Combatting the PMA Squeeze

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The PMA Squeeze

- Industry Downturn
- Integrated Supply Programs
- Export Compliance Challenges
- Regulatory Policy Moving Target
- PMA Misconceptions

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Industry Downturn

- Approx 2,300 aircraft grounded
- Additional 400 scheduled to be cut in 2009
- All regions, except the US, are expecting operating losses in 2009
- Older, maintenance intensive aircraft are retirement candidates
- President of ICAO predicts poor traffic in 2009 for all regions with growth around 0%
- Expected traffic recovery and growth of around 4.4% in 2010

Associated Press Feb 24, 2009
Aircraft Technology Engineering & Maintenance
Crienglish.com

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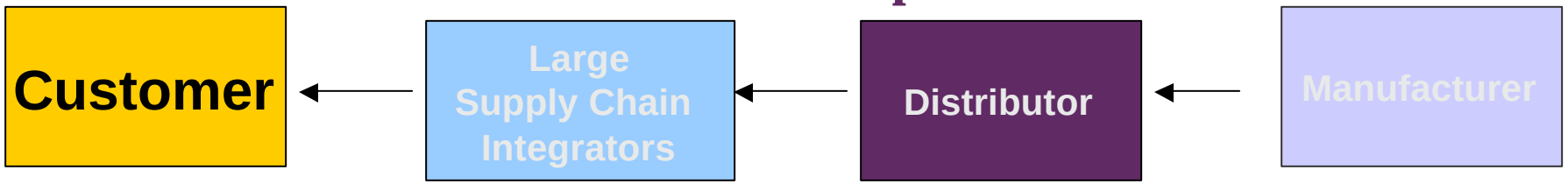
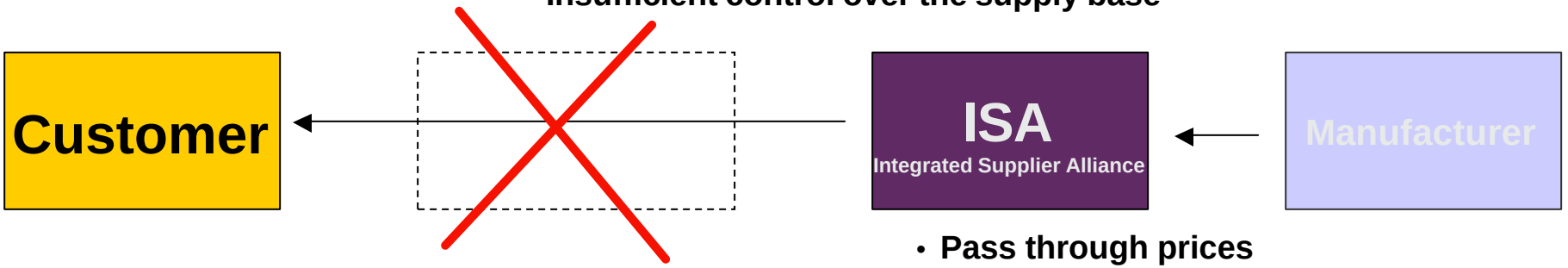
Integrated Supplier Solutions

Model Comparison



- Higher cost due to additional supply chain link
- No incentive to provide PMA and reduce costs
- Insufficient model to plan & forecast
- Insufficient control over the supply base



- Pass through prices
- Ongoing cost reduction via PMA/alternates
- Low management costs
- Fewer links in supply chain
- One point of contact, one PO one Invoice

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Export Compliance

- A continual distribution challenge
- Includes even standard commercial parts
- Increased enforcement activity, with serious penalties even for minor and unknowing violations of the law
- Technical PMAs are often export restricted, requiring a license to a foreign country or foreign-owned air carrier
- China has been targeted for increased enforcement activity with a unique regulatory scheme recently enacted

Export Compliance

Wencor has an industry-leading automated export compliance system that safeguards both suppliers and customers with seamless precision

The process includes:

- Identifying the proper Export Control Classification Number (ECCN)
- Entering customer information and identifying the country of end use
- Providing all required documentation automatically through sophisticated systems

