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MARPA's Guidance Material for a PMA Continued Operational Safety (COS) System

Report No. MA-07-0316

Revision 4

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Aviation companies use their Quality Systems to help them meet business goals like satisfying customer demands and promoting industry safety. A properly implemented COS system is a tool to be integrated into a business' Quality System in order to help that company achieve long-term safety goals through oversight of the life-cycle of their aircraft articles. This document was produced to aid PMA companies in establishing and managing a COS system. It represents one way, but not the only way, to implement such a system. A COS system should be tailored to the specific needs of the implementing company. Implementing a robust COS system should help encourage aviation safety, but it cannot eliminate all possible risk, and its effectiveness may depend on the specifics of implementation and oversight; MARPA makes no representations about the results of implementing COS system in accordance with this guidance. This document is not meant to reflect a minimum standard for safety. Compliance with this document is voluntary and not mandatory.

Table of Contents

Section 1

1.0 MARPA's Definition of COS

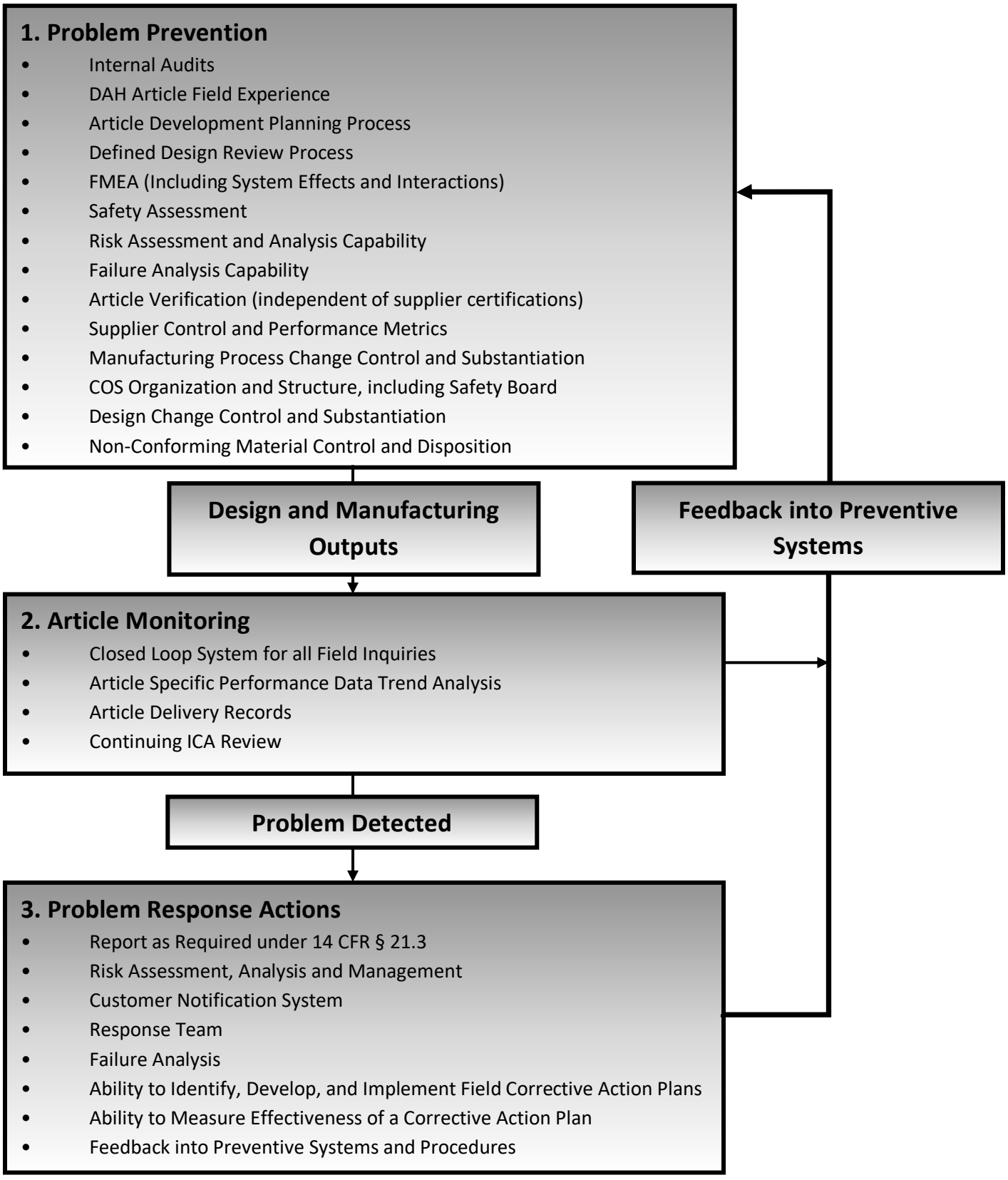
Continued Operational Safety is a closed-loop technical and logistical support system that ensures lifetime article safety. This support system includes the following three fundamental elements addressed both before and after FAA article approval:

1. Problem Prevention
2. Article Monitoring
3. Problem Response

Figure 1 shows the MARPA PMA COS system overview.

