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**IMPLEMENTING RISK MANAGEMENT IN YOUR ORGANIZATION:
WHAT TO CONSIDER**

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ABSTRACT

The objective of this paper is to provide guidance on what to consider to implement Risk Management within an organization including what practices need to be in place to ensure that leadership will continue to support Risk Management over the long term. It also presents techniques to determine risk severity, risk mitigation methods, ideas for ensuring risk management helps achieve a program's objectives, and techniques for incorporating risk measurement parameters into a program's daily execution activities.

1.0 INTRODUCTION

Implementing Risk Management Processes within an organization that has not formally managed risk is challenging. As Gentry Lee, Chief Systems Engineer at Jet Propulsion Laboratory summarized, "*Risk Mitigation is painful, not a natural act for humans to perform*". [Ref 1]

Another challenge programs face is not measuring and knowing the return on investment when implementing risk management [Ref 2]. There is probably no consolidated effort in place to collect and share lessons learned across programs & departments to leverage the benefits of risk management. There may be a lack of awareness that risk management implementation requires a multi-year roll out plan where expectations (for risk

management) are defined incrementally for each year.

Before one can start rolling out a Risk Management Process, the human and management aspects should be taken into consideration.

In today's global environment, Risk Management is considered the fourth dimension for increasing organizational effectiveness, the other three being People, Process and Technology [Ref 2]. Risk Management enables organizations to identify new ways to increase effectiveness.

In addition, Risk Management must be tied in with how it fits in with other organizational objectives, as outlined by Figure 1. Specifically, it is important to correlate highly visible risks with program objectives.

This paper will highlight factors to consider to make sure that you and your

organization are successful in implementing the Risk Management Process over the long term and are able to derive value from risk management activities.

2.0 FACTORS TO CONSIDER FOR RISK MITIGATION TO BE SUCCESSFUL

This paper focuses on seven factors to consider when implementing risk management. These factors are:

1. The questions to evaluate and answer prior to rollout of a risk management process.
2. Communication needs, who are the stakeholders and the forums that will be used to review risks.
3. Identifying biases that can potentially negate risk management.
4. Analysis of the severity (or criticality) of risk impact.
5. Different risk handling methods.
6. How mitigating risks adds value.
7. Embedding risk management functions into daily business operations.

The following sub-sections further elaborate on each factor.

2.1 Questions to Consider Prior to Rolling Out Risk Management

It is imperative leadership, risk facilitators and key stakeholders consider and clarify these questions to their direct reports [Refs 3 and 4]:

Risk Management Process: What is the Risk Management Process? Who has ownership of the risk management process? What are the desired behaviors necessary to implement

risk management? Is there a roadmap (see Figure 2 and Figure 3) defined to guide behavior and decision making? Has the Risk Management Process and Risk Ranking methodology (ranking Consequence and Likelihood) been explained and understood by all stakeholders? (See Figure 5 and Figure 6). Further discussion of Risk Ranking can be found in Section 2.4.

Importance of Risk Management: What is the importance for executing Risk Management? How will the rationale explaining the need for risk management be communicated to all members of the organization.

Impact of Change: What will the overall impact of the change be? How does Risk Management affect me and my job?

Recognition: How will I be evaluated? Will I be rewarded for executing new behaviors to support risk management? Will programs be recognized for embracing and successfully integrating risk management practices successfully into their everyday business activities?

Process Initiative Roll-Out Plan: How will Risk Management be conducted? What is the plan and schedule to roll out risk management across the entire organization? What are the expectations during the early phases of the risk management rollout? The goal is to gradually increase the level of risk management maturity until the process becomes established within the organization's program management activities. Have pilot programs & resources been identified to support initiative?

Communication & Mentoring: How will leadership communicate their expectations to their direct reports? Will they take an active role in mentoring their departments by facilitating risk review meetings and

identifying risks that are critical? Will they walk through defining a risk mitigation plan with their direct reports and subsequently update them in the future?

