data sheets of some airplanes. However, that **cannot** be done without revising the special conditions which themselves led to the **limitations** being imposed. In order to revise those **limitations**, new special conditions should be **proposed**, including a detailed exposition of the specific criteria used by FAA to reach a determination that a new, less stringent, limitation is appropriate. Those special conditions (or, more appropriately, a new provision of Part **25**) should be written **objectively**, as performance **standards**, in such a way that they can be applied to all **aircraft** seeking expanded **ETOPS approval**, **not** simply the **B-777**.

An ad hoc policy letter **from** Flight Standards is **not** the appropriate means to modify Type Certificate limitations that have been imposed in accordance with public **rulemaking** procedures. Instead, a public rulemaking is the appropriate vehicle.

(8) Need for Better. Not More Relaxed. Weather Forecasts

The proposed **ATA** policy letter language refers to “a number of **factors**” which give rise to the need **for** relaxation of the **ETOPS** criteria to **permit** operation beyond **180** minutes. It is **impossible** to **evaluate** the validity **of this** claim without more specific data on the **historical number of these occurrences** and their duration, two pieces of data essential to projecting their **future frequency** and duration. **Without** such **data upon** which to base a decision, any **modification** of existing **ETOPS** criteria would be essentially arbitrary.

We are **concerned**, too, with the implication that “higher weather **minima** [required by existing **ETOPS guidance** material] at dispatch” is one of the factors cited as justification for relaxing the **ETOPS** criteria. These higher weather minimums were specifically included in present guidance material for safety reasons, to add conservatism to weather forecasts. Note that this **conservatism** was believed necessary when **ETOPS** diversions **were limited to only 180 minutes, precisely 1/2 of a standard forecast interval of 6 hours.**

The **ATA** proposal to permit greater than **180-minute** diversions would actually extend the time over which one would be relying upon the accuracy of forecast weather conditions by nearly **1/2** hour. Expanding **ETOPS** flying in the Pacific would **further** extend the time between receiving a **forecast** and encountering the weather even more, because of the great distances involved. It does not appear consistent to extend the time over which one must rely on the **forecast** on the one hand, and then use this conservative weather **forecast** of minimums to **justify** the use of **207-minute** authority on the other. Perhaps there is some historical data which shows that the forecast accuracy which one can expect over such forecast times has improved since the original criteria were established. This proposal does not provide that data, however.

Relaxing the **ETOPS** limitation of **180-minutes** to **207-minutes** **certainly** provides a potential increase in the number of **airports** that might be considered suitable alternates at the time of receiving the **forecast**. But the longer the flight, the more unlikely the weather at a designated alternate corresponds to that forecast at the beginning **of the** flight. Thus, the longer the flight, the more conservative the weather forecast should be when selecting designated alternates. In this **case**, we see a proposal that would expand the **ETOPS limitation** so **that**, simply because of the conservatism employed for **ETOPS** dispatch, there is a wider array of airports from which to select alternates, in the event that weather is **forecast** to be bad at many, if not all, of those airports within the **180-minute** limitation. In the Atlantic, when an airplane leaves one side for another, one may rely on perhaps an 8 hour forecast window for the entire crossing. For some alternates in the Pacific, this time approaches twice that value. This is **the** wrong region of the **world** to explore sacrificing weather forecast conservatism, which is precisely the effect of this proposed change.

(9) FAA's 1995 ETOPS Policy Letter is Not a Precedent

It is simply not true that the **1995 ETOPS** policy letter can serve as a precedent **for** operational **extension** of **maximum** diversion time by up to **15** minutes, as this document suggests. **In fact, there are major differences between the situations then and now which confirm that there is no precedent** for using an ad hoc policy letter to make such a major change to existing **ETOPS guidance** and **standards**.

In **1995**, the FAA **had some** 7 years experience with **180** minute **ETOPS** operations, and most long range airplanes so **approved** today had received their **180** minute type design approvals by then. Some operators who were not planning to take advantage of the **180** minute **ETOPS** approval permitted by that guidance sought the ability to operate to the **138-minute standards** which were similar to those permitted by **JAA** regulations. The applied standards were **close** to those of the **180-minute standard**, with the absence of compliance, e.g., with **fuel** requirements of the **Configuration, Maintenance and Procedures (CMP)** document, and with a special "**beyond 120-minute**" minimum equipment list.

What is important to note is that the "**120-minute + 15%**" **ETOPS** authority implemented by ad hoc policy letter in **1995** was one which fell *between existing limits of 120- and 180-minute ETOPS* authorities. It *did not extend* the **maximum ETOPS** authority in existence at the time, as this proposal would do. In the proposed **ATA** policy, the entire body of international standards and FAA guidance material would be expanded beyond present limits. The **1995** action is in no way a precedent for the proposed action

In addition, the **ATA** proposed action does not appear to fit within either the spirit or the letter of compliance with **ICAO** requirements for either **certification** or operations. **As** a unilateral action on the part of the FAA, it clearly does not comply with **the FAA's often-repeated harmonization goals**. Policy letter **EPL 95-1 itself**, and this proposal, both state that "[t]he FAA is committed to harmonize Federal Aviation Regulations (FAR's) and aviation policy with the **JAA** wherever it is feasible, and harmonization in this specific area is desirable." We agree with that statement, and urge the **FAA** to harmonize its proposal *before* enacting any relaxation of existing **ETOPS** criteria.

(10) Limitations Should be Specific

Paragraph c. of the **ATA** proposed policy letter is central to their proposal. However, the language of these proposed limitations is too vague for precise evaluation of their effect on **safety**. The proposed language states that "[i]t is intended that this extension will be applied on a flight-by-flight exception basis." However, there are no limits placed on the frequency with which these relaxed criteria may be exercised. **Without** such a limitation, there is no way one can evaluate the impact of the proposed change. Any action to implement this proposal by FAA certainly must apply such a limitation and provide an analysis of the expected impact on safety of permitting operation to the reduced severity **ETOPS standards** with the permitted **frequency**.

