International Maintenance Review Board Policy Board (IMRBPB)
Issue Paper (IP)

Initial Date: 1-MAR-2013
IP Number: IP 128
Revision 1 / Date: 1-MAY-2013

Title: Impact of AC 25-19A on ATA MSG-3 document

Submitter: Joint MPIG submission (drafted by Airbus)

Issue: In October 2011, FAA released AC 25-19A which replaces the earlier AC 25-19 dated November 1994. Among various changes, a revision to the methodology to coordinate the CMR selection process with the MRB process was introduced which includes additional information regarding the eligibility of an MSG-3 task to cover a CCMR.

Problem: ATA MSG-3 2007 document introduced expanded text and added a flowchart to better explain the interface between the CMR selection process and the MRB Process. Further to issuance of AC 25-19A, the text added in 2007 now needs to be revised.

AC 25-19A requires that MRBR tasks that cover CCMRs shall be guarded against escalation beyond CCMR intervals. Means to assure this control during any evolution of MRBR tasks within an MRB Report can be easily introduced if not already present. However, escalation of the interval of these MRBR tasks by a carrier could lead to exceedance of the CCMR value. It is thus necessary to define a means to provide an operator with sufficient information to prevent such occurrences.

Recommendation (including Implementation):

Revise procedure depicted in Figure 2-3-8.6.) to address (a) changes arising from release of AC 25-19A and (b) enhancements further to Industry experience of the application of the current MSG-3 guidance.

1.0 Discussion and justification for changes

Step 1

Change from:
CMCC identifies the list of CCMRs
to
CMCC assesses CCMRs that are eligible to be mitigated by MSG-3 tasks

AC25-19A para 12a identifies criteria that will force a CMR designation on a task irrespective of how it might also have been developed from MSG-3 logic. These tasks are thus out of scope of the MSG-3 text since an assessment may not be made on whether they might be covered by MSG-3 tasks. The CMCC will review all CCMRs but with respect to the interface with the MRB Process they only assess those that may be mitigated by MSG-3 tasks.

This revised wording is compatible with EASA's AMC 25-19 which does not include criteria to prevent mitigation of any CCMR.

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Step 2

Change from:
Is there an existing MSG-3 safety category task that detects the latent failure of the CCMR?
to
For these CCMRs, is there an existing MSG-3 safety category task whose scope would fully detect the latent failure(s) of the CCMR

Minor change to clarify that (a) the assessment is limited to a subset of CCMRs and (b) that multiple hidden failures might be addressed by the CCMR and it is necessary to check that every one is addressed by the MSG-3 task before answering 'yes'.

New Step 3 replacing previous Step 4

Change from:
Does the MSG-3 task meet the scope and interval of the CCMR?
to
Is the MSG-3 task interval shorter than the CCMR interval?

This is amended to (a) reflect the fact that the 'scope' issue is addressed in Step 2 and (b) to clarify that in accordance with AC 25-19A para 12b(4)(a)2, the MSG-3 task interval must be shorter than the CCMR interval (it can no longer be equal to it). Note that adequacy of the value of the delta between the two values is addressed in Step 9.

New Step 4 replacing previous Step 3

Could SSA information justify a re-evaluation of level 1 or 2 MSG-3 analysis?
to
Does information from the SA justify a re-evaluation of the FEC (Level 1) or task (Level 2) in MSG-3 analysis?

This is purely a wording improvement to clarify the potential impact on the Level 1 & 2 analyses. In addition, writing 'Does' instead of 'Could' is more positive. 'SSA' changed to 'SA' (Safety Analyses) to reflect the fact that CCMRs may arise from any Part 25 compliance document even though the majority will come from System Safety Assessments produced to show compliance with 25.1309.

New Step 5 now combines previous Step 5 and Step 8

Change from
CCMR becomes CMR (Step 5)
CCMR becomes CMR and MSG-3 task remains in Systems & Powerplant Section (Step 8)
to
CCMR becomes CMR. Note: If the same task is derived from MSG-3 it remains in the Systems and Powerplant Section

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A single step summarises the consequence of a 'No' answer to four steps (Steps 4, 6, 8 and 9). The word 'If' is added in the note to allow for the fact it is does not apply to No answers from Step 4 and 6. The MRBR will reflect the interval defined by the MRB Process.

