

Top 50 Checklist Tool Guide for RAM Planning System Readiness Accountability Direct Programme Decisions

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Site Visit Executive must formulate comprehensive reliability availability and maintainability RAM programme using appropriate readiness growth strategy to improve RAM performance until requirements are satisfied. Programme must consist of engineering activities including: RAM allocations, block diagrams and predictions; failure definitions and scoring criteria; failure mode, effects and criticality assessment. Any efforts to improve state of readiness must include maintainability and built-in test demonstrations; reliability growth testing at the system and subsystem level; and a failure reporting and corrective action system maintained through design, development, production, and sustainment. The RAM programme is an integral part of the systems engineering process.

Site Visit Executive must prepare preliminary RAM Cost Rationale Report in support of Acquisition Milestone decision points. This report provides a quantitative basis for RAM requirements and improves cost estimates and programme planning, and must be attached to the Systems Engineering Plan to be updated in support key Acquisition milestone decisions.

Technology Development Strategies at key milestones must specify how sustainment characteristics of materiel solutions resulting from assessment of alternatives and Capability Development to make sure sustainment key performance parameter thresholds have been translated into RAM design requirements and contract specifications.

Strategies must also include the tasks and processes to be stated in the request for proposal contractor is required to employ to demonstrate achievement of RAM design requirements. The Test/Evaluation Strategy must specify how RAM will be tested and evaluated during the associated acquisition phase.

Metrics are used to illustrate, and report reliability growth to be included/updated in acquisition phases and must be stated in series of intermediate goals and tracked through fully integrated, system-level test/evaluation events until RAM threshold is achieved. If single metric is not adequate to describe overall system RAM, metrics must be provided for critical subsystems with rationale for their selection.

Site Visit Executive must assess RAM growth required for system to achieve its RAM threshold during initial operational test/evaluation and report results of that assessment to acquisition Milestone Decision Authorities.

RAM growth must be monitored and reported throughout the acquisition process. Site Visit Executive must report status of RAM objectives and/or thresholds as part of the

formal design review process, during Programme Support Reviews, and during systems engineering technical reviews:

1. Implement the reliability activities described within Request for Proposal with appropriate methods, tools, and best practices, in order to accomplish the following four objectives: 1) understand the DoD requirements, 2) design product/system for reliability, 3) produce reliable products/systems, 4) monitor and assess user reliability?
2. Include procedures for verifying that planned reliability activities are implemented?
3. Manage risks due to new technologies?
4. Include decision-making criteria and plans for intensifying reliability-improvement efforts?
5. Require periodic updates coordinated with the customer/user?
6. Routinely update the model as failure definitions are updated, failure modes are identified, operational load estimates are updated, and design or manufacturing changes are made?
7. Include detailed component stress and damage models?
8. Update allocations, reliability and identify single points of failure?
9. Identify critical reliability items and the need for additional design or testing activities?
10. Integrate reliability activities with the systems engineering process throughout service life?
11. Incorporate reliability improvement actions routinely during design, production, and in the field?
12. Monitor and evaluate the reliability impact of design changes and supplier change notices throughout service life?
13. Control design rules that affect item reliability?
14. Develop and periodically update load estimates throughout the service life?
- 15.. Verify estimates on instrumented systems/products with operationally realistic conditions applied in time for reliability verification?
16. Use system engineering estimates in reliability modeling, assessment, and

verification?

17. Develop and periodically update these load estimates based on operational condition loads applied at system level?

18. Verify load estimates on instrumented systems/products/assemblies with operationally realistic conditions applied?

19. . Flow down estimates and updates to designers; integrators of suppliers?

20. Use estimates to identify failure modes and mechanisms and in assessments and verification?

21. Begin to identify failure modes and mechanisms as soon as development begins using realistic service life operational loads in conjunction with engineering models?

22. Ensure that teams developing assemblies, subassemblies, and components for the system identify and confirm failure modes and distributions with assess, test, or accelerated test?

23. Ensure that teams selecting/integrating assemblies, subassemblies, and components for the system identify and confirm failure modes and distributions with analysis, test, or accelerated test?

24. Identify and confirm failure modes induced by manufacturing variation and errors?

25. Identify and confirm test and field failure modes induced by user or maintainer errors?

26. Map to customer-specified failure definitions and scoring criteria for all failure modes to formulate corrective actions throughout service life?

27. Aggressively mitigate failure modes until reliability requirements are met?

28. Employ mechanism for monitoring and communicating the implementation and effectiveness of corrective actions that is accessible by the customer?

29. Include failure modes that may occur during service life in system reliability model?

30. Assess feasibility of reliability requirements using the system reliability model in conjunction with expert judgment?

31. Allocate reliability requirements to lower indenture levels and flow them to subcontractors/suppliers?

32. Periodically assess reliability of the system throughout service life using the

reliability model, operational load estimates, and customer specs?

33. Include reliability values to be achieved at various points in the programme?

34. Track reliability assessments from field test as a function of time and compare them with allocations and customer reliability requirements?

35. Monitor and evaluate the implementation of corrective actions as well as other changes to the design or manufacture of the systems/product that may impact reliability?

36. Develop and periodically refine reliability requirements verification strategy/plan as integral part of the systems engineering verification and is coordinated and integrated across all phases?

37. Include a strategy to ensure that reliability requirements will be verified during design and will not degrade during production or in the field?

38. Include in a reliability growth plan the reliability values to be achieved at various points during development?

39. Base verification on testing, or a mixture, and ensure that the verification is operationally realistic?

40. Verify system-level operational service life loads will be used?

41. Include any customer-specific requirements?

42. Design to avoid failures due to user or maintainer errors?

43. Ensure proposal specifies how and when technical reviews will be conducted throughout service life?

44. Conduct periodic interchanges with the customer/user that promote understanding of operational conditions?

45. Schedule and conduct technical reviews to 1) ensure progress toward achieving reliability requirements, 2) verify planned reliability activities are implemented, and 3) compare status and outcomes of reliability activities?

46. Conduct and participate in reviews with customer/user that address identification, classification and mitigation of failure modes?

47. Implement reliability activities with methods and tools from the request for proposal?

48. Obtain customer approval for changes in methods, tools, or best practices and include in proposal?

49. Ensure continuous customer access to output updates from all reliability activities?

50. Schedule and update outputs in reliability case?