The third sentence of proposed paragraph **c.** states that adequate **enroute** airports must exist on the proposed **207-minute ETOPS** route. It further requires that these airports be available and that, **if they** had been "suitable" for dispatch purposes, they would have permitted operation on the route within **180-minute ETOPS** guidelines of **AC 120-42A**. Thus, the only condition that would permit the use of **207-minute** authority as proposed here would appear to be normal "below minimums" **weather**, applying the definitions provided in Paragraph 4 of **AC 120-42A**. However, elsewhere in this document we note that the justification **for** the creation of these relaxed **standards** includes "political concerns, airport suitability conditions due to higher weather minima at dispatch, various weather related events, and operational necessities." **In** addition, in yet another place the proposal cites "**volcanic** eruptions or other temporary closures" of airports as being justifications for the use of the proposed **207-minute** authority. These exceptions confuse the issue somewhat and would appear to imply that there are many more situations than poor weather which are envisioned to **justify** the use of **207-minute** authority on any individual flight.

It is very **difficult**, without further data and analysis that has not been presented, to understand the implications of this proposed policy element. “Political concerns” are generally not short-lived situations. Volcanic eruptions **can**, as we have seen even in the US, render low-activity airports unusable for months at a time. One can imagine the difficulty of dealing with a need to clean an airport of volcanic ash in some of the more remote high latitude locations of importance here, which lie, ironically, in the volcanic “Ring of Fire.* It appears that “temporary closures” could occur for many reasons, and be of fairly long duration, including the permanent unavailability of adequate airport crash-rescue firefighting capability, weather reporting capability, landing aids, lighting, etc. At what point does a “temporary closure” render an otherwise adequate airport inadequate, and therefore unsuitable regardless of the weather?

These are important factors, which must be quantified in order to understand the safety impact of the proposed relaxation to the **180-minute ETOPS standard**. In addition, **these** factors must be **far** better **defined** and explained by FAA ifoperations inspectors in the US or elsewhere are to consistently apply the guidance. As presently stated, the **limitations** on the **frequency** with which the proposed **207-minute** authority might be **used, or the circumstances under which its use might be justified, are inadequately** defined by any measure.

(11) Baseline Definition of Pacific Airports Needed

Paragraph **d.** of the proposed policy letter **notes** that “[a]llowing **207-minute ETOPS** extension is not intended to encourage or support **further** closure of en route alternate airports.” We concur with this intention, and **certainly** support **all efforts** to keep open alternate airports for use of airplanes of all types, regardless of the number of engines they employ. However, we note that **there** is a wide gap between expressed intention and **assurance**.

The proposal should, as a minimum, incorporate a list of each alternate airport upon which the analysis is based **for** the area of operations within which the use of **207-minute ETOPS** authority is proposed. This list should include specific reference to all available **landing aids, runways,** and other aeronautical data and weather reporting **facilities** as **required by FAR 121.117 and FAR 121.119 which presently exist at or for the airports.** This would to precisely define the “base case,” below which **operations** in the area will not be **permitted**. As presently **drafted**, the intent is clear but it is not converted to an actionable limitation and as such is quite misleading.

(12) Proposal Not Yet Mature

The proposed discussion section of the policy letter concludes with a finding that it is “appropriate” to release the policy letter allowing **207-minute ETOPS authority**. We believe, however, that this submission demonstrates a number of reasons why such unilateral action on the part of the FAA is premature, and inconsistent with the

requirements levied by the standards of **ICAO**. In addition, we urge that harmonization of **ETOPS** regulations, guidance material and policies be done, as the FAA has repeatedly pledged over at least the past 9 years in regard to this specific subject matter.

· **"Approval Basis" Section of ATA Proposal**

(13) FAA Should Reconsider "Still Air" Provisions

The proposed approval basis for **207-minute ETOPS** authorizations continues to rely on the computation basis, **first** established by FAA in **1953**, of distance traveled at single engine speed **in still** air. When this method was first established some **46** years ago, not only were its considerations limited to **60** minutes, but the ability to **nowcast** and forecast winds was relatively primitive compared to that which we have today. **The proposed** relaxation of criteria which is the subject of this discussion involves an increase of **27** minutes of diversion time, **nearly half the total time considered in 1953!** Given reasonable headwind estimates, the **difference** between diversion times computed assuming still air and one actually flown could even exceed the **total 60-minute** maximum diversion permitted in **1953**.

It is time to reconsider the basis of these computations. The growth of diversion times from **60** minutes in **1953** to the **207-minute** maximum proposed today renders obsolete the simplifications **necessarily** made nearly **50** years ago. It is **difficult** to **justify** continued incremental **increases** using such inaccurate assumptions when the state of the meteorological art permits greatly improved calculations with little **difficulty**.

(14) FAA Should Specify Airport Communications Requirements

Paragraph **5** of the proposed approval basis requires that adequate crash-rescue **firefighting** systems (**RFFS**) be available at **ETOPS** alternates. There are two deficiencies **in the proposed language, in our view**. **First, the language reads that "[f]or the case of 207-minute ETOPS, the aircraft must remain at all times within 207 minutes of at least one adequate airport.. which has an RFFS of International Civil Aviation Organization (ICAO) Category 7 or higher."** It appears that the intent of this provision requires that the **aircraft be dispatched to remain within 207 minutes of at least one suitable airport with appropriate RFFS**.

In **addition**, we note the absence of any specific requirement for adequate communications between the airport and the **ETOPS aircraft** (either directly or via relay). Given the remote and demand& nature of much of the North Pacific **area** under consideration, and the **frequent** communications **difficulties** encounter& **it** would appear that special attention needs to be paid to **ensuring** that such communications are reliably available at the airport. This is particularly essential when noting that the **proposed** requirements do not demand the physical presence of adequate **RFFS** on the diversion airfield, but provide for an "equivalent level of support" to be available "given

notification of the divert.” Without special attention to airport communications capabilities, it is likely that such an intention would not be **fulfilled** at some of the North Pacific area alternate airports.