New Step 6

Does the re-evaluation lead to a safety category task whose scope fully detects the latent failure(s) of the CCMR?

This is the equivalent of Step 2 but is now asked again after the re-evaluation of the MSG-3 using information from the Safety Analyses that was not originally available to the analysts. Unlike Step 4 of the current logic, a 'yes/no' answer is required for the 'safety/scope' aspects before going to another question concerning the interval. The current logic includes both questions in the same step which results in a difficulty to detail different consequences to a 'No' response.

New Step 7 replacing previous Step 4

Change from
Does the MSG-3 task meet the scope and interval of the CCMR?
to
After re-evaluation, is the MSG-3 task interval shorter than the CCMR interval?

This now focuses on the interval after the re-evaluation that may have resulted in changes to the FEC (safety) or scope. As in new Step 3, the questions requires confirmation whether interval is shorter than CCMR interval (it can no longer be equal). Again, the adequacy of the value of the delta between the two values is addressed in Step 9.

New Step 8 replacing previous Step 7

Change from
Will the ISC accept a reduced task interval to satisfy the CCMR interval?
to
Does information from the Safety Analyses / Engineering Judgment justify a re-evaluation of the interval in MSG-3 analysis?

The wording of the previous Step 7 suggests that an ISC could decide to reduce all intervals corresponding to CCMRs that are eligible to be mitigated by MSG-3 tasks and thus avoid these becoming CMRs. It is not the intention of this MSG-3 section to provide means to override MSG-3 results purely to avoid the categorisation of a task as a CMR. The goal is to provide the possibility for the analyst to revisit the previously declared interval to take into account information from the SA that he was previously unaware of.

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New Step 9

Does the CMCC accept that typical in-service escalation of the MSG-3 task interval will not lead to an unacceptable value?

This new question addresses the AC25-19A para 12b(4)(a)2 sentence that refers to the use of factors to provide 'a margin to guard against potential escalation of FEC8 task intervals beyond the intervals specified by the CMR'

The potential for escalation varies according to the task, its interval and the operator's packaging concept. Generally the goal will be to escalate the interval to allow the task to be retained within an existing check package. Whereas a 'factor of one half of the CMR interval' might be valid for a frequent task where it is conceivable that high percentage increases could occur over aircraft lifetime (e.g. 400FH to 1000FH) it is not a realistic factor for tasks at much higher intervals where the same goal (retention in a check package) can be achieved with much smaller percentage increases (e.g. 48000 FH to 60000 FH). The question in Step 9 allows the CMCC to discuss and agree an appropriate interval without declaring a fixed value for the factor.

New Step 10 replaces previous Steps 6 and 9

Change from
The MSG-3 task is considered to properly cover the CCMR (step 6)
The revised MSG-3 task is considered to properly cover the CCMR (step 9)
to
The MSG-3 task is considered to fully mitigate the CCMR

As a result of applying this procedure, the applicant will have two lists of CCMRs. One list will comprise CMRs. These will be published in a limitations document and the intervals will be mandated. The others will be published in MRB Reports and their subsequent evolution will be controlled through IP44 (for MRBR revisions) and local operational regulations (for air carriers' maintenance programs).

AC 25-19A para 12b(4)(a)3 requires the applicant to have 'procedures in place (e.g. tagging of MSG-3 tasks to identify those derived from the safety analysis) so that the FEC8 or FEC5 task would not be susceptible to escalation beyond the interval that would otherwise be required by a CMR'.

Though not part of MSG-3 (and hence not part of the CIP) this new requirement will cause the applicant to clearly identify the subset of FEC8 or FEC5 tasks that are mitigating CCMRs. This will require that either an existing ICA or a new ICA identifies these tasks and thus allows an appropriate control by the air carrier. Since one solution is to include this information in the MRB Report it is proposed that this issue is discussed in parallel to the MSG-3 update since, if this is the agreed solution, a further change may be necessary to the flow diagram.

2.0 Proposed changes to MSG-3

The following wording is proposed for MSG-3 para 2-3-8.6 Certification Maintenance
Requirements (CMRs).