Note: Per Part 21.1 (b) Article means a material, part, component, process, or appliance. Product means an aircraft, aircraft engine, or propeller.

Figure 1-Overview of a PMA COS System



Section 2

2.0 Fundamental Elements of a COS System

2.1 Preventive Systems/Procedures

The PMAH should establish procedures within their Quality System that include the following:

2.1.1 Internal Audits-Internal audits should be performed at least annually in order to monitor compliance with airworthiness standards and adequacy of procedures to ensure that such procedures produce airworthy articles. The internal audit element of the Quality System may be contracted to another organization or a person with appropriate technical knowledge and proven satisfactory audit experience. The internal audit should include a detailed review of all Quality System Audit (QSA) results and any reporting under 14 CFR §21.3 to ensure a closed loop in the problem response. The procedures should have a quality feedback reporting system to the accountable manager that ensures proper and timely corrective action is taken in response to reports resulting from the independent audits performed.

2.1.2 DAH Article Field Experience-Prior to developing the candidate PMA article, the PMA applicant should perform a comprehensive review of all available NPRM, SDR, AD, ASB, SB and operator and maintenance provider inputs.

- Service Difficulty Reports (http://av-info.faa.gov/sdrx/) and pertinent ADs should be studied to understand the nature and extent of field issues connected to the PMA candidate article and any efforts toward corrective action on the part of the affected DAH.
- All available ICA (including Overhaul and Maintenance Instructions, Illustrated Parts Catalogs and Service Bulletins) should also be reviewed.
- Operators and maintenance providers should be surveyed to assess their service experience with the candidate PMA article. The scope of the survey should, at a minimum, enable confirmation of the findings of the SDR, AD, and ASB/SB reviews.

2.1.3 Article Development Planning Process-Engineering should consider structuring the design effort into significant elements to ensure article safety and reliability. The structure should include:

- The design and development plan.
- The review, verification, and validation that is appropriate to each design and development stage.
- The responsibilities and authorities for design and development, and project communication.

- Design and development inputs related to article requirements should be determined and records maintained. These inputs should include:
    - Functional and performance requirements.
    - Applicable statutory and regulatory requirements.
    - Information derived from previous similar designs.
- Organizational experience, equipment, and capability gap assessment and closure plan

Note: For simple projects, this process may be collapsed into the design review.

2.1.4 Defined Design Reviews -The PMAH should have a Design Review process in place. The process should systematically review the PMA candidate design at the appropriate stages to evaluate the progress of the design activities. Participants in such reviews should include representatives of functions concerned with the design.

Items to be reviewed should include the following items:

- A review of the available ICA, maintenance instructions, and service history.
- The NHA and influenced parts
- Interface features
- Failure Modes and Effects Analysis (FMEA)
- Safety assessment
- Classification of Characteristics -See definition Appendix A6.2
- Feature and manufacturing process controls
- Special processes such as plating, heat treating, peening, coatings, and plasma spray
- Inspection plans and needed equipment

The reviews should identify new items, propose necessary closure actions, close items identified in previous reviews, and authorize progression to the next stage. Records of the review and any actions should be maintained.

2.1.5 Failure Modes and Effects Analysis (FMEA)- A failure modes and effects analysis is a qualitative process, independent of failure rates and probabilities, by which each potential failure mode of an article in the product is assessed. Each system and subsystem of the product is broken down into its basic functions using a functional block diagram consistent with the Air Transport Association policy for identification and definition of systems. (See AC 33-8 Appendix 1 for an example.)

The functional block diagram defines each system and subsystem, and all their functions, in the product. The SME performing the analysis determines the article-to-article and article-to-system influences in both directions (input and output).

System interactions are influences that an article, or a set of articles, can have on the airplane, engine, or propeller through form, fit, or function. These influences may extend beyond the

article being analyzed, may be direct or indirect, and may develop immediately or over time. Characteristics of these influences include:

(1) Direct influences, which are form and fit. These influences are based on physical contact or interface clearances between adjacent parts.