(15) FAA Oversight Needs to be Independent and **Adequately Staffed**

Paragraph 7. of the **ATA** proposed approval basis contains specific reporting requirements for **207-minute ETOPS** operations. We concur in the need for adequate data **gathering** so that trends can be monitored and appropriate corrective action defined and taken We are concerned, however, at the current state **of FAA** monitoring of **ETOPS** operations, and do not see these provisions as addressing this need.

The regulatory authority should not be in the position of being unable to adequately oversee the regulations it enacts. FAA today does not have any ongoing surveillance activity within its Flight Standards organization devoted to monitoring compliance with **ETOPS** operations and maintenance requirements, following trends, and initiating appropriate corrective action Despite the safety criticality **of these operations**, and the detailed guidance contained in AC **120-42A** and its Appendices 1 and **4**, FAA resources specifically devoted to continuing surveillance of **ETOPS** operations and **certification** related issues is minimal. FAA relies almost completely on the industry to be alerted to trends that threaten the safety of **ETOPS** operations. It conducts no routine **independent** reviews of its own on a national basis, and only on an exceptional basis at the individual operator level.

These operations are too safety critical to be **ignored**, as is essentially the case today. FAA should, in addition to requiring still more reports **from** the industry, devote the **staff** expertise **and** resources necessary to properly oversee maintenance and operational trends in regard to **ETOPS** operations of all types.

In addition, this specific **paragraph** of the proposed approval basis should be reviewed and revised to be more specific in delineating precisely what will be **reviewed** by this industry group (and, one hopes, by FAA as well). Review criteria should be established, and appropriate control limits need to be established for each review item Determinations should be made, *before the fact*, of what constitutes acceptable variation in the monitored elements, what criteria **will** be applied to determine that performance has **fallen** below acceptably safe levels, and under what conditions **207-minute ETOPS authority will be withdrawn**.

(16) **Type Certification Limits Cannot be Waived by “Policy”**

The last **paragraph** of the proposed approval basis discusses type design approval requirements. **Somewhat surprisingly** (perhaps based on the **erroneous** impression that the **1995 ETOPS** policy letter forms an adequate precedent for this action), the proposal suggests that only a **180-minute** type design approval be required in situations where a

maximum of **207-minute** diversion times be authorized. This appears to be a clear **difference** with existing **ICAO** standards. It also constitutes a major deviation **from** the requirements of the present FAA advisory circular, and appears to violate the very limitations imposed by FAA in its own certification process.

Note that., in **1985** when the concept of **ETOPS** was **first** presented in AC **120-42**, the “**138-minute**” authority was based on a system that, at the time, did not include limitations on the type certificate data sheet because **ETOPS was just** being introduced. It is only recently, in accordance with **ICAO** requirements and FAA certification decisions involving special conditions for early **ETOPS** approvals, that type **certificate** limitations have been introduced. Having done so, one cannot revert to a system which was based in part on operational approvals that were not precluded by such limitations, as **is now the case**.

In addition, as discussed above, employing such informal policy letters authorizing waivers of type certificate limitations creates considerable **confusion** on the part of non-US authorities who would seek to authorize similar expansion of **ETOPS** authority for their operators of **aircraft** originally type certificated by FAA. The presence of FAA imposed limitations on the **aircraft** purchased or leased by their operators would appear to preclude any authority to take advantage of such an **informal** process.

We strongly urge that FAA establish, through public rulemaking, criteria for approving type certificate limitations appropriate to any expansion of **ETOPS** authority, and follow these criteria in **modifying** the existing type certificate limitations of **180-minute** diversion time. We would further urge that any such action be harmonized with other regulatory authorities, and developed in a **fully** public process.

We note that this **paragraph** of the proposal also requires a review of the **airframe-engine** combination to determine **if there** are any factors which would **affect** safe conduct of **207-minute ETOPS** operations, and a number of **factors** are then discussed. In many of **these factors**, however, as **further** discussed below, no specific criteria are proposed to permit judging whether or not the review has found an acceptable level of **safety**. In such a review, it is critically important that specific and clearly defined “pass-fail” criteria be defined *before the fact, so that reviewing* officials in FAA and other countries can **consistently** apply them. That **effort** should be completed before any criteria for expansion of **ETOPS** authority are established.

(17) Need For Specific Pass-Fail Criteria

The numerical probability analysis proposed to be a prerequisite to approval **of the** ax&me-engine combination for **207-minute ETOPS** operations does not include any **pass-fail** criteria. Without such “**pass-fail**” criteria, such a requirement is meaningless, and is bound to produce inconsistent results depending upon the analyst.

(18) Time Limited System Effectiveness

Three **paragraphs** in the proposal discuss time-limited systems. The first requires adequate oil supply margins to support a **207-minute** diversion in still air plus an additional allowance of **15** minutes for holding, an approach and landing. However, as a general observation as discussed above, given today's state of the art in meteorology and forecasting, the actual maximum likely diversion time, given realistic winds of the day, can easily be forecast. In **fact** these data are necessary in order to calculate the fuel requirements for the **flight**. FAA could not propose to permit dispatch with an oil supply that is known, at time of **takeoff**, to be **insufficient**. The fuel and **oils** supplies must cater for the winds that will be encountered in the event of a maximum duration diversion for all flights, not just for **ETOPS** flights. It only makes sense to **require** that the oil supply margin be consistent with **actual forecast winds, and** not still air conditions, under realistic worst case conditions. In point of **fact**, this issue does not appear to be **ETOPS-specific**, as certification requirements themselves would be expected to provide adequately large oil reservoirs.

The second paragraph similarly discusses requirements **proposed** to be **applied** to cargo fire suppression systems. We believe that the predicate for this **paragraph**, a computation that **unrealistically** considers still air rather than the actual forecast winds, is similarly flawed. How can one justify permitting takeoff with a fire suppression capability that is **below that required for the actual forecast** maximum diversion time? Here, too, it only makes sense to require that the **fire** suppression systems be capable of safely containing a fire for the entire length of the maximum anticipated diversion time consistent with actual forecast winds.