Correlation to Product Strategy and Goals: How does Risk Management tie product strategy and goals with cost reduction and value creation? What are the benefits and expectations? Specifically what program objectives are correlated to highly visible risks and are resources made available to help mitigate these risks?

Lessons Learned: Are risk analysis results, mitigation plans, and lessons learned being shared with other departments within the organization? At what level and at what frequency will the progress of risk mitigation be tracked and monitored? How will lessons learned be collected, their implications be analyzed and recommendations be shared with other programs (see Figure 4)? Since the objective of risk management is for programs to leverage best practices, will a forum be held bi-annually where all programs can share their lessons learned amongst each other?

2.2 Communication and Involvement from All Stakeholders for Risk Reviews & Lessons Learned

Communication of Expectations and Importance: Risk Management requires involvement from all stakeholders (all involved) (see Figure 2 and Figure 3). Expectations for and importance of risk management must be communicated often and across all levels of the organization. The objectives of Risk Management must be clearly communicated often and clearly.

Possible Avenues for Risk Reviews: Risk reviews should be held at least on a monthly basis. To ensure everyone clearly understands how risk management is to be executed, the program should define a risk workflow. The program will then distribute the workflow to all stakeholders. Figure 2 is a notional description of a risk workflow. Risk workflow should reflect the existing program needs and infrastructure. The risk workflow is a tool aiding in communicating to program members at a high level the sequence of activities to be performed and who has primary responsibility for reviewing and approving risks and risk mitigation plans.

Level 1 Risk Working Group (RWG): A Risk Working Group consists of risk owners, subject matter experts and functional leads. Risk Working Group has primary responsibility for identifying risks, assessing root cause and severity and defining and implementing mitigation plans.

Level 2 Risk Integrated Product Team (IPT): A Risk IPT consists of IPT Leads and their major responsibility is to ensure that risks are properly defined and analyzed, mitigation plans are realistic and that resources and funding are available to implement mitigation plans.

Level 3 Risk Review Board (RRB): A Risk Review Board (RRB) typically consist of Program Managers and leadership from other cross-functional teams. The primary responsibility of RRB is to monitor risks of moderate and high criticality.

2.3 UNCONSCIOUS BIASES

In the initial phase of risk management roll out, expectations for and importance of

risk management is being communicated. One would expect there being a lot of communication, training sessions and workshops held to support the risk management rollout. Management, risk facilitators and key stakeholders must be cognizant of any unconscious biases held, some of which are:

Old Perceptions from Previous Risk Management Efforts: Harboring old perceptions about the value of risk management, and charging ahead without exactly understanding the existing organizational culture, perceptions and the implementation plan.

Not Understanding Available Resource Needs: Not properly taking human behaviors and resources into account.

One Size Fits all Model: Implementing a one size fits all model. A model developed for one program being generalized and incorrectly applied to all other programs.

2.4 Analyze Risk Impact Severity/Criticality

Risk Analysis is one of the steps of Risk Management. Risk Analysis involves understanding root cause and ranking probability and consequence. As part of the risk analysis, programs needs to ask these two questions:

1. What is the probability (*likelihood*) this risk will occur? , and,
2. What is the level of negative impact (or severity) of the *consequence* of the risk on program objectives (cost, performance, and/or schedule)?

Ranking likelihood and consequence helps in determining how much attention and resources must be invested to mitigate the risk.

There needs to be a common methodology across an organization on how to rank likelihood and impact of

consequence. For example, the Department of Defense Risk, Issue and Opportunity (DoD RIO) Guide had defined a sample set of definitions to assist with ranking likelihood and consequence (see Figure 5 and Figure 6) [Ref 5]. To ensure good risk management and identification of critical risks, it behooves your organization to derive a common set of definitions and criteria for ranking likelihood and consequence; these definition need not be the same as the one found in the DoD RIO Guide.

Defining the ranking criteria for likelihood and consequence varies according to the program scope and objectives.

When ranking consequence and likelihood, one must ask:

To determine likelihood ranking: What is the likelihood for this event occurring?

