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**RELIABILITY, AVAILABILITY, MAINTAINABILITY,  
AND COST (RAM-C) RATIONALE REPORT  
OUTLINE GUIDANCE**

**Version 1.0**

**February 28, 2017**

Office of the Deputy Assistant Secretary of Defense for Systems Engineering  
Washington, D.C.

Distribution Statement A. Cleared by DOPSR, Case # 17-S-1312. Distribution is unlimited.

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The following RAM-C Report outline was prepared by the Office of the Deputy Assistant Secretary of Defense for Systems Engineering for use by Department of Defense acquisition programs. The outline includes guidance and expectations regarding appropriate details to include in each section.

The program may use this document as a template or establish a RAM-C Report template that includes the recommended content.

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**Reliability, Availability, Maintainability, and Cost (RAM-C)  
Rationale Report**

**Month dd, yyyy**

**Program Name – ACAT Level**

**RAM-C Rationale Report  
Version \_\_\_\_**

**Attached To Program Name System Engineering Plan  
Supporting Milestone \_  
and  
[Appropriate Phase Name]**

**SEP Dated Month dd, yyyy, SEP Version Xx**

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SUBMITTED BY

_____ Name Lead Systems Engineer	_____ Date	_____ Name Product Support Manager	_____ Date
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_____ Name Business Financial Manager	_____ Date	_____ Name Program Manager	_____ Date
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CONCURRENCE

_____ Name Program Executive Officer or Equivalent	_____ Date
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COMPONENT APPROVAL

_____ Name Title, Office	_____ Date
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*Expectation: The RAM-C Rationale Report should be attached to the SEP and approved at an appropriate level as determined by the program office.*

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## 1. Executive Summary

*Expectation: The information for the Executive Summary is obtained from the body of this document. The purpose from Section 2.1 (Purpose) is entered here.*

### 1.1 Sustainment KPP Assessment

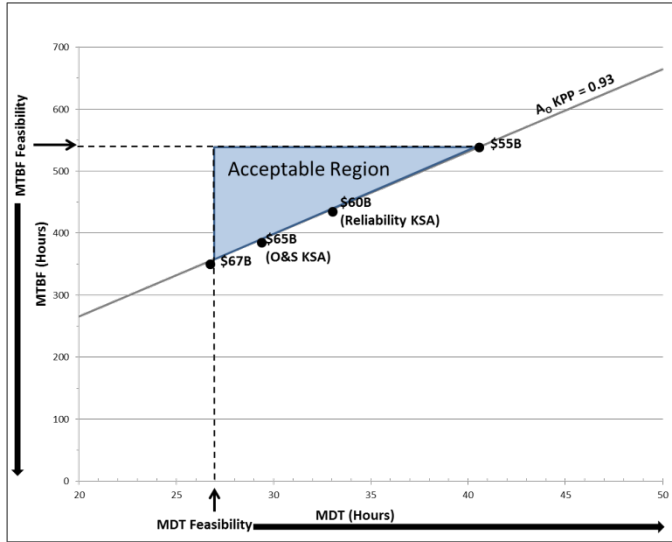
*Expectations: The list of Sustainment Key Performance Parameters (KPPs) and supporting Key System Attributes (KSAs) and Additional Performance Attributes (APAs) and their values should be extracted from Table 3.2-1 (Sustainment Parameters Table). The Composite Model Estimate of the new system and Predecessor (Legacy) System values should be obtained from Section 5 (Feasibility). Identify and discuss any thresholds that are not feasible e.g., the mission reliability estimate shown in red.*

**Table 1.1-1 Sustainment KPPs (sample aviation parameters and values based on continuous usage)**

<i>Draft CDD, CDD or CPD</i>		<i>Feasibility Results</i>		
<b>Parameter</b>		<b>Threshold</b>	<b>Composite Model Estimate</b>	<b>Predecessor (Legacy) System</b>
KPP	Materiel Availability	0.65	0.67	0.58
KPP	Operational Availability	0.80	0.80	0.73
KSA	Mission Reliability	46	40	18
KSA	Logistics Reliability	3.5	4.2	2.5
APA	Maintenance Burden	9.0	8.0	15
APA	Corrective Maintenance	0.5	0.5	1.0
KSA	O&S Cost	\$423.7M	\$471.4M	\$722.6M