(changes in opening paragraphs only are shown in red)

6. Certification Maintenance Requirements (CMRs)

In addition to those tasks and intervals established through MSG-3 analysis, scheduled
maintenance tasks may arise within the certification process (e.g. from compliance with
25.1309).

A CMR is a required scheduled maintenance task, established during the design certification
of the airplane systems as an operating limitation of the type certificate or supplemental type
certificate. CMRs are a subset of the instructions for continued airworthiness identified
during the type certification process. A CMR usually result from a formal, numerical analysis
conducted to show compliance with the requirements applicable to catastrophic and hazardous
failure conditions. A CMR is intended to detect safety-significant latent failures that would,
in combination with one or more other specific failures or events, result in a hazardous or
catastrophic failure condition. A CMR can also be used to establish a required task to detect
an impending wear-out of an item whose failure is associated with a hazardous or catastrophic
failure condition

It is important to note that CMRs are derived from a fundamentally different analysis process
than the maintenance tasks and intervals that result from MSG-3 analysis. The process for
coordinating MSG-3 derived tasks with CCMRs involves a Certification Maintenance
Coordination Committee (CMCC) as described by regulatory guidance material (e.g. AC 25-
19A). The CMCC may influence the MWG's decision as per the flowchart (figure 2-3-8.6).
This process provides an acceptable means to identify an MSG-3 task that mitigates a CCMR
and justifies that CMR status is not required.

Flowchart Procedure (Figure 2-3-8.6.):

  1- CMCC reviews the CCMRs identified by the applicant through Safety Analysis (SA).
  An assessment is then made of those that are eligible to be mitigated by MSG-3 tasks.

  2- For those CCMRs that are eligible for mitigation by an MSG-3 task, the CMCC
  determines if an MSG-3 defined safety category task exists that will fully detect the latent
  failure(s) identified in the CCMR task requirement.

  3- If an MSG-3 task does exist, is the interval shorter than that required to satisfy the
  CCMR?

  4- If an MSG-3 task does not exist, the CMCC will ask the ISC/WG if the SA provides
  new information to the MSG-3 analysts that might justify a re-evaluation of the Failure
  Effect Category (Level 1 sheet) or the task selection (Level 2 sheet).

5- If the SA does not identify information that was previously unknown to the MSG-3 analysts then the MSG-3 result remains valid. The CCMR thus becomes a CMR.

6- If the SA identifies information that was previously unknown to the MSG-3 analysts then the CMCC will ask the ISC/WG if a subsequent re-evaluation would lead to a safety category task whose scope fully detects the latent failure(s) identified in the CCMR task requirement. If 'No', then the CCMR thus becomes a CMR.

7- If the re-evaluation results in a safety category task, is the MSG-3 interval shorter than the CCMR interval? If 'Yes', go to Step 9.

8- If the MSG-3 interval is the same as, or is longer than, the CCMR interval, the CMCC will ask the ISC/WG if the SA provides new information to the MSG-3 analysts that might justify a re-evaluation of the selected interval. If it does not, or if any subsequent re-evaluation does not reduce the interval below the CCMR value, then the CCMR becomes a CMR and the MSG-3 task is included in the Systems & Powerplant Section quoting the interval derived from MSG-3 application.

Note: This question is not intended to provide means to override MSG-3 results purely to avoid the categorisation of a task as a CMR. It provides the possibility for the analyst to revisit the previously declared interval to take into account new information from the SA.

9- Having established a compatible task and interval, does the CMCC accept that typical in-service escalation of the MSG-3 task interval will not lead to an interval that would be unacceptable for continued airworthiness? If 'No', then the CCMR becomes a CMR and the MSG-3 task is included in the Systems & Powerplant section with the interval derived from MSG-3 application.

10-A 'Yes' answer to Step 9 indicates that the MSG-3 task requirement fully mitigates the CCMR. The task thus does not need to be considered in the same way as an airworthiness limitation.
Note: AC 25-19A requires that the applicant identifies means to ensure that the intervals of MSG-3 tasks that mitigate CCMRs are not escalated in service beyond the CCMR value. This may require tagging such tasks with an identifier and publication of the CCMR interval as a cap beyond which escalation is not permitted.

