



RESEARCH
AND ENGINEERING

THE UNDER SECRETARY OF DEFENSE

3030 DEFENSE PENTAGON
WASHINGTON, DC 20301-3030

JUN 18 2018

MEMORANDUM FOR: SEE DISTRIBUTION

SUBJECT: Framework for Risk Categorization for Use During Independent Technical Risk Assessments

The National Defense Authorization Act for Fiscal Year 2017 required the Secretary of Defense to issue a framework for categorizing the degree of technical and manufacturing risk when conducting Independent Technical Risk Assessments.

The attached framework provides a methodology for assessing technical risk, including technology and manufacturing risks, which could impede a program's ability to meet cost, schedule, and performance goals. This framework is in line with the approved Department of Defense Risk, Issue, and Opportunity Management Guide for Defense Acquisition Programs.

The Office of the Under Secretary of Defense for Research and Engineering OUSD(R&E) will maintain this Framework, which will be published on the OUSD(R&E) system engineering website (<http://www.acq.osd.mil/se/pg/guidance.html>).

A handwritten signature in blue ink, appearing to read "M. D. Griffin", with a long horizontal line extending to the right.

Michael D. Griffin

Attachment:
As stated

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Department of Defense
Independent Technical Risk Assessment
Framework for Risk Categorization



June 2018

Office of the Under Secretary of Defense
Research and Engineering

Washington, D.C.

Distribution Statement A: Approved for public release. Distribution is unlimited.

**Department of Defense Independent Technical Risk Assessment
Framework for Risk Categorization**

Office of the Under Secretary of Defense

Research and Engineering

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www.acq.osd.mil/se

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DOPSR Case #18-S-1828

1. OVERVIEW

a. Independent Technical Risk Assessment (ITRA) will assess technical risks for Major Defense Acquisition Programs as described in this framework and the Department of Defense (DoD) Risk, Issue, and Opportunity (RIO) Management Guide for Defense Acquisition Programs (<https://www.acq.osd.mil/se/pg/guidance.html>), including risks related to critical technologies and manufacturing. For the purposes of this discussion, the term “risk” will refer to both risks and issues, although a risk differs from an issue in that risk occurrence is probabilistic whereas an issue is certain or has already occurred.

b. In general, technical risks are those events or conditions typically emanating from areas such as mission/requirements, technology, engineering, integration, test, software, manufacturing/quality, logistics, and system security/cybersecurity that may prevent a program from meeting cost, schedule, and/or performance objectives.

c. ITRAs will leverage ongoing program activities whenever practical, e.g., Technology Readiness Assessments (TRA), Manufacturing Readiness Assessments (MRA), Systems Engineering Technical Reviews, and Industry Days. These assessments and activities will inform the ITRA; however, the team will provide an independent assessment of any risks or maturity concerns identified. As such, there may not be a direct correlation between external assessments or measures, such as technology readiness levels, and the team’s assessment.

2. RISK CATEGORIZATION

a. The ITRA will document and characterize each risk in terms of consequence to the program and to any interdependent programs should the risk be fully realized, and the likelihood the risk will occur. If known, the cause of the event or condition also should be described. Risks will be analyzed using the likelihood and consequence criteria as established in the DoD RIO guide.

b. Using these predefined likelihood and consequence criteria will provide a structured means for consistent evaluation of risks. Any deviations from these criteria will be noted in the assessment along with associated rationale. Assessors will underpin the assessment with engineering analysis and data.

c. Risk consequence will be described as a potential deviation against cost, schedule, and performance in program plans or established baselines. Table 1 describes the consequence criteria. Assessments will attempt to capture all cost, schedule, and performance impacts of a given risk. The consequence rating should capture the greatest anticipated impact in cost, schedule, or performance as if the risk were fully realized, that is, without further risk reduction or mitigation efforts. Wherever possible, fully burdened costs should be used in risk assessments.