To determine consequence ranking: When supporting a Department of Defense (DoD) related program, one may ask “*What is the negative impact on cost, schedule or performance on my program?*” One must determine the quantitative values in describing the impact. The consequence can be defined in terms of cost, OR, schedule, OR performance or any combination of the three. If there is more than one parameter influencing consequence ranking, then the recommendation is to take the most severe ranking of the three.

For an example within a DoD environment, if a risk has consequences influencing both schedule and performance, and schedule is impacted by the program slipping by more than two months of the approved schedule baseline (consequence ranking is 4) and a performance is impacted by not able to meet a KPP requirements (consequence ranking is 5), then the aggregated consequence ranking is 5.

In the DoD RIO Guide, the factors considered for consequence are: *Schedule*,

Performance and Cost. For programs outside of the defense sector, a different set of factors can be considered for consequence. To elaborate the differences in definitions for a program in the health care industry, Figure 7 and Figure 8 present the definitions for ranking criteria as used by a Community Health Service Organization [Ref 6].

2.5 Risk Handling Methods

There are four methods to handle risks.

Risk Acceptance (and Monitoring)

The program is aware of the consequences of the risk and is prepared to accept the consequences. The program accepts the risk as the benefits outweigh the consequences and/or due to unavailability of realistic alternatives. Nevertheless, the program should continue to monitor the risk and make sure the consequences do not worsen over time. By accepting the consequences, programs should make sure the necessary resources to manage risk are available to deal with the consequences if the risk is realized.

An example where risk acceptance is common is in the pharmaceutical industry. Pharmaceutical companies are willing to incur the risk of the high cost and many years required to conduct research and clinical trials, test and manufacture new drugs because these companies understand the profits earned from the sales of new drugs outweigh these costs.

Risk Avoidance

By avoiding the risk, the risk is eliminated. The program avoids (and eliminates) the risk by adjusting the project

plan so as to avoid the conditions that can trigger the risk to occur. By adjusting the project plan, the program takes an alternate path or chooses not to execute certain activities.

Examples of risk avoidance are getting a waiver on demonstrating a key performance parameter (KPP) within a program's current phase and deferring implementation and demonstration of the KPP to occur at Critical Design Review (CDR) instead of at Preliminary Design Review (PDR), having multiple suppliers for a component to offset one supplier being unable supply the necessary parts, and deciding to use a proven technology instead of an innovative one that is still new to the market.

Risk Transfer

This involves transferring the responsibility for risk mitigation activities to another organization. However a program must understand that transferring a risk, does not excuse the program from all responsibilities. The transferring organization has to monitor and track risk mitigation activities with the receiving organization.

Risk Transfer is widely practiced within the automotive and defense industries. To avoid the R&D cost of developing, testing and integrating new automotive technologies, and to leverage the innovative centers of excellence already established within external organizations, Automotive Original Equipment Manufacturers (OEMs) and the Department of Defense make arrangements with automotive suppliers and defense contractors (respectively) to develop, test, integrate and provide for components necessary for product/technology upgrades.

Risk Control

Risk Control is the most commonly used method. By controlling a risk, the program executes mitigation tasks to reduce the impact of the consequence and probability of risk from occurring. Formal risk mitigation is typically implemented on risks that are either critical or moderate, where leadership and stakeholders pay close attention to the risk mitigation progress and determining if there is a reduction in likelihood and/or consequence. Due to resource constraints, low risks typically do not undergo a formal mitigation process, however they may be monitored periodically internally within the team to make sure their consequences and likelihood do not worsen over time.

2.6 How Does Risk Mitigation Help Meet Program Objectives?

Many organizations wonder how implementing the risk management process and mitigating risks helps meet program objectives.

