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2024 MSG-4 Working Group Update

May 12, 2024

Avril Benson, MPIG MSG-4 WG Chair

2024 MSG-4 Working Group Update

May 12th, 2024

To facilitate the development of MSG-4 a working group was assembled by MPIG as requested by the Policy Board.

The initial task was to evaluate the need for a full replacement of the existing MSG-3 process. This evaluation resulted in the development of White Paper :

RECOMMENDATIONS FOR THE DEVELOPMENT OF MSG-4

With the completion of this analysis the working group has started work on developing the MSG-4 document and a transition plan from the current MSG-3 into MSG-4.

This presentation will focus on the process we are using to develop MSG-4 and the following presentation will focus on the transition plan.



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Several small teams from the working group members were set up to analyze specific areas

Systems: Nicole Elders, Len Beauchemin, Armando Chieffi, Ty Peace, Alessandra Batalha dos Santos Loureiro, Ravi Rajamani, Jeff Miller, Christiane Lindauer, Wang Jin, Ali Million, Robert Meissner

Ground Based Systems: Felix Kranich, Robert Meissner Phil Naylor, Ravi Rajamani, Alessandra Batalha dos Santos Loureiro, Di Flores, Wang Jin, Len Beauchemin, Mike Hansen

L/HIRF: Armando (L/HIRF), Len Beauchemin, John Sullivan, Di Flores, Lorenz Wenk

Structures: Di Flores, Nicole Elders, Michael Hansen, Matthew Razniewski, Taka Kobayashi

Zonal: Manny Gdalevitch, Jeff Miller, Len Beauchemin, John Sullivan, Di Flores, Ty Peace, Lorenz Wenk

Evaluate Zonal after SYS/STR/LHIRF development



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To track the areas we intend to address within the MSG-4 document a list of items from the white paper, the initial analysis of each small group, the existing IP that have not been incorporated into MSG-3, and pending MSG-3 CIP's will be maintained throughout the project.

MSG-3 IP / Issue	Title	Comments	Disposition for MSG-4	Status
CIP MPIG 2024-03	Use of IP44 Evolution process for MTB based Maintenance programs			Open
CIP RMPIG 2024-02	AC Zones, include S1000D as option to ISpec2200			Open
MSG-4 WG White Paper	Impact of Novel and Emerging propulsion on Aircraft Design	Sys		Open
MSG-4 WG	Comprehensive analysis for electric Propulsion systems			Open
MSG-4 WG White Paper	Introduction of new workflows to account for new materials as well as those with a combination of metallic and non-metallic properties.	Str		Open
MSG-4 WG SYS	Function vs systems and how MSIs relate to both			Open
MSG-4 WG SYS	Current tasks selection and task types			Open
MSG-4 WG SYS	Favor guidance over definition			Open
MSG-4 WG SYS	how to assess hidden failures of backup systems			Open
MSG-4 WG SYS	How deeply should be assess something? Guidance - For example failure for failure modes			Open
MSG-4 WG SYS	What is a system? And how does it relate to an item of analysis (placard, galley, overhead beam)			Open
MSG-4 WG SYS	Does a function have to have an input and an output?			Open
MSG-4 WG SYS	Analysis flow - can we add IAHM/HUMS			Open
MSG-4 WG SYS	Analysis flow - can we add supplemental analysis (rotor craft)?			Open
MSG-4 WG SYS	Should we make a link to other processes? I.E. Criticality for systems safety interface to DFMES/FMEA/ Sampling programmed?			Open
MSG-4 WG SYS	The current definitions may not be in line with future technologies			Open
MSG-4 WG SYS	what is the goal and classification of the MSI ?			Open
MSG-4 WG SYS	How do we enter the logic process?			Open
MSG-4 WG SYS	MSG-3 dossier template – standardize and remove variability (MSI)			Open
MSG-4 WG SYS	Is the system to provide SHM, a function of the system?			Open
MSG-4 WG SYS	Do we need a new flowchart for system and structure codependency?			Open
MSG-4 Ground	Aircraft conditions shall be detected/diagnosed (mostly) automatically with no/minimal manual intervention			Open
MSG-4 Ground	Any developed standard shall be applicable to various air vehicles that can potentially be operated remotely and/or autonomously			Open
MSG-4 Ground	User permission/validation shall be achieved through training and not			Open
MSG-4 Ground	Any logic developed for ground-based infrastructure shall be embedded seamlessly into the overall MSG-X process			Open
MSG-4 Ground	The implementation shall be possibly through usage of "open-source"/COTS infrastructure			Open
MSG-4 Ground	The ground-based infrastructure shall be certifiable through ISO 14001			Open