Decision taken in IMRBPB meeting, 26 April 2013

Proposed changes to Figure 2-3-8.6 and the flow chart procedure in paragraph 2-3-8.6 were assessed as unnecessary. Agreement was reached to update the Introductory text of paragraph 2-3-8.6 (with amendments to Industry proposal) and correct the figure and procedural steps to reflect 'Safety Analyses' rather than 'System Safety Assessments'. Original proposal to remain in the paper as a record of the Industry submission.

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Changes to MSG-3 agreed with IMRBPB:

6. Certification Maintenance Requirements (CMRs)

In addition to those tasks and intervals established through MSG-3 analysis, scheduled maintenance tasks may arise within the certification process (e.g. from compliance with 25.1309).

A CMR is a required scheduled maintenance task, established during the design certification of the airplane systems as an operating limitation of the type certificate or supplemental type certificate. CMRs are a subset of the instructions for continued airworthiness identified during the type certification process. A CMR usually result from a formal, numerical analysis conducted to show compliance with the requirements applicable to catastrophic and hazardous failure conditions. A CMR is intended to detect safety-significant latent failures that would, in combination with one or more other specific failures or events, result in a hazardous or catastrophic failure condition. A CMR can also be used to establish a required task to detect an impending wear-out of an item whose failure is associated with a hazardous or catastrophic failure condition

It is important to note that CMRs are derived from a fundamentally different analysis process than the maintenance tasks and intervals that result from MSG-3 analysis. The process for coordinating MSG-3 derived tasks with CCMRs involves a Certification Maintenance Coordination Committee (CMCC). The CMCC may influence the MWG's decision as per the flowchart (figure 2-3-8.6). This process provides an acceptable means to identify when a CMR designation may not be necessary if there is an equivalent MSG-3 task to accommodate the CCMR.

Changes to Flowchart Procedure (Figure 2-3-8.6.):

   1- CMCC identifies the CCMR's from the Safety Analyses (SA)

   2- CMCC determines if a MSG-3 defined safety category task exists that will detect the latent failure identified in the SA.

   3- If a MSG-3 task does not exist, the CMCC will ask the ISC/WG if a reassessment of the MSG-3 analysis is possible to include a task, based on additional information provided by the SA report.

Changes to Figure 2-3-8.6. CMR and MSG-3 Coordination

   Step 3: 'SSA' corrected to 'SA'
   Definitions box: 'SSA' corrected to 'SA' in two places

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Original proposal – rejected by the IMRBPB

Figure 2-3-8.6. CMR and MSG-3 Coordination

Abbreviations

CCMR– Candidate Certification Maintenance Requirement
CMR – Certification Maintenance Requirement
CMCC- Certification Maintenance Coordination Committee
SA/EJ- Safety Analysis / Engineering Judgment

Note: All changes to the MSG-3 analysis must be approved by the Working Group and ISC

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Final agreement by the IMRBPB

Definitions
CCMR - Candidate Certification Maintenance Requirement, coming from SSA
CMR - Ceritification Maintenance Requirement
CMCC - Certification Maintenance Coordination Committee
SA - System Analyses

Note: All changes to the MSG-3 analysis must be approved by Working Groups and ISC.

1-CMCC identifies the list of CCMRs

2- Is there a existing MSG-3 safety category task that detects the latent failure of the CCMR?

3- Could SA information justify a re-evaluation of level 1 or 2 MSG-3 analysis?
See Note

4- Does the MSG-3 task meet the scope and interval of the CCMR?

6- The MSG-3 task is considered to properly cover the CCMR.

7 – Will the ISC accept a reduced task interval to satisfy the CCMR interval?
See Note

9- The revised MSG-3 task is considered to properly cover the CCMR.