(2) Indirect influences, which are functional in nature. These influences are not based on physical contact, but may be aerodynamic, electrical, hydraulic, thermal, or vibratory.

2.1.6 Safety Assessment-The FMEA should drive the safety/risk assessment of the candidate PMA article. AC 23.1309-1, AC 25.1309-1, or AC 33.75-1 can be used as guidance for safety assessments.

The article criticality classification should be determined during this review to establish the extent of quality and manufacturing controls. (See Section 5)

2.1.7 Risk Assessment and Analysis Capability-The PMAH should be capable of providing a detailed risk assessment and risk analysis. The FMEA and Safety Assessment are the building blocks of a (qualitative) Risk Assessment. Quantitative Risk Analyses should be performed if the Risk Assessment identifies a potential unsafe condition.

2.1.8 Failure Analysis Capability-The PMAH should be capable of providing a detailed failure analysis of any in service or manufacturing difficulty. The failure analysis should take into consideration its manufacturing processes, interaction with mating articles, relationship to NHAs, other systems, and the product.

2.1.9 Article Verification (Independent of Supplier Certifications)-The PMAH should have a system in place to determine the conformity of incoming articles independent of supplier certifications. The extent of the evaluation should include geometric, material and special process characteristics. The PMAH may contract services from appropriately qualified parties, preferably those that hold ISO9001, AS9100, or similar approvals.

2.1.10 Supplier Control and Performance Metrics-The PMAH should evaluate and select suppliers based on supplier capabilities, performance, and article criticality. Criteria for selection, evaluation, and re-evaluation of suppliers should be established. Records of the results of evaluations and any necessary actions arising from the evaluation should be maintained. Supplier performance metrics should comply with the intent of AC 21-43A Chapter 3 (Supplier Control Program).

The type and extent of control imposed onto the supplier for the purchased article or service is dependent upon the criticality of the article and the effect of the purchased article or service on downstream article realization. The control systems put in place should also meet the intent of AC 21-43A Chapter 3.

Suppliers should be formally advised that their facilities, personnel, and articles being supplied are subject to evaluation and inspection by the PMAH and the FAA, as they constitute an extension of the facilities of the PMAH.

2.1.11 Manufacturing Process Change Control and Substantiation-A system to control manufacturing processes and services should be considered in order to ensure article safety and reliability. Such a system requires that each process be performed in accordance with approved specifications containing definitive standards of quality. Certain article categories may dictate the need for FPC (fixed/frozen process controls) to qualify and manage changes to the manufacturing processes and/or inspection systems. Substantiation for a proposed process change may include functional and/or destructive testing.

2.1.12 COS Organization and Structure, including Safety Board-The PMAH should have a defined COS Program Manager who is responsible for ensuring that the elements of the PMAH's COS systems and procedures are consistent with all regulatory and guidance material. In addition, the COS Program Manager should be responsible for the creation and maintenance of PMAH's Safety Board. This Safety Board should address any safety issues that may arise with the PMAH's articles. The Safety Board should be responsible for communication with the FAA on any safety or airworthiness issues that may arise. A6.6 has a sample of a RACI (Responsible, Accountable, Consulted, and Informed) Matrix that can be customized to a specific PMAH's organization.

2.1.13 Design Change Control and Substantiation-Evaluation of the design changes should include the effect of the changes on the articles, the NHA, any affected systems, and the product in accordance with the PMAH Quality System. The change should be approved, verified, and validated, as appropriate, prior to implementation. The PMAH's Safety Board should review design changes as defined by the COS system.

2.1.14 Non-Conforming Material Control and Disposition-The non-conforming material control and disposition process should evaluate and disposition non-conforming material in accordance with the PMAH Quality System. The PMAH's Safety Board should review material dispositions as defined by the COS system.

2.2 PMA Article Monitoring

The PMAH should establish procedures within their Quality System that includes the following:

2.2.1 Closed Loop System for All Field Inquiries-The PMAH should have systems and procedures in place to review, evaluate, and respond to any inquiries or notifications of potential service problems from aircraft operators, maintenance service providers, or the FAA. This procedure should establish the individuals or organizations responsible for responding to all inquiries/notifications. The procedure should require the PMAH to have appropriate methods and resources available to them to be able to identify the cause of any service difficulties, develop corrective actions, and implement those actions in a timely manner. It should also define how the resolution and corrective action (if necessary) would be transmitted to the notifying entity, other entities potentially impacted (if necessary), and the FAA (per 14 CFR § 21.3).