### 1.2 Summary

Based on the detailed analysis conducted in the body of this document, summarize whether the Joint Capabilities Integration and Development System (JCIDS) sustainment parameters are validated and feasible. Identify any significant issues in the Operational Mode Summary/Mission Profile (OMS/MP), failure definitions, or Maintenance Approaches. Identify any issues with specific sustainment parameters and associated recommendations provided to the requirements developers or other stakeholders. For updates to the RAM-C at the RFP Release Decision Point, MS B, and MS C summarize notable program changes that influenced the outcomes of the RAM-C analysis. Provide the results of trade study to illustrate the acceptable region for R&M parameters consistent with the A<sub>O</sub> and Operations and Support (O&S) cost thresholds.



*Expectation: If significant issues are discovered during the development of this report, the program should work with the cognizant Requirements Developer, JCIDS Requirements Manager, DCAPE, and other DoD Component to resolve them before the report is submitted for approval. Summarize any remaining significant issues from sections 3.2 (CONOPs and OMS/MP), 3.3 (Maintenance Concept and Planning Factors), 4 (Validation), and 5 (Feasibility). Illustrate the trade study conduct in section 6. For recommendations to specific sustainment parameters, refer to section 7.*

**Figure 1-1 Relationship Between Sustainment Parameters and Cost (sample)**



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## 2. Introduction

### 2.1 Purpose

Provide a brief overview of the purpose of this version of the report and the JCIDS documentation (i.e., Draft Capability Development Document (CDD), CDD, or Capability Development Document (CPD)) that it supports.

*Expectations: The RAM-C Rationale Report should provide a quantitative basis for reliability, availability, and maintainability requirements, as well as improve cost estimates and program planning. RAM-C rationale reports are to be developed and attached to the SEP at MS A, RFP Release Decision Point, MS B, and MS C.*

### 2.2 Changes

List changes to the RAM-C in Table 2.2-1 since the last update or indicate that this report is the initial release. The RAM-C may be updated due to changes in supporting documents i.e., changes to the OMS/MP or JCIDS documentation (user requirements).

**Table 2.2-1 RAM-C Update Record**

Revision Number	Date	Description of Changes	Approved By
001	1/1/15	Updated OMS/MP required a re-assessment of mission reliability	XYZ

### 2.3 Preparers

List the RAM-C Rationale Report preparers in Table 2.3-1. Add additional rows if needed.

**Table 2.3-1 RAM-C Preparers and Organizations**

Function	Preparer	Organization
R&M Engineer	Name	Organization Name and Code
Product Support Specialist	Name	Organization Name and Code
Cost Analyst	Name	Organization Name and Code

### 3. Program Information

*Expectation: Section 3 (Program Information) provides the data and information needed to develop the rationale that program's sustainment parameters are valid (Section 4) and feasible (Section 5). As part of the process for developing the report, provide a list of acronyms in Annex A and a list of references in Annex B.*

#### 3.1 System Description

Using the reference design concept from or that will be in the Acquisition Strategy, identify major subsystems that are subject to R&M requirements. The system description should be user-oriented and operational and should include all elements of the system, including Government-furnished and contractor-furnished hardware (whether developmental or not), system software, operating and support documentation, and the crew and maintainer personnel.

#### 3.2 Sustainment Parameters

In Table 3.2-1, list the sustainment parameters as stated in the JCIDS documentation (Draft CDD, CDD, or CPD). During the MSA Phase, the data gathering should begin as soon as preliminary inputs are available from the (user) e.g., from working versions or informal review of the Draft CDD.

Include the source of the sustainment parameters. For example: The sustainment parameters, definitions, and thresholds with units in Table 3.2-1 were obtained from the Program Name Draft CDD version xx, dated Month dd, yyyy.