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Regulatory Developments
High-Value PMAs

Recently closed draft ACs would make PMA certification prohibitively expensive for PMA applicants for blades and vanes

- In spite of proven success and constantly improving technology and capability, new AC guidelines discount the inherent verification capability of reverse engineering, focusing instead on more expensive and less fundamentally sound bench and component test procedures
- Draft AC on vibration testing (AC33.83) specifies destructive HCF testing of 60-100 new OEM and PMA parts - those tests alone would cost $1M for a large engine HPT blade or vane
- Draft AC on PMAs by T&C divides parts into categories and specifies that all but the simplest parts require bench testing

Industry and Wencor have submitted comments (comment period expired last year, 2008)

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Regulatory Developments
PMA Restrictions - Higher Costs

- The draft guidelines prescribe an unprecedented level of identicality between the PMA and OEM parts and further restrict ability for PMA improvements through minor changes

- Simultaneously, the same guidelines add new requirements for system-level safety analysis, general compliance analysis, and ICA analysis previously only required for new designs or major design changes (TC and STC holders)

- By definition, PMA parts do not involve (major) design changes – the above analyses are unnecessary (will never produce any new findings) and only increase the cost and complexity of PMA approvals

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SFAR 88 - Background

- FAR Amendment 25-102 (14CFR25.981 – fuel tank ignition prevention) - issued May 2001 in response to TWA 800 and two B-737 fuel tank explosions
- SFAR 88 issued at the same time for retroactive application of Amendment 25-102
- SFAR 88 was applicable to:
  - Holders of aircraft TCs
  - Holders of STCs affecting the fuel tank systems of the those aircraft
- SFAR 88 was NOT applicable to:
  - PMA holders

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SFAR 88 - Requirements

- Conduct a safety review to determine that the design meets the requirements of 14CFR25.901 and 25.981(a) and (b). If the current design does not meet the requirements, develop all design changes to the fuel tank system necessary to meet the requirements

- Develop the maintenance and inspection instructions necessary to maintain the design features required to preclude an ignition source within the fuel tank system

- Submit to FAA report with substantiation of the fuel tank system design and necessary design changes, and all maintenance and inspection instructions required to comply with Para 2. above

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Implementation of SFAR 88

- TC holder reports completed in 2007. The majority of designs were found compliant and remained unchanged
- TC holders inspection instructions included certain one-time and periodic inspections
- TC Holder configuration and ICAs were fixed as Critical Design Control Configuration Limitations (CDCCLs)
- The TC holder information was adopted through FAA ADs requiring:
  - Revision of FAA-approved maintenance programs to TC holder specs
  - Revision of the Airworthiness Limitations Section (AWL) of the ICA to incorporate the CDCCLs
  - Disallowing alternative parts, inspections, or procedures

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FAA
Aircraft Certification Service

AIRWORTHINESS DIRECTIVE

www.faa.gov/aircraft/safety/alerts/
www.gpoaccess.gov/fr/advanced.html

2008-10-10 Boeing: Amendment 39-15516. Docket No. FAA-2007-28384; Directorate Identifier 2006-NM-165-AD.

Effective Date

(a) This airworthiness directive (AD) is effective June 12, 2008.

Affected ADs

(b) None.

Applicability

(c) This AD applies to Boeing Model 737-600, -700, -700C, -800, and -900 series airplanes, certificated in any category, with an original standard airworthiness certificate or original export certificate of airworthiness issued before March 31, 2006.

Service Information Reference

(f) The term "Revision March 2008 of the MPD," as used in this AD, means Boeing Temporary Revision (TR) 09-020, dated March 2008. Boeing TR 09-020 is published as Section 9 of the Boeing 737-600/700/800/900 Maintenance Planning Data (MPD) Document, D626A001-CMR, Revision March 2008.