2.2.2 Article Specific Performance Data Trend Analysis-An article-specific performance tracking system should be implemented for a PMA article that was determined during the design phase to have potential adverse effects on the operational safety of the NHA and/or product/article if it does not perform as intended. This system should include at a minimum, inspection and qualitative feedback from the article user after removal for any reason (including routine maintenance). The return of used article to the PMAH for evaluation is preferred. When possible, the PMAH should develop an in-service plan with the article end user to assess article performance relative to the design assumptions.

2.2.3 Article Delivery Records-For all PMA articles delivered, the PMAH should maintain records of the quantity shipped, ship date, and customer. The records should contain sufficient information to allow the PMAH to positively link each shipment to the lot number or manufacturing order under which the articles were produced.

2.2.4 Continuing ICA Review-Each PMAH should have a system and procedure in place to review all available new and revised DAH maintenance instructions, Service Bulletins, etc. as well as NPRMs and Airworthiness Directives that pertain to the DAH article replaced by each of their PMAs. This system may utilize periodic searches of new or revised DAH ICAs referencing the DAH PN replaced by the PMA PN.

This procedure should include the individuals or organization within the company with defined responsibilities for determining if any new or updated ICAs potentially affect the performance of the PMA article and procedures for resolving any such issues. It should also define steps to be taken when it is determined that the PMA article is affected by new or revised ICA.

2.3. Problem Response Actions

The PMAH should establish procedures within their Quality System that includes the following:

(See A6.5 for a flow chart depicting the COS Problem Response process flow.)

2.3.1 Report as Required under 14 CFR § 21.3- The FAA requires a means for reporting failures, malfunctions, defects, and service difficulties that have or could have created an unsafe condition within 24 hours of identification. PMA Holders already have this requirement within the PMAH Quality System. In addition to the PMAH PMA approval letter requirements, AC 21-9 provides requirements for reporting under 14 CFR § 21.3.

2.3.2 Risk Assessment, Analysis, and Management- Risk assessments (qualitative) are performed immediately upon identification of a potential unsafe condition. Any design or hardware issue discovered by the PMAH that could result in a reduction in operational safety should be evaluated to determine the risk level. If a risk assessment cannot make a definite determination that the condition is not unsafe, then a risk analysis (quantitative) should be performed.

The ACO COS Program Manager can assist in performing a risk analysis as needed. (Reference FAA Order 8110.107 MSAD (Monitor Safety / Analyze Data))

Once the Risk Analysis has been completed, the results should be compared to the appropriate ACO's Risk Management requirements to determine if the level of risk is acceptable.

2.3.3 Customer Notification System-This system should include a procedure for the release and control of technical information that is issued to ensure all necessary parties are aware of the field problem. The notification system may include FAA review. The notification system should include detailed technical instructions which the end user can utilize to complete the necessary corrective action.

2.3.4 Response Team-A Response Team should be assembled to utilize expertise in resolving manufacturing, technical, or in-service issues. The expertise may vary depending on the issue at hand and the particular article or system involved. The team should also provide resolution to the customer and the FAA.

2.3.5 Failure Analysis-Once a failure (in service or manufacturing difficulty) has occurred, the PMAH should have the means to perform a detailed failure analysis, either internally, externally, or a combination of both. A policy should be in place that makes clear where the responsibility lies in completing the failure analysis and how that information is disseminated and presented to the FAA.

2.3.6 Ability to Identify, Develop, and Implement Field Corrective Action Plans-The PMAH's Safety Board should direct the development and implementation of the field corrective action plan based on input from the Response Team. The PMAH should have a means of

communicating with the supply chain and customers such that issues can be tracked and corrective actions implemented. The PMAH Quality System should already include a corrective action procedure and this procedure should include field corrective action plans.

The PMAH Safety Board should oversee risk analysis of its PMA article's field reports that might involve the article's reliability and/or a safety issue for the product. A good reference for creating a rational plan is AC 39-8: Continued Airworthiness Assessments of Powerplant and Auxiliary Power Unit Installations of Transport Category Airplanes. While there is not a parallel document at this time for other products, the process as outlined in AC 39-8 can be applied to assess the hazard severity and likelihood. (See also FAA Order 8110.107)

Once the Risk Analysis has been completed, the results should be compared to the appropriate ACO's Risk Management requirements to determine if the level of risk is acceptable. If the level of risk is unacceptable, the PMAH Safety Board should coordinate with the ACO COS Program Manager to identify and develop a Field Corrective Action Plan. The Risk Analysis should be reevaluated with the Corrective Action Plan to determine if the risk level has been sufficiently reduced. The PMAH should continue to refine the Corrective Action Plans until the level of risk is acceptable.