**Table 3.2-1 Sustainment Parameters (sample aviation parameters and values based on continuous usage)**

Parameter <sup>1</sup>		Definition (samples)	JCIDS Threshold	Units
KPP	Materiel Availability	Measure of the percentage of the total inventory of a system operationally capable, based on materiel condition, of performing an assigned mission.	0.65	
KPP	Operational Availability	Measure of the percentage of time that a system or group of systems within a unit are operationally capable of performing an assigned mission e.g. uptime/(uptime + downtime).	0.80	
KSA	Mission Reliability		46	Hours
KSA	Logistics Reliability	Total number of items removed from the aircraft that cause a demand to be placed on the supply system divided by the total number of flight hours.	3.5	Hours
APA	Maintenance Burden		9	
APA	Corrective Maintenance <sup>2</sup>		2.0	Hours
KSA	O&S Cost <sup>3</sup>		\$423.7M	2013 Dollars

Notes:

1. Include all relevant KPP, KSA and APA sustainment parameters and associated information including definitions (e.g. Failure definitions, mission duration, etc.) and rationale. Refer to the JCIDS manual.
2. Corrective Maintenance (Mct or MTTR) Include the tasks included in downtime, e.g., crypto load, start-up, active repair, verification of repair.
3. Include the type of dollars (e.g., then year, present year) and the units.

*Expectations: For each of the parameters, list the notes, rationale, and assumptions stated in the JCIDS documentation, e.g., the inclusion or exclusion of GFE or COTS, average sortie duration or mission time, failure definition. Per the JCIDS Manual, the parameters should be measurable, testable, and support efficient and effective T&E. Indicate whether the Failure Definition and Scoring Criteria (FD/SC) have been developed. If so, ensure that the definitions in the JCIDS documentation are consistent with the FD/SC. Ensure the rationale provided in the Draft CDD/CDD/CPD is adequate (see JCIDS Manual Appendix D to Enclosure F “Endorsement Guide to the Sustainment KPP” dated February 12, 2015, including errata as of December 18, 2015).*

### 3.3 OMS/MP

Summarize the Operational Mode Summary/Mission Profile (OMS/MP) and environment expected for the materiel solution. An accurate and thorough OMS/MP, based on the Concept of Operations (CONOPs) or combat scenario deemed to be the most representative, is critical to ensuring the fielding of new equipment that will meet the User’s needs. Highlight any special conditions of use, such as any unique high-intensity cycles of use within a mission or from the Concept of Employment (CONEMP) that would affect the sustainment of the system. In Table 3.3-1, summarize the mission time from the OMS/MP. The mission reliability parameter should be based on the planned mission time(s), or appropriate life units (miles, cycles, etc.) and be traceable to the appropriate DoD Architecture Framework (DoDAF) viewpoints (reference JCIDS Manual table C-C-1). Provide the frequency for each Task or Function which should take into account the OPTEMPO, indicating how often each task or function will be performed. Provide the information source(s) with version and date.

Include the sources for the OMS/MP e.g. The information provided in Tables 3.3-1 and 3.3-2 were obtained from the Program Name OMS/MP version xx, dated [date].

**Table 3.3-1 Operational Mode Summary (sample land system functions)**

Tasks or Functions	Frequency	Duration (hours)	Total Time (hours)
Extended Tactical Movement			
Combat Replenishment Operation (CRO)			
Deliberate Attack – Fix & Isolate Enemy			
Exploitation			
Sustainment Replenishment Operation (SRO)			
Deliberate Attack – Urban Environment			
<b>Total</b>			

Summarize the expected environmental profiles. Summarize the external and internal conditions (such as temperature, humidity, shock vibration, etc.) either natural or man-made, or self-induced, that influences the form, operational performance, reliability or survival of an item. A sample for operating temperature is provided in Table 3.2-2.