Finally, the proposal requires that, for other time-limited systems, the time limit for those systems be predicated on **still** air diversion times. We suggest that these requirements be predicated on maximum actual forecast diversion times as well, consistent with the actual forecast winds at departure, rather than the artifice of a still air assumption.

19MMEL Amendments are Always Possible

The proposed language of the review of the suitability of the **airframe-engine** combination **for 207-minute ETOPS** would provide for amendments to the master **minimum equipment list (MMEL) if the** reliability analysis or service experience **indicates** that the existing **MMEL** is no longer appropriate for **207-minute ETOPS operations. Without** a clear explanation of what is intended here, and specific criteria that can be applied to determine when the **MMEL** is no longer appropriate, and what **amendments might be required, this paragraph cannot be fully evaluated nor can it be** expected to be consistently **enforced** by regulatory authorities. This provision need not be specific to **207-minute ETOPS** operation, since **MMEL's** should always be appropriate to the kind of operation for which they are used.

"Application" Section of ATA Proposal

(20) Flight-by-Flight Limitation

As noted above, the **ATA** proposed authorization to use **207-minute ETOPS** authority does not appear to substantially accomplish the apparent intent to make the use of such authority a rare event. If the present loose explanation of when such flight-by-flight exceptions would be acceptably authorized is not **modified as** discussed more **fully** in our comments above, the **207-minute** authority could be used quite **often**. This would effectively create a **permanent** (as **opposed** to **infrequently** used) extension of **180-minute ETOPS** authority to **207-minute** diversions, which is not the stated intent of this action.

There needs to be a clearly defined set of criteria which **define** precisely when exceptions **can be granted to the 180-minute limitation, and these criteria need to be written so that** (as is intended) the exercise of the authority would be a rare event.

(21) Flight Standards Should Not Waive Certification Limitations

Paragraph **2.** of the "Application" section refers to application for **approval** of an airframe-engine combination **for 207-minute ETOPS** authority. It is contemplated that this approval, which waives a clearly stated limitation on the Type Certificate Data Sheet' would be given by the FAA Flight Standards Office. (Note that this limitation is also reflected in the "limitations" section of the pilot's Airplane Flight Manual, which must be obeyed.) This informal approach constitutes an undesirable blurring of authority, which is unprecedented in FAA. While it is acknowledged that it is not necessary to have the FAA Aircraft Certification Service approve every individual operational aspect of airline operations, it is unprecedented to provide authority outside of the Aircraft Certification Service to waive type **certificate** limitations for any other than emergency reasons.

As explained more **fully** in our comments above, we believe that such changes to **limitations** placed on the Type Certificate Data Sheet because of special conditions should only occur after full notice **and** comment opportunity, in the normal rulemaking
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(22) Requirement for Operational Revisions Needs to be Specific

Paragraph **4.** of this section refers to a proposed **requirement** that "a summary of revisions made to operational documents" be provided as part of the request for authorization to use **207-minute ETOPS** authority. Nowhere in this **ATA** proposal is there a clear explanation of what revisions are required to the airline operational documents.

It is essential' for **uniform** enforcement and application in both the US and other **countries**, that clarity characterize the requirement for changes to airline operational

documents and procedures. We request that such requirements be developed and harmonized internationally.

(23) Training Requirements Need Specification

Similarly, Paragraph 5. of this section refers to a proposed requirement that a request to use **207-minute ETOPS** authority include “a summary of the revision to training curriculum for maintenance, dispatch, and flight crew personnel to distinguish **207-minute ETOPS** authority **from 180-minute ETOPS** criteria.” The precise aim of this proposal is unclear from the brief explanation provided (as quoted). We assume that this **paragraph refers to changes in the airline training that would be required by FAA** to ensure that maintenance, dispatch and flight crew personnel receive appropriate **training** in the additional elements of **ETOPS** operations necessary to promote the highest possible level of **safety** when exercising the proposed **207-minute ETOPS** authority. Nowhere in the **ATA** proposal is there a clear explanation of what changes in these airline training curriculums are **required**.

Here, too, we believe that uniform enforcement and application of these requirements demands more detailed guidance for inspectors and airline personnel in FAA and other **countries**. We would hope that it, too, could be internationally harmonized,

(24) Inspector Training Not Addressed

While the **last paragraph** of this section requires that the policy be distributed to **all ETOPS** operators, nowhere in the **ATA** proposal is the important issue of FAA (and other authority) inspector training addressed. We believe that lack of proper training in new policies and procedures can lead to significant problems potentially resulting in a reduction in operational safety levels **from** lack of appropriate oversight. In addition, it is **unarguable** that an absence of **training** promotes inconsistency in the application of FAA regulations and policy.

We strongly recommend that such inspector guidance and **training** curriculums **be** developed, and **harmonized** internationally, prior to any expansion of **ETOPS** authority **beyond existing limits**.

"Executive Summary: B777 Reliability Study" Section of ATA Proposal

(25) Reliability Study Data Incomplete

This section of the **ATA** proposal as published by FAA appears to have **been** furnished “to assist in **[FAA]** review and analysis of this **proposal**.” Inasmuch as the document does not contain the detailed reliability study to which it makes **reference**, it is only possible to make general comments on the subject matter.

We strongly request that the complete study, and all supporting data, be entered into the docket to permit the **affected** public the opportunity to review it in detail and offer comments.

(26) Data Needed to Justify Rule Change

The summary states that “the **180 minute [ETOPS] limit *has been shown*** to present certain obstacles to reliable operation in the North Pacific.” [emphasis added] However, nowhere in the **ATA** proposal or in this summary section are there any details furnished to **justify** this statement, or to provide statistical data to support it. This is all the more problematic when, elsewhere in this **ATA** proposal, it is noted that **ETOPS** operations are presently being conducted in the Pacific by one airline, and 3 more plan to initiate such **operations** this year. We find it hard to reconcile this rapid increase in **ETOPS** operators **in the Pacific, which is taking place with the current 180-minute limit, with the claim that** such operations are unreliable.