The risk analysis and PMAH proposed recommendations (Service Bulletin, Alert Service Bulletin, or AD) should be reviewed and coordinated with the FAA Corrective Action Review Board (CARB) as early in the process as feasible.

The PMAH should have the ability to source replacement articles to address reliability and safety issues to satisfactorily manage the FAA and customer expectations.

2.3.7 Ability to Measure Effectiveness of a Corrective Action Plan-When corrective action is implemented its effectiveness should be monitored. Proper communication between the PMAH and customers and/or suppliers allows for measurement of the effectiveness of the corrective action plan. Through the implementation phase, the Risk Analysis should be periodically reevaluated as additional data is collected to ensure that the original risk analysis assumptions remain valid.

2.3.8 Feedback into Preventative Systems and Procedures-The final closure to resolving service difficulties is providing feedback into the existing engineering, quality, manufacturing, and safety systems. The aim is to prevent recurrence of these and similar problems and, at the very least, minimize their occurrence. Feedback can occur through various means such as a "Lessons Learned" library, training activities, and continuous monitoring. The PMAH's Management, Engineering, Manufacturing, Supply Chain, and Quality should be in the loop for service information leading to necessary changes regardless of the level of safety impacted. The key rationale is to develop and implement solutions for problem root cause so that they do not become field issues in the future.

Section 3

3.0 Application of a COS System

3.1 General and Article-Specific COS Plans

The PMA COS System uses two levels, depending on the results of the safety analysis that is performed during the design phase.

3.1.1 General COS Plan-The General COS plan requirements would be the default requirements for all articles that do not require an article-specific COS plan. A reference to the PMAH's General COS requirements should be included in the applicant's PMA data package.

3.1.2 Article-Specific COS Plan-An article should have an article-specific COS plan defined if it was determined during the design phase to have potential adverse effects on the operational safety of the NHA and/or product if the PMA candidate article does not perform as intended. This article-specific COS plan could add additional items that go beyond the PMA Applicant's General COS plan, such as article reliability reporting, a life management system, or destructive testing of used articles. The article-specific COS plan would be defined or referenced in the PMA Applicant's data package and approved by the ACO prior to PMA approval.

Section 4

4.0 Implementation and Verification of the COS System

4.1 Implementation

The PMAH or Applicant should have a Quality System that complies with this guidance document.

4.2 Verification

Each PMAH should develop an audit procedure to demonstrate initial and continued compliance of their Quality System to this document. The PMAH may use the checklist in Appendix A6.4 to perform the verification.

Section 5

5.0 Article Classification Guidance

AC 21.303-4 requires the PMAH to perform a safety assessment to determine if an article is “critical” or “non-critical”. AC 23.1309-1, AC 25.1309-1, or AC 33.75-1, and AC 33-8 provide guidance for performing the safety assessment. The result of the PMAH’s safety assessment is used to determine the criticality classification of the article.

Section A6 Appendices

A6.1 List of Abbreviations and Acronyms

AC	Advisory Circular
ACO	Aircraft Certification Office
AD	Airworthiness Directive
ASB	Alert Service Bulletin
CARB	Corrective Action Review Board
CFR	Code of Federal Regulations
COS	Continued Operational Safety
DAH	Design Approval Holder
FAA	Federal Aviation Administration
FMEA	Failure Modes and Effects Analysis
FPC	Fixed or Frozen Process Controls
ICA	Instructions for Continued Airworthiness
MARPA	Modification and Replacement Parts Association
MSAD	Monitor Safety / Analyze Data
NHA	Next Higher Assembly
NPRM	Notice of Proposed Rule Making
PMA	Parts Manufacturer Approval
PMAH	Parts Manufacturer Approval Holder
PN	Part Number
RACI	Responsible, Accountable, Consulted, Informed
SB	Service Bulletin
SDR	Service Difficulty Report
SME	Subject Matter Expert
TC	Type Certificate

A6.2 Definitions

Classification of Characteristics – A system for classifying the importance of design or specification features relative to the article's fit, form, or function.

Risk – means the composite of predicted severity and likelihood of the potential effect of a hazard (reference 14 CFR Part 5).

Safety – the condition of being safe from undergoing or causing hurt, injury, or loss.