**Table 3.3-2 Summary of Environmental Data (sample land system environment)**

Operating Temperature		
Climate	Operating Climate Temperature	% Use
Basic	-25°F to 110°F	85%
Hot	Up to 130°F	10%
Cold	Down to -50°F	3%
Severe Cold	Down to -60°F	2%

*Expectation: Programs should analyze how the OMS/MP and environmental factors will affect the system in terms of loads and stresses it encounters and then note the factors from the OMS/MP and environmental profile that will be used during the validation and feasibility assessment for the sustainment parameters of the system. Typical factors include operating time, average sortie duration, duty cycles, and expected environments. The information is used to determine if adjustments are needed to account for differences in mission and/or operating environment conditions.*

List the maintenance concept planning factors for the system and source of the values.

*Expectations: The planning factors and their values used to determine Mean Down Time (MDT) and other maintainability KSAs or APAs are needed to validate  $A_o$  and  $A_M$  and should provide a realistic, definitive, and uniform basis to determine downtime. The planning factors should support the sustainment capabilities as viewed by the user, maintainer, supplier and transportation providers, taking into account constraints (e.g., preventative maintenance, reset time, periodic depot maintenance) and limitations (e.g., “core” requirements, statutory requirements).*

## 4. Validation

*Expectations: This section will contain the detailed assessment of the sustainment parameters to ensure they are valid. The parameters should be consistent with the CONOPS, CONEMP, OMS/MP, environmental profiles, product support strategy, planned inventory, operating hours (mission durations) and planned downtimes. In addition, the parameters should support each other, as shown by calculation and/or M&S and be traceable to the appropriate JCIDS document.*

### 4.1 Operational Availability (A<sub>O</sub>)

*Expectation: Determining the value for Operational Availability requires a comprehensive analysis of the system and its planned CONOPS, including the planned operating environment, operating tempo, and reliability and maintenance concepts. The logistics reliability and maintainability KSAs/APAs used in the A<sub>O</sub> calculations do not require independent validation. However, they are assessed for feasibility in Section 5.2.*

Provide the equation used to determine A<sub>O</sub>. For complex A<sub>O</sub> calculations, provide the inputs and outputs from any simulation models that may have been used to determine A<sub>O</sub>. Using the R&M values from Table 3.2-1 along with other input parameters as needed, calculate the expected A<sub>O</sub>.

Placeholder for A<sub>O</sub> equation

In Table 4.1-1, provide the JCIDS A<sub>O</sub> threshold value, input parameters, and calculated A<sub>O</sub> value.

**Table 4.1-1 A<sub>O</sub> Validation (sample aviation values)**

JCIDS A <sub>O</sub> Threshold	Calculated A <sub>O</sub>	Input Parameters <sup>2</sup>		
		MFHBF <sup>1</sup> Threshold	MDT	
			MTTR	ALDT
0.8	0.8	8.4	0.9	1.2

Note:

1. Use appropriate service definitions for failures that influence A<sub>O</sub>. In most cases this value of MTBF will not be the same as the logistics reliability value unless all events that place a demand on the supply system also affect A<sub>O</sub>.
2. List additional input parameters or assumptions needed for the A<sub>O</sub> calculation.

Describe the rationale for the level of reliability stated in the draft CDD/CDD/CPD. Provide the supporting rationale for the mean down time. Compare the calculated A<sub>O</sub> value to the threshold value and verify if the calculated A<sub>O</sub> is equal to or greater than the JCIDS A<sub>O</sub> threshold.

### 4.2 Materiel Availability (A<sub>M</sub>)

*Expectation: Materiel Availability covers the timeframe from placement into operational service through the planned end of service life. Materiel Availability may be equivalent to Operational Availability if the total number of a system or group of systems within a unit is the same as the total inventory, e.g., one command and control center, one fixed land-based radar.*

Provide the equation used to determine A<sub>M</sub>. For complex A<sub>M</sub> calculations, provide the inputs and outputs from any simulation models that may have been used to determine A<sub>M</sub>.

Placeholder for  $A_M$  equation

Describe the data sources used. Provide supporting rationale demonstrating the link between  $A_M$ , Reliability, Maintainability, and Product Support Strategy. In Table 4.2-1, provide the JCIDS  $A_M$  threshold value, input parameters, and calculated  $A_M$  value.

