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PMA From Revolution to Evolution

Keynote Presentation

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Gorham Conference

April 8, 2010



The Revolution

- PMA industry driven

The Evolution

- Airline and MRO Driven
- FAA Influence in the Evolution
- Value Propositions

Closing Comments – it's in your hands



PMA development seemed more like a revolution than a growth industry...

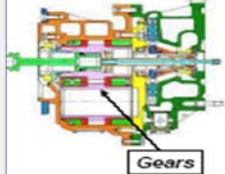
- There was great debate between Customers, OEM's and PMA Suppliers about warranty issues, regulatory issues, and general legality of the parts
- The OEM used strong negative language in advertising and in conference presentations stating PMA's were “bogus parts” and/or that they were “technically inferior”

Example of FUD in a presentation.....

50
YEARS
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Configuration Management . . . PMA

CFM56 Main Fuel Pump



- Four low time impeller drive shaft failures after pump overhaul
➢ 37, 52, 3289 & 133 hours
- Failures attributed to interaction with PMA gears installed during pump overhaul
➢ PMA gears have variation in key geometric features v. OEM design
- No similar failures documented with OEM designed fuel pumps during last 16 years
➢ more than 180M engine flight hours


Pump Marked with OEM Part Number . . . PMA “Hidden”

GE Aviation Services *CFM56-3B Engine & Main Fuel Pump* *GE Aviation* *16 February 2008*

No Facts, No Data, No references – just FUD...

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Alternate Materials



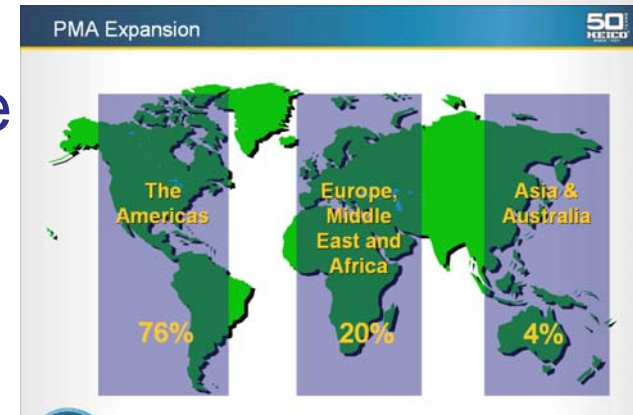
- PMA parts and non-Type Certificate Holder repairs available today may vary substantially from the type certified parts produced by GE
- materials, processes, certification basis, configurations, . . . etc.
- GE issued Instructions for Continued Airworthiness (ICAs) do not apply

Part Numbers are Identical!

GE Aviation Services *GE Proprietary - Subject to Restrictions on Cover Page* *CFM-56/3B Technical Symposium* *November 2006 - 2008*

PMA development seemed more like a revolution than a growth industry...

- Alternate parts in many areas of the world were taboo
- Many players involved in the development of alternative parts, primarily in engines and core auxiliary systems
- Curiosity from both the customer and supplier side of the industry



Acceptance

- Aggressive acceptance of PMA parts was generally from a small group of airlines and MRO's utilizing a small set of parts
- They were firm in their stance backing the PMA industry on many occasions
- Each had their own methodology to accept PMA parts into their systems. Review process as long as 18-24 months
- But they would eventually approve the part and start purchasing them

Parts Group - Strategic Partnerships

HEICO[®]

IS A SOLUTION FOR:

Lufthansa Technik 1997	JAL 2004
American Airlines [®] 2001	BRITISH AIRWAYS 2007
UNITED AIRLINES 2002	EXPRESSJET 2008
DELTA 2003	IBERIA 2010

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Regulatory

- FAA Order 8110.42 was clear about responsibilities
- Bi-laterals with other nations was also firming up in favor in the PMA industry
- Several keys documents but many interpretations of those documents led many astray from the facts of acceptance



Offering

- Generally lower complexity parts across many suppliers
- Product often developed on speculation thinking surely airlines and MRO would want an equivalent part for less money
- Some suppliers didn't handle the growth well
- Others become very aggressive in their development of product