Should – indicates a recommendation with some flexibility allowed in compliance methodology.

A6.3 List of References

1) Title 14 CFR Part 21, Certification Procedures for Products, Articles and Parts.

2) Title 14 CFR Part 45, Identification and Registration Marking.

3) AC 21-9B, Manufacturers Reporting Failures, Malfunctions, or Defects, 12 August 2010.

4) AC 21-43A, Production Under 14 CFR Part 21, Subparts F, G, K, and O, 01 October 2015.

5) AC 21.303-4, Application for Parts Manufacturer Approval Via Tests and Computations or Identicality, 21 March 2014.

6) AC 23.1309-1E, System Safety Analysis and Assessment for Part 23 Airplanes, 17 November 2011

7) AC 25.1309-1A, System Design and Analysis, 21 June 1988.

8) AC 33.75-1A, Guidance Material for 14 CFR § 33.75, Safety Analysis, 26 September 2007.

9) AC 33-8, Guidance for Parts Manufacturer Approval of Turbine Engine and Auxiliary Power Unit Parts under Test and Computation, 19 August 2009.

10) AC 39-8, Continued Airworthiness Assessments of Powerplant and Auxiliary Power Unit Installations of Transport Category Airplanes, 08 September 2003.

11) FAA Order 8110.42D CHG 1, Parts Manufacturer Approval Procedures, 15 September 2017.

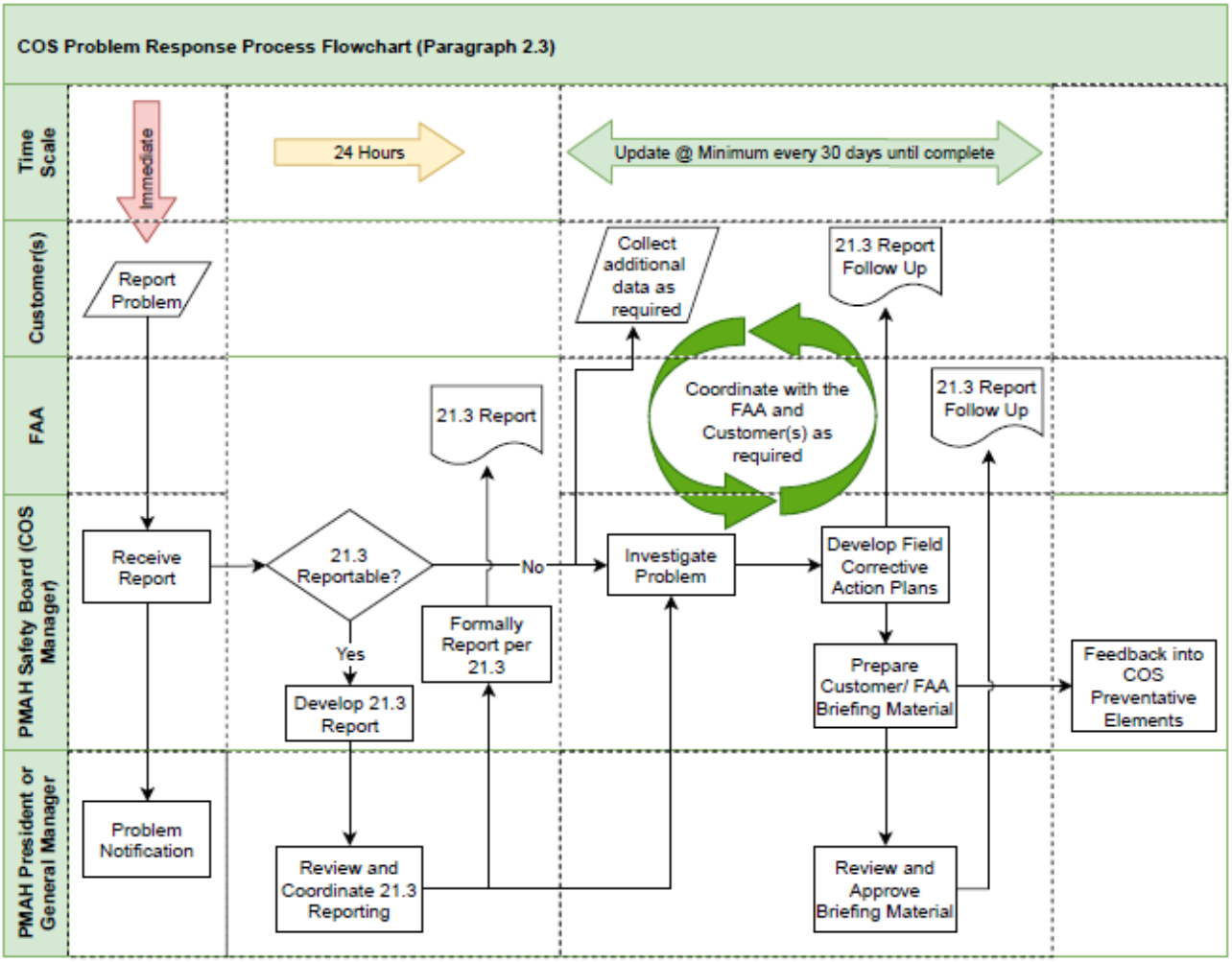
12) FAA Policy Memo ANE-2004-33.4-4, Policy for Design Approval Procedures for Parts Manufacturer Approval of Critical Engine and Propeller Parts, 04 March 2005.