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A detailed review to document all variation between Vol 1 and Vol 2 content

ATA MSG-3 Volume 1, Revision 2022.1					
Volume 1	Volume 2	Vol1 Differences	Vol 2 Differences	Combine (Y or N)	Proposed new para
		AFM AFM aircraft			
2. Direct Adverse Effect	2. Direct adverse effect on safety		human occupants, including those directly supported by external load carrying systems (i.e.	Y - there is an effort to consolidate this section of the MSG-3. Refer to CIP EASA 2023-07	
4. Operational Effect	4. Operational Effect	none	Volume 2	Y - remove "volume 2"	
4. Hidden Function Safety Effects (Category 8)	4. Hidden Function Safety Effects (Category 8).	NOTE: In order to take credit for tests that are performed automatically by electronic equipment at power up of a system, the assumption that this system is de-powered frequently enough to provide the timely detection of the failure is to be justified prior to the MRB Report approval, and the assumed maximum period between power-downs shall	none	Y - Note can be combined. N- As above the P156 was not applicable to Rotorcrafts.	
4. Inspection/Functional Check (All Categories).	4. Inspection/Functional Check (All Categories)	none	Scheduled Health and Usage Monitoring (S-HUM) may be an option for carrying out a Functional Check, provided that the HUMS is certified for credit for the concerned failures. Dedicated analysis procedures need to be developed and approved/accepted at the level of the PPH for such technology. The PPH will also explain if S-HUM tasks are meant to replace other tasks that would have been applicable and effective without the HUMS, or if the decision to take credit from HUMS or not is	Y - Vol 2 paragraph that describes the S-HUM should be moved to the section 2-3-7 as an introduction. The paragraph should harmonize the AHM and S-HUM level 3 approach in MSG-4. N - This is a methodology difference between HUMS and AHM level 3 analysis...The approval of HUMS was related to use HUMS in relation to this kind of tasks and not in a generic format. Separate appendix is supported.	Dedicated appendix for Vol.02 difference can incorporate this part.
2-3-8. Systems/Powerplant Classic Task Interval Determination	2-3-8. Systems/Powerplant Task Interval Determination.	* customer requirement *service experience gained with comparable or identical components and subsystems	* customer requirement *Data from an TCH/OEM approved Helicopter Flight Data Monitoring program acquired before entry into service and after controlled service introduction. Dedicated analysis procedures may need to be referenced in the PPH * service experience gained with comparable or identical components and subsystems including regulator approved HUMS usage data	N - Use specific section to preserve differences as approved in IP209	Add this section in dedicated appendix for Rotorcraft VOL02. It is related to the different HUMS process respect to AHM.



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The leads from each of the small teams along with some representatives from the policy board will draft the content for MSG-4

Outline of the proposed MSG-4 document with vol 1. and 2. differences noted.

Chapter Titles	Vol 1 Differences	Vol 2 Differences	MSG-4 Transition Phase 1	MSG-4 WG Agree
Preface	Retain All	Retain All	Preserve the history of MSG development at a high level and the initial development concepts of MSG-4, and create a transition in phases into MSG-4. Each phase will focus on a specific set of changes that will be coordinated with MPIG and the IMRBPB through the use of CIP's for approval of the changes. This will allow for an effective transition from MSG-3 into MSG-4.	Yes
Chapter 1. General.	none	none	Retain title	Yes
1-1. Objective	none	none	Remove interval and replace details with attributes, Replace second paragraph with the following The MSG-4 methodology is considered an acceptable means to develop the initial minimum scheduled maintenance requirements when utilizing the MRB or MTB processes as defined in the International MRB/MTB Process Standard (IMPS); to be made available to the operators and can be used as a guidance document to optimize the maintenance tasks and task attributes throughout the life of the program. Other processes in addition to MRB or MTB may also utilize this methodology for identification of the initial minimum scheduled maintenance requirements. Delate third paragraph, this is covered in IMPS 5.16 and should not be included in Update to include all analysis types and document primary out of scope content. Remove paragraph one it is duplicate information from the objective paragraph paragraph two will be reviewed at the end of the development.	Yes, updated to include reference to the IMPS
1-2. Scope	(including specific operations such as Extended Twin Operations / Extended Operations (ETOPS), Reduced Vertical Separation Minima (RVSM), Category (Cat) III to be identified.	Volume 2 (Rotorcraft) (including specific rotorcraft relative operations (e.g. Cat A, WAAS Approaches, external load operations)		Yes



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A working file provides context for what is changing from MSG-3 to MSG-4

1-2. Scope

The MSG-4 document presents guidelines for performing the analysis of (enter different analysis types here). It is out of the scope of this document to define (enter out of scope primary items here, unscheduled maintenance requirements, national requirements)

~~For the purpose of developing an MRB Report, MSG-4 is to be used to determine initial scheduled maintenance requirements.~~

The analysis process allows scheduled tasks and intervals required to support all certificated operating capabilities of the aircraft (including specific operations such as Extended Twin OPERATIONs / ExTended OPERATIONs (ETOPS), Reduced Vertical Separation Minima (RVSM), Category (Cat) III, Cat A, WAAS Approaches, external load operations to be identified).