We **suggest** that specific historical data be provided to **demonstrate** precisely what “obstacles” have been shown to be present which prevent “reliable operations” in the North Pacific.

(27) How Frequently Would Authority be Exercised?

We note, as discussed above in these comments, that the stated intent is to provide for **207-minute ETOPS** operations “on a flight-by-flight exception basis,” with the clear message that these exceptions would be **infrequent**, resulting **from** unusual combinations of below-minimums weather at several airports simultaneously. However, this section clearly contemplates more **frequent**, perhaps routine, use of this **207-minute** authority “when typically used alternate airports are temporarily unavailable *for reasons such as* weather.. **volcanic** eruptions, or other temporary closures.” [emphasis added]

It is proposed that the exercise of **207-minute** authority not be used to support the closure of airports in **the** North Pacific. To **meet** that objective, it appears that more precise specification of the **circumstances** under which **infrequent** use of the **207-minute “flight-by-flight exception”** authority is warranted. As explained in this section of the document, it is difficult to rule out any **frequency** of use of the authority, even **if it** were used nearly all the time, as there is a lack of quantitative measures which **could** be used to determine if utilization becomes excessive.

Quantitative guidelines limiting the frequency of use of the proposed **207-minute** authority would be **useful**, as would more precise specification of the circumstances **justifying** a waiver of the **180-minute** maximum limit.

(28) Forecast Weather Needs

This section once again raises the issue of the conservatism inherent in establishing the alternate airport weather minimums during flight planning. Without a solid statistical basis for showing that this conservatism is unnecessary, such an approach appears to move in exactly the wrong direction

In **fact**, this proposal is quite inconsistent with the conservative **safety factors** applied for the past **14** years to **120-** and **180-minute ETOPS** operations. As written, this proposal would maintain the extra conservatism for shorter **120-** and **180-minute** maximum diversion times. However, the inability to waive the requirement for **180-minute ETOPS** flight planning would create a situation that would justify **207-minute ETOPS** operations (assuming suitable weather conditions at that more distant alternate). Given the possibility that the **207-minute** diversion alternate might be the only available alternate in **the area, this does not seem to be a prudent approach.**

(29) Atlantic ETOPS Diversions Far Shorter Than Pacific

This section discusses the safety record of the **1.4** million **ETOPS** flights that have **been** made by Boeing **aircraft** since **1985**. It goes on to note that none **of these** flights have **ever** performed a diversion of **180** minutes duration, and asserts that no airplane of any type has ever performed a diversion of that length to an alternate airport. It concludes by **saying, "Therefore, allowing a 15% extension [of the existing standards] to 207-minute ETOPS is unlikely to result in an actual diversion in excess of 180 minutes."** That assertion is unsupported by the facts **presented.**

We note that, contrary to what is implied herein, we are not talking about continuing the **status** quo, but of changing a **paradigm** by encouraging wider use of **ETOPS** in the North Pacific. The statistics governing past diversion times do not apply to these new routes. In fact, using them in this discussion is misleading.

In the Atlantic, where most **of the** previous **ETOPS** flights have occurred, the probability of a diversion of anywhere near **180** minutes is **extraordinarily** low, **because virtually** all flights are flown within **120-** or **138-minute ETOPS** authorities. This limited experience with very long distance diversions is precisely one **of the reasons** why we urge caution in **expanding ETOPS** authority beyond **180** minutes, especially **in the** "remote and demanding" areas of operation such as the North Pacific.

Moving to the North **Pacific** changes **fundamentally the** type of **ETOPS** flying that will be done. For reasons of geography, a **trans-Atlantic** flight causes only a brief exposure to **the** need for **ETOPS approval.** A typical **trans-Atlantic** flight might spend perhaps 2 hours in a location more than **60** minutes **from** the nearest suitable airport. Only rarely would an Atlantic flight spend more than a **few** minutes beyond **120** minutes **from** the nearest suitable airport. **Thus,** in the event of a **need for** a diversion, it is **only** the most **rare cases in which it would need to divert for more than 120 minutes, and generally the**

diversion time would be something closer to **60** minutes. Therefore, the statistics quoted in this section of the **ATA** proposal, relying as they inevitably must on the **trans-Atlantic** experience, are not surprising. Neither, however, are they instructive when considering North Pacific operations.

On the contrary, North Pacific operations using existing **ETOPS** authority stretches the very boundaries of the **concept**. On a typical North Pacific flight **from** the US to the Far East, once **60** minutes **from** the nearest suitable airport on departure, the distance **from** the nearest suitable airport generally increases to around **120-180** minutes. Because of the vast distances **involved**, and the remote nature of the environment, this distance is then roughly **maintained** for many hours, until approaching the destination airports. The typical time during which flying the North Pacific routes exposes passengers to the need for a diversion of greater than **120** minutes is not, as **in** the Atlantic, a few minutes, but many hours! A major portion of the cruise segment of a North Pacific **flight** can be expected to be flown **120-180** minutes from the nearest suitable airport. Thus, in the event of an **ETOPS** diversion in the **Pacific**, it is to be routinely expected that a single engine diversion will last for **2, 3** or even 4 hours, depending upon actual wind and weather conditions. The risk of a long diversion in the Pacific is vastly greater than that which can be expected in the Atlantic, and the Atlantic experience cannot be used as a basis for projecting diversion times under the proposed operating scenario. Adopting this proposal will substantially increase the risk of these exceedingly long diversions.

Airplane and **engine** certification requirements, human factors considerations for crew and **passengers**, risk of second **failures** and their consequences, and the extraordinarily adverse climate experienced during the North Pacific winters are a few of the important safety related factors. All of them need to be **carefully** reconsidered before relaxing the existing **180-minute ETOPS** standards that have been internationally agreed for so long. We urge that this be done internationally, and the resulting regulatory and guidance material **be** harmonized.