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Airline and MRO Acceptance

- PMA life cycle is now entering an evolution stage
- PMA Suppliers over the years have taken a strong stance to show it has the capabilities to support the industry with lower costing alternative parts
- The time is now right for the airline and MRO sectors to aggressively move the industry in to the next stage



Driving the industry Forward

- **Approval Process**

- Airlines and MROs working on creating more streamline approval processes
- Focusing less on the actual parts and more on the supplier
- The parts are already FAA approved



Driving the industry Forward

- **Strategically core to business**
 - Requires a strategic mindset to keep PMA at the forefront of the MRO and Airline growth strategy
 - The PMA industry needs to have firm and long lasting support
 - There is no long term benefit to using PMA to leverage the industry and then walking away



Driving the industry Forward

- **Leasing**

- PMAs are accepted globally and far more people use them than don't
- Operators need to exert market pressures on Leasing companies
- To be successful the airlines/MROs are going to have to take more responsibility to push for their rights to use less expensive but equal quality products from reputable suppliers



Driving the industry Forward

- **Leasing**

- Many airlines have been successful in getting their Lessors to allow the vast majority of PMAs. Don't take no for an answer
- It is not too late – even if you have a contract you need to press the issue



Airline and MRO Growth

- PMA suppliers are not going to let up in their firm stance on equivalency
- We must now focus on the next stage, one that allows the airlines and MRO's to select the product that best suits their needs:
 - Creates an industry where the airlines and MROs can be profitable because of fair and open competition in the parts market
 - Keeps the industry moving in the right direction concerning safety
 - Works with regulatory agency to keep the industry current with continued guidance



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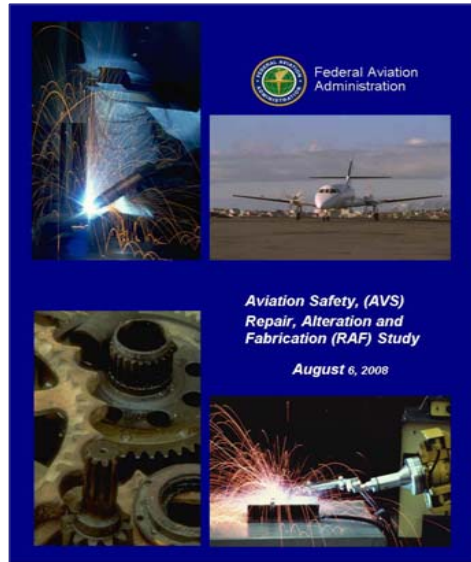


The Evolution – FAA Influence



EASA Decision ED/2007/003/C

FAA SAIB NE-08-40



FAA RAF Study




*Aircraft Technology: Issue 96, Oct-Nov 2008

Both EASA and the FAA have made bold moves in support of PMA

FAA releases Special Airworthiness Information Bulletin - August 8, 2008

FAA SAIB NE-08-40

- FAA approved TC/PC holder, PMA & STC parts are interchangeable
- Unless stated otherwise, the life limit for a TC/PC disk is unchanged and remains in effect when PMA blades are installed in that disk
- Applicants are required to assess the ICA and show that the products ICA are still valid with their part installed
- TC/PC, PMA and STC holders are responsible for the COS support for their parts and products which they have designed and produced



FAA Aircraft Certification Service

SPECIAL AIRWORTHINESS INFORMATION BULLETIN

SUBJ: Powerplant - Original Type and Production Certificate Holder Parts and Altermarket Modification and Replacement Parts
SAIB: NE-08-40
Date: August 8, 2008

This is information only. Recommendations are not mandatory.

This Special Airworthiness Information Bulletin (SAIB) alerts owners, operators, and certificated repair and maintenance providers of the responsibilities of type and production certificate (TC/PC) holders, supplemental type certificate (STC) holders, and the parts manufacturer approval (PMA) holders to support the continued operational safety (COS) of their product or part design.