▲ Move Content to IMPS and revise as needed. |

~~1-3. Organization~~

~~The organization to carry out the scheduled maintenance development for a specific type aircraft shall be staffed by representatives of the operators purchasing the equipment, the prime manufacturers of the airframe and powerplant, and the Regulatory Authority.~~



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A clean copy of the MSG-4 content and format to review and create CIP's for MSG-4

ATA MSG-4, Draft Revision 2025.1

Chapter 1. General

1-1. Objective

It is the objective of this document to present a means for developing scheduled maintenance tasks which will be acceptable to the regulatory authorities, the operators, and the manufacturers. The scheduled maintenance task attributes will be developed by coordination with specialists from the operators, manufacturers, and the Regulatory Authority of the country of manufacture. Specifically, this document outlines the general organization and decision processes for determining scheduled maintenance requirements initially projected for the life of the aircraft and/or powerplant.

The MSG-4 methodology is considered an acceptable means to develop the initial minimum scheduled maintenance requirements when utilizing the **Maintenance Review Board MRB** or **Maintenance Type Board MTB** processes as defined in the **International MRB/MTB Process Standard (IMPS)**; to be made available to the operators and can be used as a guidance document to optimize the maintenance tasks and task attributes



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Development of MSG-4 Phase II

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CIP for each section of MSG-4, following standard CIP process. Each will be submitted to the MPIG and IMRBPB for concurrence prior to addition into the full MSG-4 document. Details of the identification and transition process will be discussed in the next presentation. CIP- MPIG-MSG-4- 01

International Maintenance Review Board Policy Board (IMRBPB)

Issue Paper (IP)

IP Number: **CIP-MPIG-**

Initial Date (DD/MMM/YYYY):

Revision / Date (DD/MMM/YYYY):

Effective Date (DD/MMM/YYYY):

Retroactivity (Y/N):

Title:	MSG-4 Transition Phase 1 - Preface
Submitter:	MPIG MSG-4 Working Group

Applies To:	
MSG-3 Vol 1	
MSG-3 Vol 2	
MSG-4	1
IMPS	



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The CIP/IP process is the official record of the agreed positions from the MPIG and the IMRPBPB, and for project tracking purposes it will also be noted in the outline file.

Chapter Titles	Vol 1 Differences	Vol 2 Differences	MSG-4 Transition Phase 1	MSG-4 WG Agree	MPIG Agreed	IMRBPB Agreed
Preface	Retain All	Retain All	Preserve the history of MSG development at a high level and the initial development concepts of MSG-4, and create a transition in phases into MSG-4. Each phase will focused on a specific set of changes that will be coordinated with MPIG and the IMRBPB through the use of CIP's for approval of the changes. This will allow for an effective transition from MSG-3 into MSG-4.	Yes		
Chapter 1. General.	none	none	Retain title	Yes		
1-1. Objective	none	none	Remove interval and replace details with attributes, Replace second paragraph with the following The MSG-4 methodology is considered an acceptable means to develop the initial minimum scheduled maintenance requirements when utilizing the MRB or MTB processes as defined in the International MRB/MTB Process Standard (IMPS); to be made available to the operators and can be used as a guidance document to optimize the maintenance tasks and task attributes throughout the life of the program. Other processes in addition to MRB or MTB may also utilize this methodology for identification of the initial minimum scheduled maintenance requirements. Delate third paragraph, this is covered in IMPS 5.16 and should not be included in	Yes, updated to include reference to the IMPS		
1-2. Scope	(including specific operations such as Extended Twin Operations / Extended Operations (ETOPS), Reduced Vertical Separation Minima (RVSM), Category (Cat) III to be identified.	Volume 2 (Rotorcraft) (including specific rotorcraft relative operations (e.g. Cat A, WAAS Approaches, external load operations)	Update to include all analysis types and document primary out of scope content. Remove paragraph one it is duplicate information from the objective paragraph paragraph two will be reviewed at the end of the development.	Yes		



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Questions?