(30) Need for Climatological Data

This section asserts that adopting the relaxation to the **180-minute ETOPS** standards as proposed by **ATA** “will allow **more** direct **routings**, as well as greater choice and **flexibility** [in choice of diversion airfields] should a diversion be necessary.” In **fact**, this is true only in **the** general sense, as allowing **207-minute ETOPS** permits a wider circle of consideration for diversion airfields. However, as proposed herein, on a flight-by-flight exception basis for reasons of unsatisfactory weather, is it not at **all** clear that additional flexibility would be the result. Indeed, one can readily envision situations in which the adverse weather **circumstances** that necessitated the exercise of the **207-minute diversion** authority in the first place give rise to a flight plan in which the **207-minute** diversion airfield is the only one forecast to be available.

The assertion that the relaxation of **180-minute ETOPS** standards will provide for greater choice and flexibility for flight crews in the event of a diversion is not **always** valid.

Climatological data should be presented and analyzed to determine the **frequency** with which flexibility **will** be increased, and how **often** it will actually be reduced.

(31) Claimed Risk Reduction Not **Supported by Data**

This section makes the remarkable statement that relaxing **the present 180-minute ETOPS** diversion time limitations “may actually result in decreased diversion times.. **[and]** may actually yield a net decrease in risk.” No data whatsoever has been presented to support this claim. It **may** be true that, for certain routes **made** newly available by relaxing the **180-minute ETOPS** limit, the overall flight time is reduced, and that CM **be** said to marginally reduce the exposure time, and therefore reduce the risk on a given flight of the need for a diversion on these routes. (This, we suspect, gives rise to the economic incentive to seek this relaxation.) However, it is clear that, as discussed earlier, when comparing the past **14** year of **ETOPS** flying with the **projected** increase in North **Pacific ETOPS** flying envisioned in this document, it is impossible to project anything but a dramatic **increase** in overall risk. North Pacific flights involve much longer distances, and during each flight the aircraft is exposed for much longer times to the need for **ETOPS** authority. If a diversion is necessary in the Pacific, the likelihood that the diversion will involve several hours of actual single engine flight time is vastly greater than would be experienced in the Atlantic, both in terms of averages and in terms of extremes, for reasons discussed above. Relaxing the **180-minute ETOPS standards** to permit even greater diversion times clearly increases the extremes of each of these risk **factors**.

(32) Type Certificate Limits are **Regulatory**

This section goes on to state that, on the basis of the alleged reduction in risk discussed previously, “formal review of **B-777 certification** related data is probably unnecessary for approval of **207-minute ETOPS.**” We disagree. First, as we have noted, no data has been provided to support the alleged **reduction** in risk associated with the relaxation of the **180-minute ETOPS standards**. **Until facts and data support this assertion, it should not be** given any weight.

Perhaps more important, however, is the implication that FAA should ignore the specific **180-minute ETOPS** limitations it imposed during the **B-777 type certification** process in accordance with normal public rulemaking procedures. These **limitations** not only constitute a regulatory limit, but also are those required by **ICAO ETOPS** standards, and are relied upon by the authorities of every country whose operators use the **B-777 in ETOPS** service. Surely FAA cannot simply, by using an **ad hoc** policy letter, modify these regulatory limitations at **will**.

Given the regulatory nature of these Type Certificate Limitations, and the obligation to establish them in accordance with **ICAO standards** and international practice, we would expect that FAA would establish formal criteria for type certification to **207-minute**

ETOPS diversion times, just as it has done for **180-minute** diversion times. We would hope, given the **FAA's** stated position in regard to **ETOPS** regulatory and policy harmonization at least going back 9 years, that these changes be developed in an international forum, and harmonized with other nations, and with **ICAO** standards. We would also expect that they would be in the form of regulations.

(33) Reliability Assertions Not Supported by Data Provided

Despite the assertion noted earlier that there was probably no need for a formal review of the **B-777** certification related data, “an analysis of the **B-777** type design was nevertheless performed to assess the suitability of the **B-777** airplane to a **207-minute** diversion.” This section of the **ATA** proposal **summarizes** that analysis. It is asserted that “[i]n all cases, the most conservative criteria with the **greatest** impacts were applied to this analysis.” Nevertheless, the specific criteria that were applied and analyzed, and the results **of those** analyses, are not provided. It is, therefore, not now possible on the basis of the public record to evaluate the **validity** of the claim that “this analysis **confirmed B-777** airplane design and reliability capability well in excess of the proposed **15%** extension.”

To complete the public record, it is necessary to include the **complete** basis for these analyses in the public docket and permit time for interested parties to review and comment on these important data. Without these **data**, one can evaluate neither the results of the analysis, nor more important, the criteria applied to make a **determination** that the airplane is indeed suitable for the proposed operation. In addition, it is essential that these data be provided to permit future evaluations of other airplanes for similar applications, **should** the need arise.

(34) Time Limited Systems Considerations

Despite the assertion (above) that “this analysis **confirmed B-777** airplane design and **reliability** capability well in excess of the proposed **15%** extension,” the document goes on to say that “**the** undersigned parties are prepared to offer a modification to the cargo fire protection system that accommodates the **15%** extension in **ETOPS** diversion time, even though risk analysis methodology does not demonstrate a need for such a modification” **Fire** protection systems are not generally installed based on an assessment **of the risk that a fire will last for a particular duration, but are installed to conform to the** regulatory requirements set by the **certificating** authority. **Certainly** this is the case with **ETOPS requirements** that exist today, and we can find no justification **for** resorting to a statistical risk analysis rather than providing adequate protection for the maximum diversion time permitted.

In addition, we pointed out above that the nearly **50-year** old simplifying assumption that the diversion would take place without any headwind should be discarded in favor of a more realistic criterion. We suggest that the time-related cargo fire **limitations**, and all

other time limited systems in the airplane, have operating duration requirements established that are based on the actual maximum diversion time expected at dispatch, taking into account the latest forecast winds. To do otherwise ignores data already in the hands of the operators for **fuel** and oil requirements planning, and inappropriately relies on statistical luck in the event of a diversion. Modifications to account for actual flight times including forecast headwinds do not involve substantial cost, and could mean the difference between a successful diversion and a catastrophe.