**Table 4.2-1  $A_M$  Validation (sample aviation values)**

JCIDS $A_M$ Threshold Value	Calculated $A_M$	$A_M$ Inputs					
		Up Assets				Down Assets <sup>1</sup>	Total Assets
		CONOPS	Op Systems for Training	Attrition Reserve	Pre-positioned Assets	Total Average Annual Down Assets	Total Average Annual Assets
0.65	0.65	102	12	22	20	84	240

Notes:

1. The average number of unavailable assigned assets, based on assumed planned depot, flight-line downs, or shipyard cycles

Compare the calculated  $A_M$  value to the threshold value in Table 4.2-1 and verify if the calculated  $A_M$  is equal to or greater than the JCIDS  $A_M$ .

### 4.3 Reliability

Provide the assumptions (e.g., inclusion of GFE/CFE), equations, and models used to determine mission reliability. Ensure that the FD/SC used is consistent with the definitions provided in Section 3.2. For repairable systems (including system-of-systems), describe the most stringent mission duration, composition, and the definition of success and failure of the mission. Ensure that the model uses the expected mission duration. In most cases, a reliability block diagram should be developed and used to validate the mission reliability. Compare the calculated value of the mission reliability to the threshold in table 4.3-1 and assess if the results support the threshold. Ensure that the continuous value validated here supports the value used to determine  $A_o$ .

For one-shot or single use non-repairable systems (i.e. throwaway items), ensure the mission reliability supports calculation of any higher-level probability thresholds (e.g., probability of kill, mission effectiveness, success rates). Validation of mission reliability should also ensure the threshold is consistent with user needs, CONOPs, and maintenance concept planning factors.

**Table 4.3-1 Mission Reliability Validation (sample)**

JCIDS Mission Reliability Threshold Value	Mission Reliability Inputs		
	Calculated Mission Reliability Value	Mission Duration	Probability <sup>1</sup> of Success or Continuous Value

Note:

1. If JCIDS mission reliability is defined as a probability of success, use the continuous value in this block. If JCIDS mission reliability is defined as a continuous value, use probability of success in this block.

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#### **4.4 Operations and Support (O&S) Cost**

List the sustainment KPP-related input parameters (e.g., reliability, repair time per failure, quantity of systems, operating hours) used in the Program Office baseline O&S cost estimate. Compare the input parameters to the information provided in section 3.2.

If the input parameters are consistent, obtain the baseline O&S cost estimates. Compare the calculated O&S cost value to threshold. If the calculated values are consistent, the O&S cost values are validated. If they are not consistent, determine the cause of the inconsistency, e.g., discrepancies in input parameters.

#### **4.5 Summary**

Summarize the results of sections 4.1 – 4.4, noting any parameters where the threshold exceeds the calculated value. If the calculated value ( $A_O$ ,  $A_M$ , or O&S cost) does not support the threshold, determine the appropriate input parameters that would be needed and coordinate the information with the Requirements Developer (Manager) and/or user representative.

## 5. Feasibility

*Expectations: This section will contain the detailed assessment of the sustainment parameters to ensure they are feasible. The parameters should be assessed for feasibility by determining if all the sustainment parameters can be implemented in the system under consideration consistent with state of the art and technical maturity. This document does not address the overall feasibility of program schedule or cost issues.*

### 5.1 Composite System Model

Develop and include a reliability block diagram and a composite model of the new system using legacy data, analogous subsystem or system data, and other R&M data as applicable. Obtain the best available data at the system and subsystem (for example 2 level Work Unit Code (WUC) levels). Describe how the model of the composite system was developed including the sources of data, and document the subsystem details in Annex C.

### 5.2 Reliability and Maintainability (R&M) Feasibility

Using the composite model and the details documented in Annex C, provide the summary level numbers for reliability and maintainability in Table 5.2-1. Determine feasibility by verifying if the “Assessed System” R&M values support the applicable JCIDS thresholds.