5- CCMR becomes CMR

8 -CCMR becomes CMR and MSG-3 task remains in System and Powerplant Section
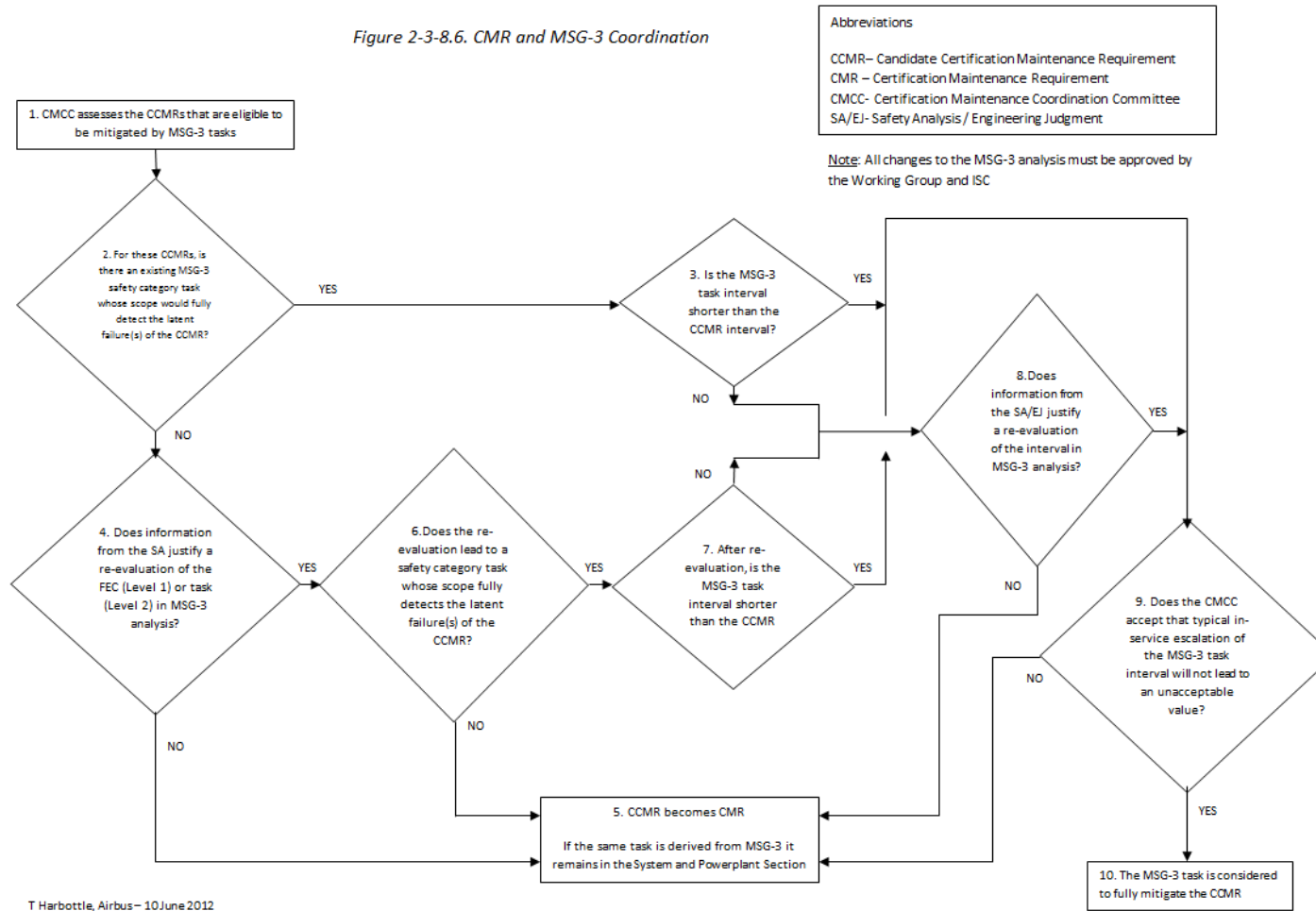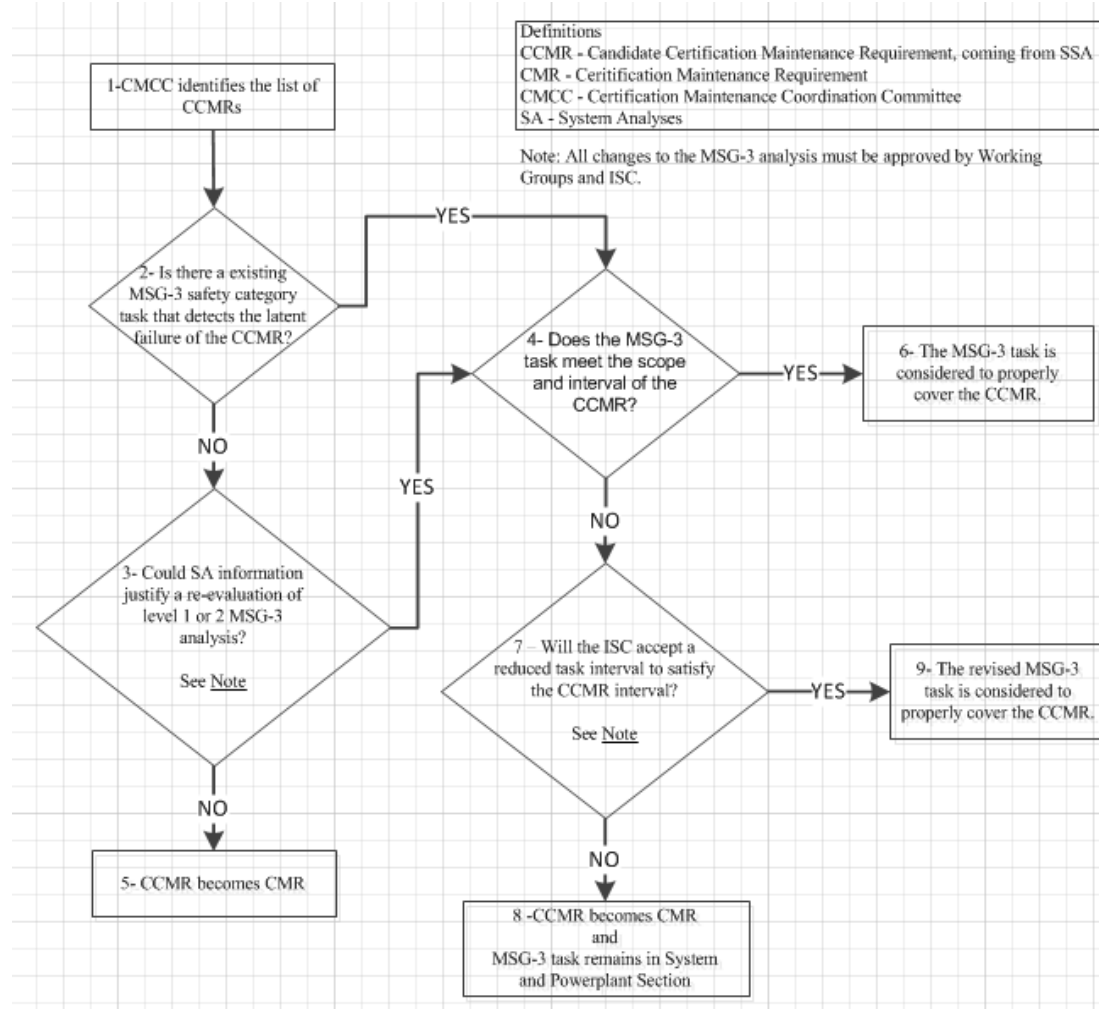
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IMRBPB Position:

Date: April 25, 2013

Position: The IMRBPB has determined that the current CMR and MSG-3 coordination process is to be used to identify when a CMR designation may not be necessary if there is an equivalent MSG-3 task to accommodate the CCMR.

Additional information contained within AC25-19A is to be used during the CMCC process to determine the equivalency of an MSG-3 task and the MSG-3 coordination process, 2-3-8.6, is to be used when requested to review MSG-3 analysis.

Based on this, AC25-19A does not impact the current flowchart contained in figure 2-3-8.6 but paragraph 2-3-8.6 has been updated to reflect AC25-19A, including reference to SSA, which has been changed to safety analyses (SA).

Status of Issue Paper (when closed state the closure date): Closed as IP 128 April 26, 2013 and revised text completed in Revision 1, May 1, 2013.

Recommendation for implementation: Implement new paragraph 2-3-8.6 and paragraph 1, 2 and 3 of the flowchart procedure, which are contained within section 2.0 of this IP. Also, the flowchart figure 2-3-8.6 will require revision to change SSA references to SA.

Change is applicable to MSG-3 Volume I and II.

Important Note: The IMRBPB positions are not policy. Positions become policy only when the policy is issued formally by the appropriate National Aviation Authority.