Additional Technical Considerations Regarding ETOPS Beyond 180 Minutes

(a) Increased Risk of Additional Hardware Failures

The vast **distances** of travel in the Pacific area give rise, as noted earlier, to not **only** much longer travel times than those common in the Atlantic, but to very much longer average and maximum diversion times. These **factors**, then, should cause a review of the fundamental risk assumptions and models used in developing **ETOPS** risk management guidelines before relaxing them. In particular, the **ETOPS** flight sector length itself may be **150** minutes in the North Atlantic; **400** minutes in the North Pacific; **540** minutes in Polar areas; and over **600** minutes for South Pacific flights. Thus we could expect up to 2 times the rate of **ETOPS** diversions on the North Pacific as would be experienced on the Atlantic (on the assumption that risk increases linearly with exposure time). Associated with these flights are typical (not maximum) diversion times (including considerations of typical actual temperature and winds) of **75** minutes in the North Atlantic, **160** minutes in the North Pacific, **140** minutes on Polar routes, and **195** minutes in **the** South Pacific. Making the same assumption about the relationship between risk and exposure time, we can speculate that, typically, the risk of a second engine **failure** will, on the North Pacific routes, be double that on the Atlantic.

Additionally, engine **in-flight** shutdown rates are not expected to be the same, based on available data, between cruise and the **higher** engine power setting that is required during a single engine diversion. A **preliminary** review of the data available shows that **the** shutdown rate at diversion power settings may be a factor of 2 above that required for **180-minute ETOPS approval**. Combining all of these **factors** appears to indicate an **increase** in risk of a diversion by a **factor of 2**, and an increase in risk of a subsequent dual engine **failure** of perhaps a **factor of 4** or greater for North Pacific operations compared to those in the Atlantic. The data, **while not dispositive**, are **sufficient to call for** a detailed public review of the risk assumptions adopted **some 14** years ago for **ETOPS** flying before relaxing the restrictions based in part on that **model**.

(b) Extremely Low Temperatures and Long Diversion Times

The temperatures and exposure time at diversion altitudes over the North Pacific and other high latitude areas introduce risk **factors** not covered by current **ETOPS** risk management criteria. The cockpit and cabin temperatures that will be achieved **after** only a short time in the event of a double **bleed failure** (or **failure** of one engine plus the

opposite bleed) are severe enough that such an event should be **considered** “catastrophic” in terms of system certification **criteria**.

To ensure compliance with the system certification criteria of FAR **25.1309**, it would **appear that a** third bleed source is necessary over such lengthy diversions at high latitudes **in the winter**.

(e) Severe Engine Operating Conditions

There is little experience in **certification** testing or otherwise that will provide **confidence** in prolonged engine operations under the severe weather conditions that are likely to be encountered in the Pacific at diversion altitudes. These conditions include severe conditions of **ice** buildup on the failed engine nacelle, **fan** and spinner, and the associated increased drag. In addition, severe precipitation can be expected for prolonged duration during a diversion in some seasons, such as the conditions considered by the new **threat** model of **NPA JAR E 20**, for hail and rain ingestion.

We believe these conditions should be explicitly considered prior to relaxing the **180-minute ETOPS** limitations, and consideration should be given to developing the **necessary** detailed data and adopting requirements for risk management that directly address these **factors** which are unique to the area.

(d) There are Inherently Reduced Operational Safety Margins in the North Pacific

A number of **factors** combine to present unique challenges to **ETOPS** operations in the North Pacific. Time available for comment does not permit development of all the necessary data, but it is clear that there will be a high percentage of days when it can be expected that the actual (**not still air**) maximum diversion time will be greater than **180 minutes**.

For example, a review of **climatological** data immediately available for **1996** shows that **Magadan (GDX)** was closed for the equivalent of **22** days. **GDX** had a probability of closure due to adverse weather in December, **1996**, of **22.5%**, and there were **32** days when the **RVR** was below **ICAO Cat III** minimums in **1996**. Similar **statistics** for **Petropavlovsk (PKC)** showed it closed for **26** days in **1996**; **the** probability of **PKC** being closed in December of that year was **33%**, and there were **16** days when **RVR** was below **ICAO Cat III minimums**. **In Yakutsk, (YKS) we found that for 30 days in 1996 the RVR** was below **ICAO Cat III** minimums. Detailed **climatological** data are available (given more time) that will clearly demonstrate the **frequency** with which the North Pacific alternate airports are actually expected to be available if needed. That data should be developed and made available to decisionmakers (and the interested public) before relaxing the **180-minute ETOPS** standard.

In addition, we are concerned about the reliability of **weather forecasts** that are issued more than **15** hours before the time of use of the alternate airports. Again, a study of the

available **climatological** data can be done to address this point. These data should be used to determine whether the extremely long distances which give rise to the need for such long range forecast reliability dictate the need for alternative procedures.

(e) Airport Communications

We noted above that the alternate airports are **not, as yet, equipped with reliable** communications capability (e.g., **SATCOM**) so as to effectively be able to **communicate** with the airline and the airplane in the event of a diversion emergency. There are **the** issues noted earlier regarding weather forecast reliability. In addition, there is a need for notification of **RFFS** crews to bring required **safety** equipment to the field and the need for accurate assessment of airfield conditions **from** snow, volcanic activity, or other weather **phenomena**. Therefore, consideration must be given to developing an appropriate **communications** risk management strategy for **ETOPS alternate** airfields in the Pacific. This is not explicitly discussed in the proposal

(f) Availability of Diversion Airfields

In the North Pacific, the flight crew may have no option to weigh alternative airfield risks. In many realistic situations, the isolated nature of the North Pacific airfields means there is no second alternate. In fact, unlike the North Atlantic, the North Pacific can easily give rise to a diversion requirement in which fuel reserves are not **sufficient** to allow the crew a choice between alternate airports. Experience has shown that it is **often**, if not usually, the case in the North Atlantic that a better suited alternate has been used, rather than the one that is closest at the time of the diversion decision.