*Expectation: Legacy data should be carefully reviewed to obtain an accurate estimate of reliability and maintainability. Typical areas to review include: unit quantities, operating versus clock time, removals to facilitate other maintenance, operating environment, age of equipment, differences in technology, etc.*

**Table 5.2-1 R&M Feasibility (If more than one alternative is possible, insert tables as needed.)**

	Reliability <sup>1</sup>		Maintainability	
	Mission Reliability (MFHBA)	Logistics Reliability (MFHBF)	Maintenance Burden (MMH/FH)	Corrective Maintenance (MTTR)
Assessed System <sup>2</sup>				
JCIDS Threshold				
Legacy System <sup>3</sup>				

Notes

1. Use appropriate life units (hours, miles, cycles, etc.)
2. Highlight any cell in red if the assessed system value does not meet the JCIDS Threshold
3. If applicable, enter legacy system data for each sustainment parameter

### 5.3 Operations and Support (O&S) Cost Feasibility

O&S costs consist of sustainment costs incurred from the initial system deployment through the end of system operations. Consistent with CAPE guidance, include all costs of operating, maintaining, and supporting a fielded system. Provide sources of information, assumptions, and the reliability value used for the estimate. Complete table 5.3-1 and determine feasibility by verifying if the “Estimated O&S Cost” value is equal to or less than the applicable JCIDS threshold.



*Expectation: O&S costs analysis should be based on the most recent version of the Cost Assessment and Program Evaluation (CAPE) Operating and Support Cost Estimating Guide. If available for comparison, the O&S Cost KSA data should be consistent with the capability solution's life cycle cost estimate (LCCE), Cost Analysis Requirements Data (CARD) and/or the CAPE independent cost estimate (ICE).*

**Table 5.3-1 O&S Cost Feasibility (sample aviation values)  
(If more than one alternative is possible, insert columns as needed.)**

Cost Element	JCIDS O&S Cost <sup>1</sup> Threshold Value	Alternative 1 Estimated <sup>2</sup> O&S Cost Value	Legacy O&S Cost Value
1.0 Unit Level Manpower		139.4	155.5
2.0 Unit Operations		102.1	143.0
3.0 Maintenance		30.2	59.6
3.1 Consumable Materials and Repair Parts		3.3	6.5
3.2 Depot Level Repairables		10.4	20.5
3.3 Intermediate Maintenance (External to Unit-Level)		5.2	10.3
3.4 Depot Maintenance		8.2	16.2
3.5 Other Maintenance		3.0	6.2
4.0 Sustaining Support		98.1	107.7
5.0 Continuing System Improvements		32.6	56.3
6.0 Indirect Support		38.9	50.8
Total <sup>3</sup>	423.7 (BY 2013\$)	471.4 (BY 2013\$)	632.6 (BY 2013\$)

Notes

1. Highlight any cell in red if the assessed system value does not meet the JCIDS Threshold
2. Include the type of dollars and the units

#### 5.4 Operational Availability (A<sub>O</sub>) and Materiel Availability (A<sub>M</sub>) Feasibility

Using the results of the R&M feasibility assessment in Section 5.2, along with other input parameters as needed, calculate the feasibility estimate for A<sub>O</sub>. Using modeling and simulation, perform a feasibility assessment for A<sub>M</sub>. For this assessment, data are only required at the system or system-of-systems level instead of the subsystem level. Complete Table 5.4-1 and assess if A<sub>O</sub> and A<sub>M</sub> are feasible. Provide the outputs of any simulation models used.

*Expectation: The analysis should show that A<sub>M</sub> is feasible based on the expected downtime (scheduled and unscheduled) for the primary system, primary training asset(s), and the planned calendar time that any backup assets will be in periodic depot maintenance.*

**Table 5.4-1 A<sub>O</sub> and A<sub>M</sub> Feasibility (sample)**

	JCIDS Threshold Value	Estimated Value <sup>1</sup>	Legacy Value
A <sub>O</sub>			
A <sub>M</sub>			

Note

1. Highlight any cell in red if the estimate value does not meet the JCIDS Threshold

---

## 5.5 Feasibility Summary

Summarize the results of the RAM-C feasibility assessment process. Identify any issues with specific sustainment parameters. If the parameters ( $A_O$ ,  $A_M$ , R, M, or O&S cost) are not feasible, conduct a trade study (see Section 6) to determine potential parameters that can satisfy the  $A_O$  and O&S cost thresholds. Coordinate the information with the Requirements Developer (Manager) and/or user representative.