Background

Producers of aircraft, aircraft engines, propellers, and replacement parts comprise an elite segment of a global industry that has produced some of the safest aviation products in the world. The FAA recognizes that this is due to many factors including advanced design tools, testing and analysis techniques, materials, early fault detection capability, and the regulatory certification environment that the industry operates in.

In today's competitive market, owners and operators are continuously searching for ways to reduce costs while maintaining safety. One way is to reduce maintenance expenses by finding alternative sources of replacement parts. This naturally created new markets for replacement parts.

Recently, some engine manufacturers responded to the FAA's approval of PMA and STC for parts involving their type design engine models by telling customers that support of their products could be limited if such parts are installed, since they do not have data on these PMA and STC parts and the effect these parts may have on the overall system. Some TC/PC holders have included language in the FAA-approved airworthiness limitation section (ALS) of their engine instructions for continued airworthiness (ICA) stating that the ICA was developed only for use with their parts.

The FAA understands that the TC/PC holder has no knowledge or data about the PMA and STC parts installed in the product and, therefore, can only assess the airworthiness and systems effects of their parts installed in the product.

PMA and STC parts are thoroughly evaluated for compliance with respect to any changes they introduce and their effect on the original type design. The need for supplemental ICAs, new airworthiness limitations, and other conditions is established by the FAA to ensure the safe integration of the PMA and STC parts into the product.

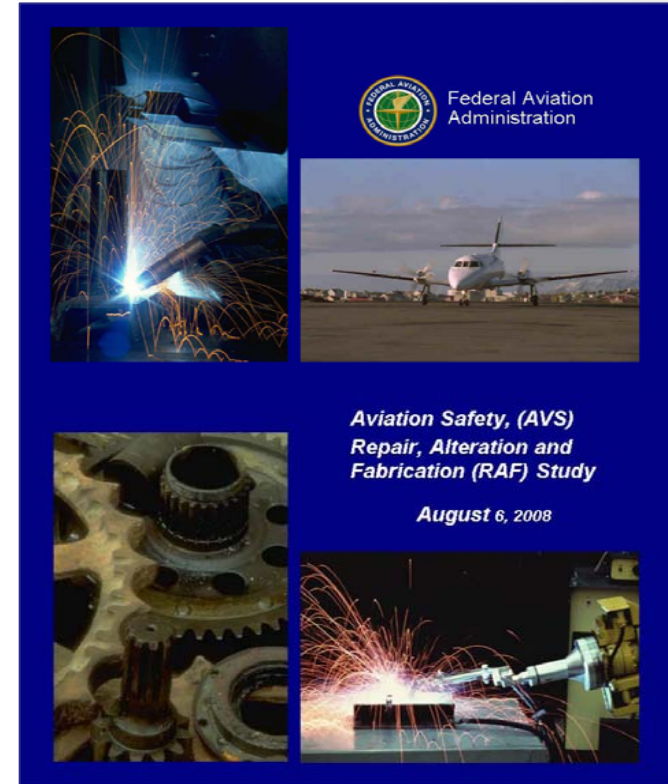
Recommendations

The following information is provided to assist the aviation community with regard to the installation of FAA-approved replacement parts -

- 1) FAA-approved TC/PC holder, PMA, and STC parts are interchangeable within the certificated product since they are approved only after a full demonstration of compliance to the applicable requirements of Title 14 of the Code of Federal Regulations (14 CFR). A PMA or STC part, when FAA-approved for installation on a certificated product, is a valid replacement part to the TC/PC holder part according to 14 CFR.