13) FAA Order 8110.107A, Monitor Safety / Analyze Data, 01 October 2012.

A6.4 PMA COS System Compliance Checklist

PMA COS System Element	Implemented	Verified
2.1 Preventive Systems/Procedures		
2.1.1 Internal Audits Scheduled and Performed?		
2.1.2 DAH Holder Article Field Experience Reviewed?		
2.1.3 Article Development Planning Process Exists?		
2.1.4 Defined Design Review Process?		
2.1.5 Failure Modes and Effects Analysis Performed?		
2.1.6 Safety Assessment Performed?		
2.1.7 Risk Assessment and Analysis Capability Exists?		
2.1.8 Failure Analysis Capability Exists?		
2.1.9 Independent Article Verification Performed?		
2.1.10 Supplier Control and Performance Metrics Exist?		
2.1.11 Manufacturing Process Change Control Exists?		
2.1.12 COS Organization and Structure, Including Safety Board Exists?		
2.1.13 Design Change Control and Substantiation Process Exists?		
2.1.14 Non-Conforming Material Control and Disposition Process Exists?		
2.2 Article Monitoring		
2.2.1 Closed Loops System Exists for All Field Inquiries?		
2.2.2 Article-Specific Performance Data Trend Analysis Exists?		
2.2.3 Article Delivery Statistics are Available for Review?		
2.2.4 Continuing ICA Review System in Place and Being Performed?		
2.3 Problem Response Actions		
2.3.1 Reporting as Required under 14 CFR § 21.3 Procedure Exists?		
2.3.2 Risk Assessment, Analysis and Management Capability Exists?		
2.3.3 A Customer Notification System Exists?		
2.3.4 A Response Team has been Developed?		
2.3.5 Failure Analysis Capability Exists?		
2.3.6 The Ability to Identify, Develop, and Implement Field Corrective Action Plans Exists?		
2.3.7 The Ability to Measure the Effectiveness of a Corrective Action Plan Exists?		
2.3.8 A System Exists to Provide Feedback into Preventive Systems and Procedures?		

A6.5 COS Problem Response Process Flowchart Example



A6.6 Sample PMA COS RACI Matrix

PMA COS System Element	ENG	PUR	QA	Safety Board	ODA (If applicable)
2.1 Preventive Systems/Procedures				R	
2.1.1 Internal Audits			R	A	
2.1.2 DAH Holder Article Field Experience	R			A	
2.1.3 Article Development Planning	R	I		A	
2.1.4 Design Review	R	I	I	A	C
2.1.5 Failure Modes and Effects Analysis	R			A	
2.1.6 Safety Assessment	R		I	A	C
2.1.7 Risk Assessment and Analysis Capability	R			A	
2.1.8 Failure Analysis Capability	R			A	
2.1.9 Independent Article Verification	C	I	R	A	
2.1.10 Supplier Control and Performance	I	R	C	A	
2.1.11 Manufacturing Process Change Control	C	R	I	A	
2.1.12 COS Organization and Structure, Including Safety Board	C	C	C	R	
2.1.13 Design Change Control and Substantiation	R	I	I	A	C
2.1.14 Non-Conforming Material Control and Disposition	R	I	R	A	
2.2 Article Monitoring				R	
2.2.1 Closed Loop System for All Field Inquiries	C	I	R	A	C
2.2.2 Article-Specific Performance Data Trend Analysis	R			A	
2.2.3 Article Delivery Statistics	I		R	A	
2.2.4 Continuing ICA Review	R			A	
2.3 Problem Response Actions				R	
2.3.1 Reporting as Required under 14 CFR § 21.3	C		C	R	R
2.3.2 Risk Assessment, Analysis and Management	R		C	A	C
2.3.3 Customer Notification System	C		C	R	I
2.3.4 Response Team	C		I	R	I
2.3.5 Failure Analysis	R		I	A	I
2.3.6 Identify, Develop, and Implement Field Corrective Actions	R	I	C	A	C
2.3.7 Measure the Effectiveness of a Corrective Action	C		I	R	I
2.3.8 Feedback into Preventive Systems and Procedures	R	I	C	A	C