Revision to Airworthiness Limitations (AWLs) Section

(g) Before December 16, 2008, revise the AWLs section of the Instructions for Continued Airworthiness (ICA) by incorporating into the MPD the information in the subsections specified in paragraphs (g)(1), (g)(2), and (g)(3) of this AD; except that the initial inspection required by paragraph (h) of this AD must be done at the applicable compliance time specified in that paragraph. Accomplishing the revision in accordance with a later revision of the MPD is an acceptable method of compliance if the revision is approved by the Manager, Seattle Aircraft Certification Office (ACO), FAA.

(1) Subsection E, "AIRWORTHINESS LIMITATIONS–FUEL SYSTEMS," of Revision March 2008 of the MPD.

(2) Subsection F, "PAGE FORMAT: FUEL SYSTEM AIRWORTHINESS LIMITATIONS," of Revision March 2008 of the MPD.

(3) Subsection G, "AIRWORTHINESS LIMITATIONS: FUEL SYSTEM AWLs," AWLs No. 28-AWL-01 through No. 28-AWL-22 inclusive, of Revision March 2008 of the MPD. As an optional action, AWLs No. 28-AWL-23 and No. 28-AWL-24, as identified in Subsection G of Revision March 2008 of the MPD, also may be incorporated into the AWLs section of the ICA.

BOEING

737-600/700/800/900 MAINTENANCE PLANNING DATA

AWL Number	Task	Interval	Applicability	Description
28-AWL-13	CDCCL	N/A	All	AC and DC Electrical Fuel Tank Pump Maintenance Concern: Potential for maintenance error during pump overhaul. Fuel pump designs contain ignition source prevention means (i.e., flame arrestor, thermal fuses, materials, leadwire retention means, etc.) that must be maintained if pump is overhauled. Repair and overhaul of AC Fuel Pumps must be per the manufacturer Component Maintenance Manual (CMM) Numbers 28-22-05 Revision Number 4, 28-22-06 Revision Number 6, 28-22-08 Revision Number 4, or 28-22-09 Revision Number 2, or later revisions of these CMMs that have been approved by the FAA Seattle ACO. Repair and overhaul of DC Fuel Pump must be per the manufacturer CMM Number 28-20-02 Revision 9, or a later revision of this CMM that has been approved by the FAA Seattle ACO.
28-AWL-14	CDCCL	N/A	All	AC Fuel Pump Fault Current Bonding Strap Installation Concern: Potential for fault current path through the pump housing to structure inside the tank. Electrical faults internal to the fuel pump motor impeller are by design routed through the motor impeller assembly to the bonding straps on the front face of the motor impeller assembly to structure

REFERENCE TO OEM CMM SPECIFYING OEM CONFIGURATION AND PROCEDURES

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Impact of Implementation on Existing Alternate Parts and Repairs

- No fuel tank system PMAs installed and no DER Repairs effective Aug 16, 08 (Airbus) and Dec 16, 08 (Boeing)
- PMA parts and DER repairs removed at next maintenance
- FAA-PMAs equivalent to OEM parts are obsolete
- All previously approved DER repairs are obsolete
- FAA resisting AMOC applications
- Maintenance costs increase and reduced part availability

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The SFAR Paradox
PMAs OK to Have but Not to Use

- For the majority of fuel system parts, SFAR reviews validated the TC holder designs
- The corresponding FAA-PMA parts continue to be FAA-approved equivalent replacements for the validated TC holder parts
- However, FAA SFAR ADs prevent the installation of the FAA-PMA parts on aircraft

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Implementation of SFAR 88
145 Repair Station View

One Repair Station owner commented: *"We have found the data incorrect in this particular manual. Most are equally poorly written, or are in need of a comprehensive review to bring them up to a usable form. If the repair industry is to be held to a standard as the 121 CMO PMI's are auditing to now, then EVERY manual used by a repair facility or an airline will need to be analyzed similarly. It is my feeling that FAA has moved the pendulum so far to the left that they are rendering the manuals unusable in their current form unless they create some regulatory guidance that sets a standard by which ALL repairs are reviewed, not just CDCCL items."*

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Two studies 20 years apart draw strikingly similar conclusions...