*Expectation: Coordinate with the Requirements Developer and other affected stakeholders prior to formal submittal of this report if analysis shows that some values are not feasible.*

## 6. Trade Studies

A RAM-C analysis includes a trade study that documents the sensitivity analysis that shows the range of R&M parameters (e.g., MTBF and MDT) that will satisfy the  $A_0$  threshold, using the constituent elements and assumptions of the  $A_0$  equation provided in Section 4.1. Provide the results of the sensitivity analysis (see Figure 6-1) illustrating the trade space for reliability and maintainability along with the associated O&S costs. Note: costs shown in Figure 6-1 refer to the O&S costs for the associated reliability values, not the O&S cost for all maintenance events.

*Expectation: The RAM-C report will document the supporting rationale for the JCIDS sustainment parameters. The focus of the trade studies in the RAM-C report will be the sensitivity analysis made between the sustainment parameters (reliability, availability, maintainability, and O&S cost).*

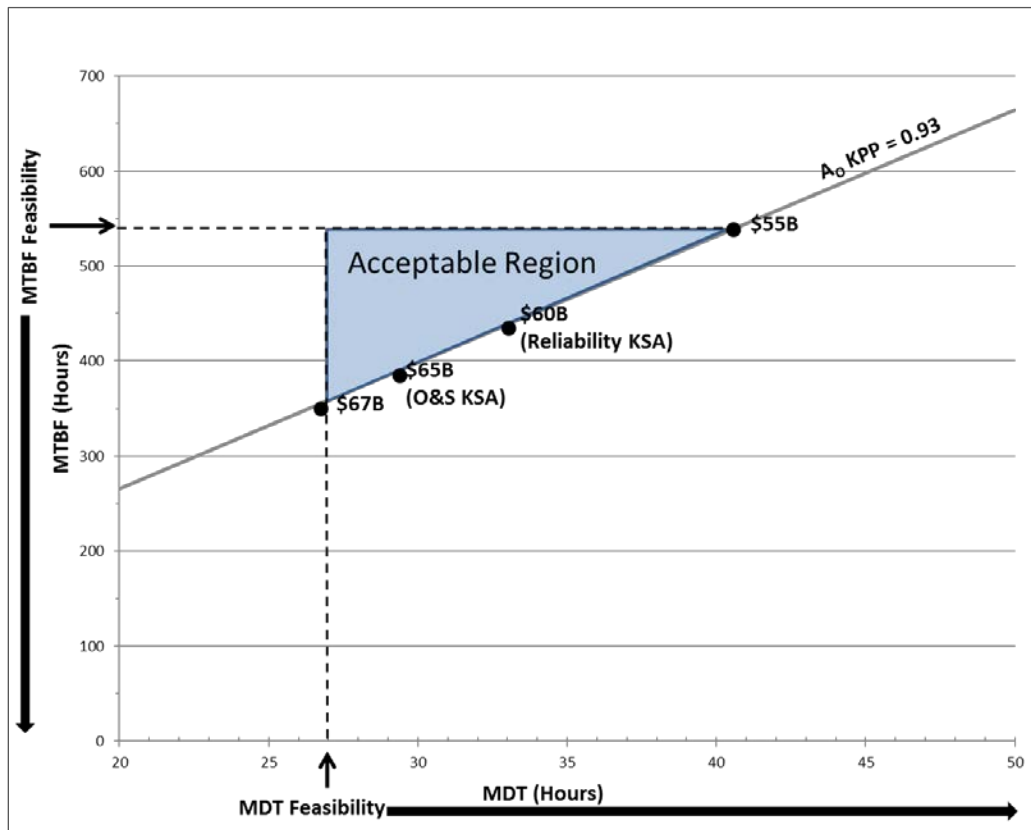


Figure 6-1 Relationship Between Sustainment Parameters and Cost (sample)

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## 7. Summary

Summarize the results of the RAM-C process. Identify any significant degraders to availability and mission success and the top drivers O&S costs along with any actions in process to mitigate these. Identify any issues with specific sustainment parameters and the recommendations and feedback that have been provided to the requirements developers.