Table 1. ITRA Consequence Criteria

Level	Cost	Schedule	Performance
5 Critical Impact	10% or greater increase over APB <u>objective</u> values for RDT&E, PAUC, or APUC Cost increase causes program to exceed affordability caps	Schedule slip will require a major schedule rebaselining Precludes program from meeting its APB <u>threshold</u> dates	Degradation precludes system from meeting a KPP or key technical/supportability threshold; will jeopardize program success ² Unable to meet mission objectives (defined in mission threads, ConOps, OMS/MP)
4 Significant Impact	5% - <10% increase over APB <u>objective</u> values for RDT&E, PAUC, or APUC Costs exceed life cycle ownership cost KSA	Schedule deviations will slip program to within 2 months of approved APB <u>threshold</u> schedule date Schedule slip puts funding at risk Fielding of capability to operational units delayed by more than 6 months ¹	Degradation impairs ability to meet a KSA. ² Technical design or supportability margin exhausted in key areas Significant performance impact affecting System-of System interdependencies. Work-arounds required to meet mission objectives
3 Moderate Impact	1% - <5% increase over APB <u>objective</u> values for RDT&E, PAUC, or APUC Manageable with PEO or Service assistance	Can meet APB <u>objective</u> schedule dates, but other non-APB key events (e.g., SETRs or other Tier 1 Schedule events) may slip Schedule slip impacts synchronization with interdependent programs by greater than 2 months	Unable to meet lower tier attributes, TPMs, or CTPs Design or supportability margins reduced Minor performance impact affecting System-of System interdependencies. Work-arounds required to achieve mission tasks
2 Minor Impact	Costs that drive unit production cost (e.g., APUC) increase of <1% over budget Cost increase, but can be managed internally	Some schedule slip, but can meet APB <u>objective</u> dates and non-APB key event dates	Reduced technical performance or supportability; can be tolerated with little impact on program objectives Design margins reduced, within trade space ²
1 Minimal Impact	Minimal impact. Costs expected to meet approved funding levels	Minimal schedule impact	Minimal consequences to meeting technical performance or supportability requirements. Design margins will be met; margin to planned tripwires

Notes:

¹ Consider fielding of capability to interdependent programs as well.

² Failure to meet TPMs or CTPs directly derived from KPPs or KSAs are indicators of potentially not meeting a KPP or KSA

APB: Acquisition Program Baseline; APUC: Average Procurement Unit Cost; ConOps: Concept of Operations; CTP: Critical Technical Parameter; PAUC: Program Acquisition Unit Cost; PEO: Program Executive Officer; KPP: Key Performance Parameter; KSA: Key System Attribute; OMS/MP: Operational Mode Summary/Mission Profile; RDT&E: Research, Development Test and Evaluation; TPM: Technical Performance Measure

d. Risk likelihood is the evaluated probability an event will occur given existing conditions. The estimated likelihood of the risk should be tied to a specific well-defined risk event or condition. Table 2 describes the likelihood criteria the reviewers will use.

Table 2. ITRA Likelihood Criteria

Level	Likelihood	Probability of Occurrence
5	Near Certainty	> 80% to ≤ 99%
4	Highly Likely	> 60% to ≤ 80%
3	Likely	> 40% to ≤ 60%
2	Low Likelihood	> 20% to ≤ 40%
1	Not Likely	> 1% to ≤ 20%

e. Based upon assessed likelihood and consequence, risks will be categorized using the risk matrix shown in Figure 1 top right. This matrix converts the combination of likelihood and the maximum of the cost, schedule, and performance consequence scores to form a risk level for each risk. Ultimately the ITRA will categorize a risk as High, Moderate, or Low in accordance with the criteria. Similarly, issues will be categorized in terms of severity of consequence as depicted in Figure 2, using the same consequence criteria in risk categorization.