For the sake of presenting concrete results elaborating on the benefits of risk management, we will look into a survey performed by EY. EY is a global leader in assurance, tax, transaction and advisory services. EY performed a global, quantitative survey (based on 576 interviews with companies around the world), and used the survey to assess the maturity level of risk management practices in 2013 [Ref 2]. From the survey, EY determined there existed a positive relationship between risk management maturity and financial performance. Financial performance is highly correlated with the level of integration and coordination of managing risks within

program management activities. Figure 9 shows companies in the top 20% of risk maturity generated three times the level of Earnings Before Interest, Taxes, Depreciation and Amortization (EBITDA) as those in the bottom 20%. Even with EY being a tax advisory firm, the author has chosen to present EY's survey results as the results convey how an organization with an established risk management process is able to meet its objectives (or improve its performance).

Figure 1 describes the inter-relationship between risk mitigation, cost reduction and value creation which all tie in with helping to meet program objectives.

Risk Mitigation [Ref 2]

Obviously, all organizations are constrained in terms of resources and manpower. In order to determine what risks to track and mitigate, the program should collectively identify and understand risks that are critical to program objectives. Effective risk mitigation requires commitment in investing in risks that are mission critical to a program, asking for ownership and accountability for mitigating risks.

In order to ensure continued support for Risk Management over the long term, it is important to share lessons learned, success stories and benefits arising out of mitigating critical risks to stakeholders and leadership.

Cost Reduction [Ref 2]

A Risk Management Process that has been collectively defined allows for an improved cost structure and cost reduction. It also allows for improved efficiency due to streamlining of duplicative activities.

Value Creation [Ref 2]

Finally leadership and all stakeholders must see the value in executing

risk management and mitigating risks. Risk management should create value – resources expended to mitigate risk should be less than the consequence of inaction [Ref 7]. The business case for risk management remains viable for the long term only if it is demonstrated that risk management improves likelihood of meeting program objectives. Examples of these are:

- Mitigating a technical risk by implementing design changes on a prototype in the Technology, Maturation and Risk Reduction Phase (TMRR).
- Demonstrating ability to deliver upgraded kits to soldiers for Field Support Readiness (FSR)
- Demonstrating availability of key testing components to support Initial Operational Test and Evaluation (IOT&E) and streamlining cost to conduct tests
- Demonstrating ability to track, make repairs, retrofit and deliver high cost components to different manufacturing sites.

Communicating How Risk Mitigation Helps Meet Program Objectives

There is continual support for Risk Management, as long as risk owners and stakeholders communicate to stakeholders:

- (1) How mitigating critical risks helps meet program objectives through cost reduction, time savings and elimination of redundant/parallel tasks
- (2) How mitigating critical risks helps meet mission critical program objectives,
- (3) How tracking critical risks and collecting lessons learned allow for improved business performance and efficiency over the long term, and,
- (4) How risk mitigation activities are tied to program objectives and the Integrated Master Schedule (IMS).

Yearly programmatic reviews is a good forum to assess specifically the

different ways how risk management helped meet program objectives and to decide whether to continue supporting risk management efforts for the following fiscal year.

2.7 Embedding Risk Management Functions Into Daily Business Operations

How do we ensure risk management is not an abstract concept for teams which makes it more difficult for teams to actively embrace risk management? In order to embed risk management functions into daily business operations, leadership and stakeholders should consider the following activities:

- Identify the critical risks and link the critical risks to top five performance indicators that are relevant to program objectives. For a program building systems or components in the automotive & defense sectors, examples of performance indicators are:
 - Estimated time to complete repairs
 - Availability
 - Mean time between failure
 - Number of spare parts
 - Number of vehicles repaired and delivered to depot
 - Number of qualified components
- Link risk mitigation activities to the Integrated Master Schedule.
- Adopt a Risk Management Process (with a defined Risk Management Plan) using commonly used nomenclature to define a common framework for defining and managing risks.
- Review risk mitigation plans for critical risks, review and approve them. Implement and track their progress in helping mitigate severity of risks.
- Adopt usage of common technology tools that will serve as a lessons learned repository for risk identification, analysis

and mitigation. For many Department of Defense programs, Project Recon is considered the tool of choice for risk management [Ref 8]. Project Recon is a network based software application owned by the US Government.