*Expectation: At the completion of the RAM-C process, all the thresholds should have been validated and aligned to support Ao, A<sub>M</sub>, O&S costs, and mission success requirements. The thresholds should be feasible and consistent with the state of the art and technical maturity. The sustainment parameters should be balanced to support Ao and O&S costs.*

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## Appendix A – Acronyms

Provide a list of the acronyms used in the report.

ACAT	Acquisition Category
ALDT	Administrative and Logistics Delay Time
A <sub>O</sub>	Operational Availability
AoA	Analysis of Alternatives
A <sub>M</sub>	Materiel Availability
APA	Additional Performance Attribute
BIT	Built In Test
CAPE	Cost Assessment and Program Evaluation
CDD	Capability Development Document
CONEMP	Concept of Employment
CONOPS	Concept of Operations
CPD	Capability Production Document
CRO	Combat Replenishment Operation
FD/SC	Failure Definition/Scoring Criteria
ICD	Initial Capability Document
JCIDS	Joint Capability Integration Development System
KPP	Key Performance Parameter
KSA	Key Supporting Attribute
LCSP	Life Cycle Support Plan
MCT	Mean Corrective Time
MDT	Mean Down Time
MLDT	Mean Logistics Delay Time
MS	Milestone
MFHBF	Mean Flight Hours Between Failure
MFHBOMF	Mean Flight Hour Between Operational Mission Failure
MMH/FH	Maintenance Man Hours per Flight Hour
MTBF	Mean Time Between Failure
MTTR	Mean Time To Repair
O&S	Operating and Support
OMS/MP	Operational Mode Summary/Mission Profile
OSD	Office of the Secretary of Defense
R&M	Reliability and Maintainability
RAM-C	Reliability, Availability, Maintainability, and Cost
RFP	Request For Proposal
SEP	Systems Engineering Plan
SRO	Sustainment Replenishment Operation
TAT	Turn Around Time
TMRR	Technology Maturation and Risk Reduction
WUC	Work Unit Code

**Appendix B – Documentation, References, and Tools**

**Documentation** - List the program documents with date and version number in Table B-1. Note relevant sections of the document that were used to develop the RAM-C rationale.

**Table B-1 Resource Documents (sample documents)**

Document	Date/Version	Relevant Sections to RAM-C
CDD		
CONOPs		
OMS/MP		
AoA Study Plan		
AoA Guidance		
AoA Report		
Acquisition Strategy		
SEP		
LCSP		
Etc.		

*Expectation: Program should list program documentation sources that were used in the RAM-C process. Relevant sections of each provide a quick and easy understanding of source material.*

**References** – Program should list all sources and references for calculations, policy, and any other analysis used to develop the RAM-C rationale.

**Tools** – In Table B-2, identify the tools the program plans to use in the RAM-C process.

**Table B-2 RAM-C Tools**

Tool	Purpose

## Appendix C – Composite Model Details

Table C-1 Composite Model Details (Sample aviation WUC)

Subsystem (2-Digit WUC)	Reliability <sup>1</sup>		Maintainability		Total Downtime (MDT)	O&S Costs (3.0)
	Mission Reliability (MFHBA)	Logistics Reliability (MFHBF)	Maintenance Burden (MMH/FH)	Corrective Maintenance (MTTR)		
11 Airframes						
12 Furnishings						
13 Landing Gear						
14 Flight Control/Lift System						
15 Hydraulic Propellers						
22 Engine						
<i>List Remaining subsystems</i>						
<b>Assessed System<sup>2</sup></b>						

<b>JCIDS Threshold</b>						
<b>Legacy System<sup>3</sup></b>						

Notes

1. Use appropriate life units (hours, miles, cycles, etc.)
2. Highlight any cell in red if the assessed system value does not meet the JCIDS Threshold.
3. If applicable, enter legacy system data for each sustainment parameter.