In a similar conference 10 years ago, Wencor presented some facts from the 1984 and 1988 PMA Program Evaluation reports prepared for the FAA by COMSIS. The study identified key PMA issues and then current PMA policies/procedures; developed alternatives to PMA regulations, policies and procedures; and provided the required analyses to support selected alternatives.

The August 6, 2008 release of the Aviation Safety (AVS) Repair Alteration and Fabrication (RAF) study commissioned by the FAA, addressed the adequacy of policy and practices surrounding non-Type Certificate (TC) holder developed replacement parts, alterations, and repairs.

Bottom Line: Purchasing PMAs Is Still Smart Business.

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COMSIS Report

Misconception : A PMA is easy to get and therefore PMA parts must be of lower quality than the Type Certificate parts.

FACT: "FAA Aircraft Certification Offices now administer the PMA program as a normal part of the aircraft certification process. The same airworthiness engineers administer and approve PMA design requests that administer other aircraft certification functions, and the same manufacturing inspectors administer and approve PMA manufacturing requests."

Misconception : PMA parts are less safe and less reliable than parts supplied by the original Type Certificate holder.

FACT: Both the COMSIS and a GAO study find that: "There is no evidence of a significant safety problem with PMA parts."

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COMSIS Report

Misconception: PMA parts are really counterfeits or bogus parts which cause safety problems.

FACT: Again the COMSIS study finds: "There is no evidence of a significant safety problem with PMA parts." COMSIS also reports that "there is a significant safety problem with bogus parts, [which are] those parts produced without PMA approval, often as counterfeit Type Certificate holder parts."

Misconception: Purchasing PMA parts really doesn't save money.

FACT: Once a PMA has been granted, the COMSIS study found that competition causes the Type Certificate holder to reduce its price 85 percent of the time.

Misconception : Quality and manufacturing control is less stringent for PMA parts.

FACT: "The manufacturing and quality control are appropriate to the sophistication and diversity of parts the PMA holder produces, and there are no significant inspection program failures."

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RAF Study

A few highlights:

- TC/PC holders claim neither non-TC/PC holders nor the FAA and FAA designees have sufficient knowledge about “their products” to develop safe, compliant repairs, alterations and replacement parts. They question non-TC/PC holders quality control systems and feel non-TC/PC holders have an unfair business competitive advantage because they are not repeating all of the original type certification testing and analysis.

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RAF Study

- The RAF study finds that there is "**no difference**" in airworthiness of parts from all means permitted under the CFRs for owner/operators to maintain their aircraft and restore or replace parts and components… including PMA parts and repairs. Also, there was **no substantive evidence of failures or unsafe conditions** arising from non-TC/PC holder developed data.
- The study clarified that a comparable level of certitude does not mean that the exact same methods of showing compliance must be repeated by everyone or are applicable in every case. The methods of showing compliance, although different than the original TC/PC holder's showing, must show that the certification basis of the product is not invalidated and that an unsafe condition is not introduced. The study further stated that there is **no substantive part failure, event, or safety data to warrant the complete compliment of certifications testing** that they did for the original TC.

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RAF Study

- The study mentions that once a TC/PC holder acquires an aftermarket company or when they own an aircraft or engines of someone else's type design they want the ability to obtain PMA, STC and repair approvals on other company's product. **What they had previously complained about suddenly becomes acceptable.**
- The study states that they desire to "Improve the credibility and global acceptability of FAA approved repairs, alterations and fabrications." and don't want to "adversely affect the balance of commerce and competition that will provide owners/operators with more sources for parts and maintenance resulting in **lower costs and higher reliability parts and services** as companies compete for market share."

PMA Acceptance

All truth passes through three stages:

First it is ridiculed

Next it is violently opposed

Finally it is accepted as being self evident

Arthur Schopenhauer

19th Century Philosopher

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Unifying a Response

- Support Integrated Suppliers that have clear PMA initiatives
- Understand current export compliance laws
- Increase involvement in MARPA to counter OEM lobbying
- Solicit FAA action – Wencor submitted an issue paper in early March addressing SFAR 88 and lack of guidance surrounding AMOC
- Stand up to OEM bullies by using facts surrounding PMAs and Repairs

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Thank You