Groups/Functions:

ENG – Engineering

PUR – Purchasing / Supply Chain

QA – Quality Assurance/Control

Safety Board – COS Safety Board

ODA – Organization Delegation Authorization (ODA), if applicable

Action/Information codes:

R-Primary Group Responsible for Action,

A-Accountable to ensure action takes place (if not primary),

C-Consultation with this group is recommended,

I-Inform this group to ensure proper communication.

A6.7 Revision History

September 16, 2007 (Revision 1) – Legal disclaimer added; address updated on page one to reflect MARPA's new office location.

August 31, 2012 (Revision 2) – Updated the MARPA logo. Updated to current FAA AC and Orders. Updated "part" to "article" and other minor editorial changes.

Note: Per Part 21.1 (b) Article means a material, part, component, process, or appliance
Product means an aircraft, aircraft engine, or propeller

Significant specific changes:

Paragraph 2.1 Re-ordered Problem Prevention section.
Paragraph 2.1.3 Changed focus from just complex parts to address all parts.
Paragraph 2.1.4 Broke Design Review paragraph into three related paragraphs (2.1.4-2.1.6)
Paragraph 2.1.5 Added FMEA paragraph.
Paragraph 2.1.11 Clarified Change Control process flow.
Paragraph 2.3.1 Added requirements for "or could have created an unsafe condition, within 24 hrs. of identification."
Paragraph 2.3.2 Added Risk Analysis and Management Capability paragraph.
Paragraph 2.3.3 Dropped "Company-Wide".
Paragraph 2.3.5 Clarified requirements to include system effects up to the product level.
Paragraph 2.3.7 Reworded paragraph.
Paragraph 5.0 Reworded paragraph, changed AC references.
Appendix A6.4 Added new appendix for responsibility/accountability guidelines.

August 5, 2014 (Revision 3) – Enhanced Problem Prevention and Problem Response sections

Significant Specific Changes:

Paragraph 2.1 Moved Risk and Failure Analysis capability from 2.3 to 2.1.7 and 2.1.8.
Paragraph 2.3 Expanded Risk Assessment, Analysis and Management 2.3.2.
Paragraph 2.3.6 Added specific language on determining risk, risk levels and acceptable levels of risk. Linking these risk findings with appropriate field corrective actions.
Appendix A6. Added new Appendix: COS Problem Response Process Flow Chart.

March 21, 2021 (Revision 4) – Updated MARPA URL on cover page, globally changed "shall" to "should" as appropriate, globally changed "TC" to "DAH", updated all abbreviations and acronyms in A6.1, added a A6.2 Definitions, and updated A6.4 List of References for currency. Many other minor editorial changes for clarity and conciseness.

Significant Specific Changes:

A6.7 Revision History (cont.)

Paragraph 2.1.3	Added the last bullet
Paragraph 2.1.4	Simplified and created bulletized list of review items, changed "critical/major" features to "classification of characteristics" and referenced definition.
Paragraph 2.1.5	Changed "analyzed" to "assessed". "Safety Engineer" changed to "SME". Changed "engine, propulsion system, or aircraft" to "engine, airplane, or propeller"
Paragraph 2.1.10	Reorganized and simplified
Paragraph 2.1.11	Changed "ESA" to "FPC"
Paragraph 2.1.12	Added linkage to A6.6 (RACI Matrix)
Paragraph 2.1.13	Simplified and eliminated term "Review Board"
Paragraph 2.1.14	Simplified and eliminated term "Review Board"
Paragraph 2.2.1	Changed "list of individuals" to "establish the individuals"
Paragraph 2.2.4	Added "NPRMs"
Paragraph 2.3.4	Simplified
Paragraph 2.3.5	Simplified
Paragraph 2.3.7	Eliminated "compared analytically to original data"
Paragraph 2.3.8	Eliminated "before safety critical action is required"
Section 4	Added Paragraph numbers 4.1 and 4.2
Section 5	Eliminated last sentence regarding criticality classification