(g) Basic Risk Model

The **ATA** proposal is based on a maximum **IFSD** rate of **0.019** shutdowns per **1000** engine operating hours. The state of the art in engine reliability is now approximately **0.01** shutdowns per **1000** hours.

In the mid-eighties, the original **ETOPS** criteria were based on the benchmark engine of the time in terms of engine reliability, the **JT8D**, because full compliance with the kind of system **reliability** requirements imposed by FAR **25.1309**, for example, were **unattainable**. In order to provide compensation for this quantitative anomaly, the Propulsion System Reliability Analysis Board (**PSRAB**) was formed within FAA. This **function** has now essentially been discontinued on an operational **basis**, and the state of the art engines can now comply with the requirements of **FR 25.1309** on existing **ETOPS** routes of the North Atlantic using internationally accepted **ETOPS** risk models.

The acceptable value of **0.019** shutdowns per **1000** engine hours, coupled with the inherently higher risk of diversion on the longer **ETOPS** routes of the Pacific, the substantially longer diversion times that would be experienced on average in the Pacific,

and the expected higher increased risk of a double engine **failure from** the long duration high power operations associated with a long diversion all combine to produce a risk model **result which**, despite the advances in engine technology over the last **15** years, **represents a step backwards. These issues** should be discussed in some detail in an **international** forum, and results of past improvements in **ETOPS** risk model results should be compared to alternative projected **future** scenarios to properly weigh the risks and benefits. These data should be used as part of the basis for decisionmaking in this **important area. Airbus** stands ready to devote the resources necessary to support this initiative on a high priority basis.

(h) An Alternative Approach to **ETOPS** Regulation

In the **1980's**, when **ETOPS** criteria were first being developed, the discussions focused on an immediate desire to operate to **138-minute** maximum diversion times in the North Atlantic, and to quickly move to a maximum **180-minute** standard. Even in the **1990's**, the **180-minute ETOPS** limit was seen as adequate, and twin engine airplane ranges of **7000** nautical miles were seen as the extreme of the future. (See, e.g., "Twin-Engine Transports, A Look at the Future;" Richard **W. Taylor**, Vice President, Boeing Commercial Airplane Group; **1990**) Perhaps it is time to change that **thinking**.

It is clear from the **ATA** presentation that there is a body of **thought** that the reliability of engines is so high, and the likelihood of a dual engine **failure** so low, that the **ETOPS** requirements as presently laid down in **ICAO, FAA, JAA** and other authorities regulatory and guidance material are outdated. This is worthy of exploration in an attempt to determine whether, and under what conditions, the **ETOPS** regulations themselves could be eliminated, as they were some decades ago for **tri-jets**. For example, a revised "risk model" may indicate that current engine reliability rates and "time at risk" **in the Atlantic area** of operations show that current **ETOPS** regulations relating to minimum diversion times are no longer required. Perhaps overflight of **the** nearest airport might be permitted in some circumstances in this area. However, these may not be the case in the Pacific or in other areas of the world where the exposure time is much greater, and the ground environment much more harsh.

The **fundamental restrictions** on twin engine flying which give rise to the need for special **ETOPS** authority **ETOPS** are contained, **for** example, in FAR **121. Because a failure** of one of the two engines on a twin will leave it **one failure** away **from** an accident, special attention is given to the need to immediately land at the nearest suitable airport following an engine **failure**. On a **tri-jet** or a quad, however, such a requirement does not apply. If the pilot in **command** of a **tri-jet** or a quad evaluates the relevant **specified factors** and determines that it is safe to do so, he may land **at** another airport. For many reasons, but especially for reasons of passenger well being and safety in harsh environments, this is a very substantial advantage for **tri-jets** and quads. In the early days of jet transports, and before, the relatively poorer engine reliability was such that it would not be prudent to overfly a **suitable airport in a twin**.

To&y, however, it is appropriate to rethink this restriction. When reduced to the basics, eliminating this overflight limitation is similar to what is being proposed in the present **ATA** documents, though they propose to maintain restrictions that prohibit a perfect parallel. At root in the **ATA** proposal, however, is their determination that engine reliabilities have achieved a very high level. A simple extension of the **ATA** proposal is that, with appropriate additional considerations that can be economically implemented in the form of both hardware and procedural changes, safe overflight of what are today defined as “suitable” airports can be considered for twins.

We believe that such an approach is particularly desirable because it is **difficult, especially** in such remote and demanding areas as the North Pacific, to provide for adequate passenger **safety** and well being at every available suitable airport. Assuming that airplane safety considerations permit, it may be better for the overall safety and well being of the passengers to land at a more distant airport than the nearest suitable one **under certain circumstances**, especially in harsh environments such as the North Pacific winter. **Of course** the question as to whether overflight of a twin engine airplane should be allowed could be treated independently of the issue of the need for establishing maximum **ETOPS** diversion times.

Airbus Industrie recognizes that these types of changes constitute major steps. They cannot be taken without **full** consideration and acceptance by the international community of regulators, airlines, pilots, maintenance technicians, and **manufacturers**. They also cannot be effected by simple guidance material or policy letter, but must have the **full** backing of formal certification and operations regulatory material both in the national Civil Aviation Authorities, and in **ICAO**. This approach would meet the requirements that are laid out in the **present ATA** proposal.

We suggest that FAA consider this alternative to the kind of incremental change that has characterized the past **14** years of FAA **ETOPS** guidance. Successful completion of this effort would establish necessary guidelines for **ETOPS** diversion authority limited only by specified safety considerations and not specific times. If fully implemented, it would also improve the confidence of the flying public by eliminating the unique overflight limitations associated with twin engine airplane operations.

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