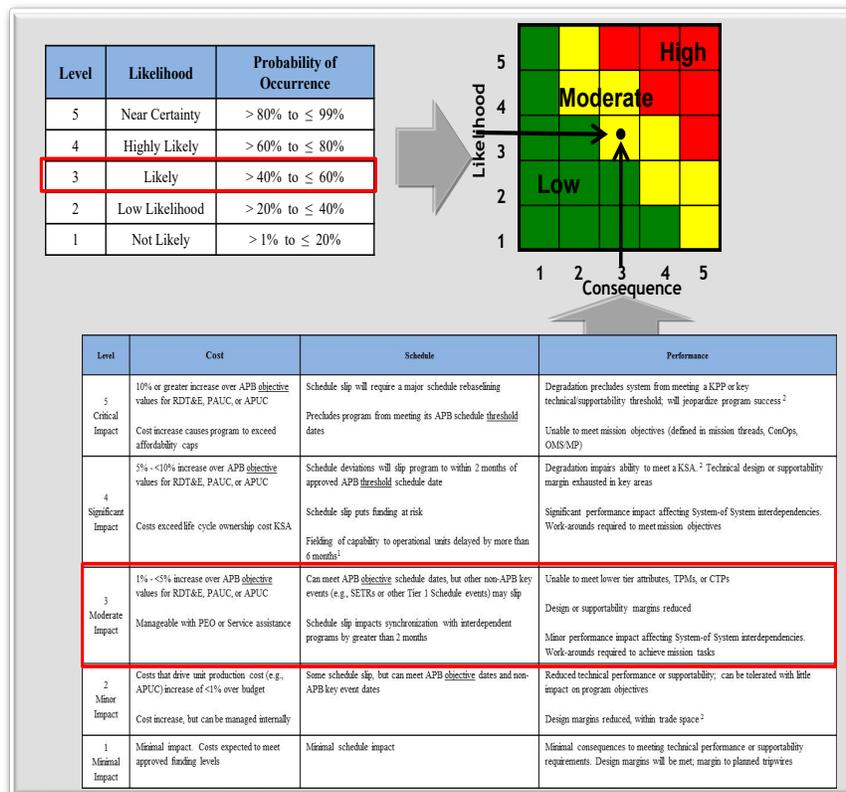


Figure 1. Risk Matrix Incorporating Likelihood and Consequence Criteria



Figure 2. Issue Consequence Matrix

f. The ITRA should also consider the effect of aggregate risk on the program and the threat that cumulative or compounding effects of multiple risks pose to successfully satisfying program objectives. The ITRA should consider and document system-of-systems and family-of-systems interactions.

g. The ITRA will document existing program mitigation strategies as well as any additional recommended strategies to mitigate risks and issues. Analysis of mitigation strategies will include whether they are feasible, affordable, and timely, given program circumstances, constraints, and objectives. The assessment will include consideration of mitigation impacts to the overall program schedule and technical performance expectations.

h. Key technical risks will be summarized using a risk matrix with an assessment of the estimated effectiveness of the planned risk mitigations, as shown in Figure 3.

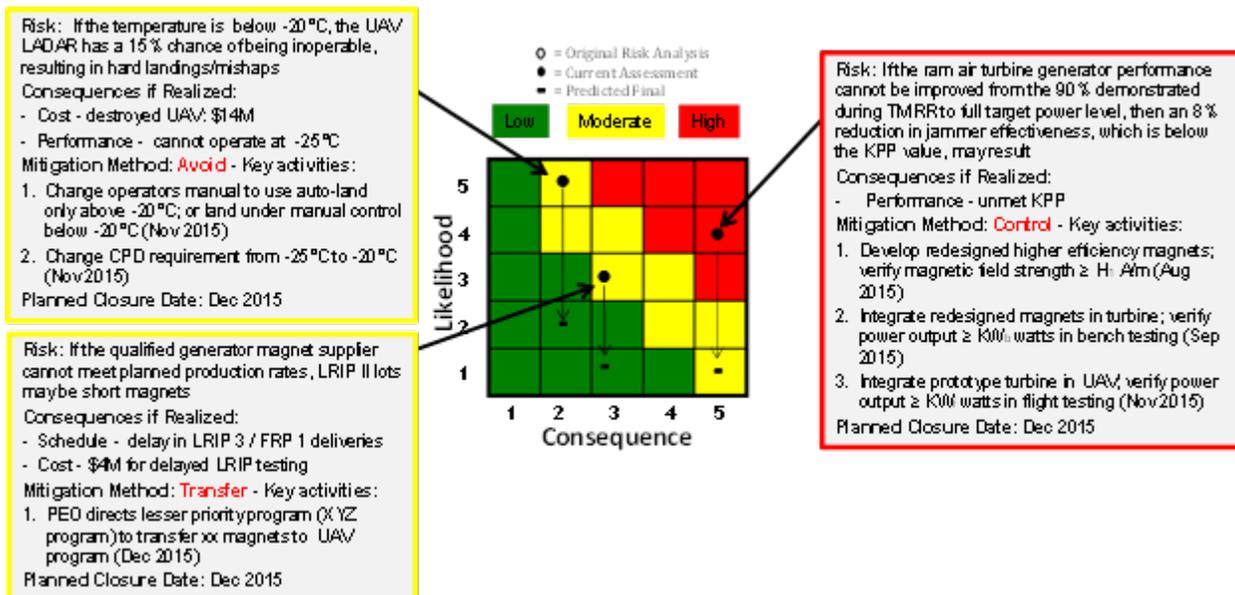


Figure 3. Sample Risk Matrix

ABBREVIATIONS AND ACRONYMS

APB	Acquisition Program Baseline
APUC	Average Procurement Unit Cost
ConOps	Concept of Operations
CTP	critical technical parameter
DoDD	DoD directive
DoDI	DoD instruction
ITRA	Independent Technical Risk Assessment
KPP	key performance parameter
KSA	key system attribute
KW	kilowatt
MDAP	Major Defense Acquisition Program
OMS/MP	Operational Mode Summary/Mission Profile
PAUC	Program Acquisition Unit Cost
PEO	Program Executive Officer
PM	Program Manager
RDT&E	research, development, test and evaluation
RIO	risk, issue, and opportunity
TMRR	Technology Maturation and Risk Reduction
TPM	technical performance measure
UAV	unmanned aerial vehicle