1

- Repair, Alterations & Fabrication Team (RAFT) Study conducted from 2/07 to 8/08
- Study objectively addresses OEM views and regulatory/industry facts about aftermarket parts and repairs
- Team members represented throughout all FAA branches (AVS, AIR, AFS, ANE)
- Guiding principles
 1. Safety, including compliance
 2. Customer service and cost impact
 3. FAA business efficiency and standardization



FAA RAF Study (Draft)

Overriding theme and Select Statements from study:

- FAA concludes “no difference” in airworthiness of parts from these sources
- Team did not find substantive evidence of failures or unsafe conditions from non-TC/PC holder developed data. In fact as the population of PMA parts....has increased substantially ...yet the occurrence of service difficulties and AD’s have not....
- TC/PC Holders diversifying into maintenance aftermarket parts supply and aircraft/engine leasing
- Once a TC/PC Holder acquired an aftermarket company, the parts they previously complained about suddenly become acceptable



New Advisory Circulars (AC33.83-1, AC33.8, and AC33.87-2) will have the following:

- Guidance for PMA of turbine engine and auxiliary power unit parts under test and computation (T&C) method
- Supports the regulatory requirements and the design approval processes defined by PMA Order 8110.42C
- Details T&C under both comparative and general test and analysis AC
- Outlines reverse engineering considerations
- Includes Part Categorization, Select design templates and COS guidance



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PMA Value propositions

- The value proposition offer from the PMA industry continues to expand every year
- The consolidation of the industry is creating stronger financially sound organizations
- Safety concerns will be addressed as companies are required to include COS plans in each of their applications



The Evolution – Value Proposition

Cockpit/Avionics

- INUs, IRUs
- Display Units
- DGAs
- Instruments
- Autopilots
- Radomes
- Nose Cowl
- Battery Packs
- Cockpit Paper

Fuselage/Interiors

- In Flight Entertainment
- Lavatories
- Seat Parts
- Tray Tables
- Galleys
- Overhead Bins

Wing

- Flight Controls
- Actuation Systems
- Guides



Landing Gear

- Wheels and Brakes
- Landing Gear

Engines

- | | | |
|-----------------|------------------------------------|--------------|
| •CFM56 | •Combustion Chambers | •Fuel Pumps |
| •CF6 | •Blades & Vanes | •Nozzles |
| •CF34 | •Fan Exit Guide Vanes | •Gears |
| •PW2000 | •Shrouds (single crystal & equiax) | •Shafts |
| •PW4000 | •Thrust Reversers | •Bearings |
| •V2500 | •Acoustic Panels | •Starters |
| •JT8D | •Pneumatic/Bleed/Anti Ice Valves | •Rings |
| •JT8D | •Heat Shields | •Spacers |
| •LM2500/500/600 | •Insulation Blankets | •Expendables |

Components

- Electro-Mechanical
- Hydraulic Pumps
- ACMs, CSD/IDG
- Batteries
- APUs

Futures propositions

- Continue to expand into many different areas of the aircraft systems
- Support MRO needs in making PMA programs work for their environment
- Technical support of product coming to forefront
- Inventory management programs
- Kitting Programs into shops that do not currently have a PMA program or doesn't allow



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The PMA Industry is Strong

- PMA suppliers have driven the industry hard for the last 20 years
- The FAA has had to address the claims of the OEMs, questions of the Airlines, and support of the PMA industry
- OEM's will not let up and neither will the PMA supplier industry
- OEM behavior is primarily driven by commercial factors, don't be fooled by the OEM rhetoric and marketing ploys
- But the industry now requires the Airlines and MROs to push PMA to the next stages



It's now up to you to drive forward

- To start this new era of PMA growth:
 - Look at what is being offered and how it can effect your maintenance planning
 - Evaluate your strategic position in the PMA market and what may have to change to have a large impact to your bottom line
 - Look at your supplier base to see if they provide the needed warranty coverage
 - Determine if your supplier can support the technical needs of the product you want to purchase
 - Evaluate the financial stability of your PMA suppliers



It's now up to you to drive forward

- Industry needs strong PMA/DER companies with fact based marketing approach to ensure customers and potential customers fully understand the facts
- Industry also needs Airlines and MRO to be aggressive with their approach PMA programs
- It must be the “Decade of the airlines and MRO’s” to move the industry forward
- As Sarah Macleod has said “PMA’s have never been for Sissy’s”

Sarah MacLeod
Executive Director
Aeronautical Repair Station Association



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Thank you

let's get the next phase started