- Share lessons learned at least during semi-annual program reviews.

CONCLUSIONS

Risk Management is a team effort where the expectations, importance and implementation plan needs to be properly defined and communicated to all stakeholders involved. Programs should address these questions: “*What is the program’s expectations?*” “*What is the importance of risk management?*”, and “*What is the plan defining how risk management is going to be rolled out?*” In terms of determining how well risk management help meet program objectives, program management should identify critical performance/measurement indicators. A program will not know how well the process is helping the program unless indicators are being measured and tracked. Overall, there needs to be a dedicated long-term focus on ensuring risk management gets embedded into program management activities, otherwise risk management is going to be viewed as another hype or buzzword ‘process to bring about organizational efficiency’. Most importantly, to ensure long term implementation of Risk Management, lessons learned should be shared among different organizations during the semi-annual organizational meetings. One of the objectives for risk management is to streamline costs. Sharing of lessons learned enables different organizations to learn from

each other and to adopt commonly used approaches to mitigating risks and eventually reduce costs.

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FIGURES

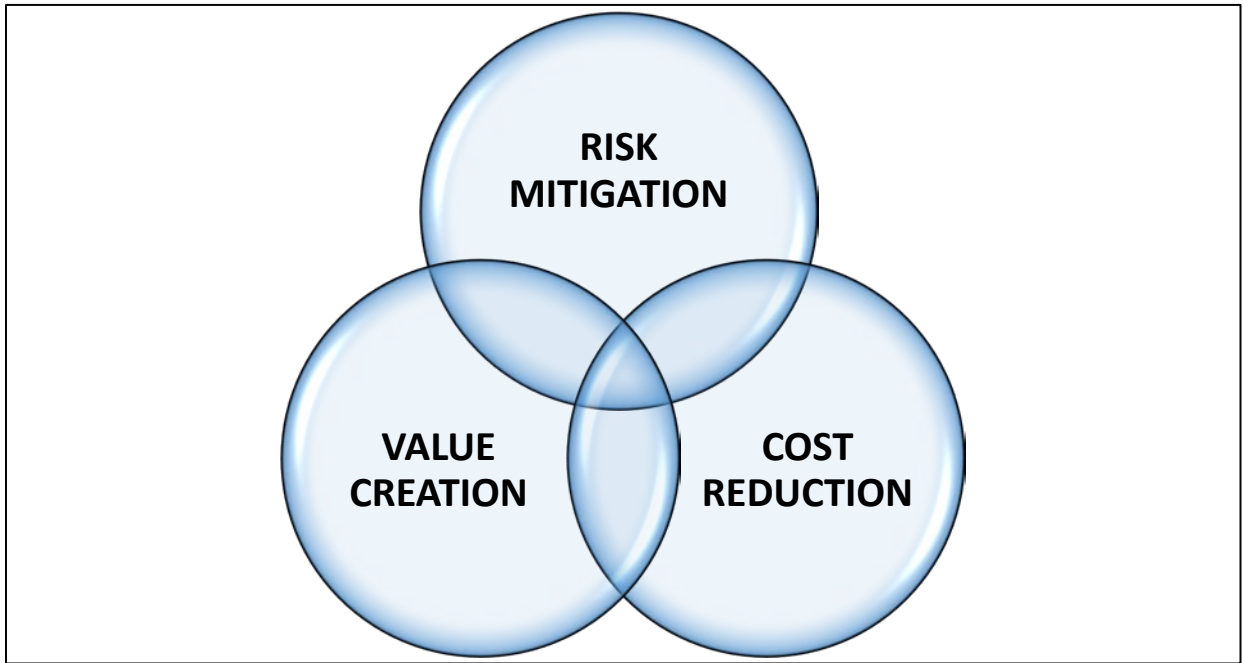


Figure 1 Tieg Risks with Other Organizational Objectives [Ref 2]

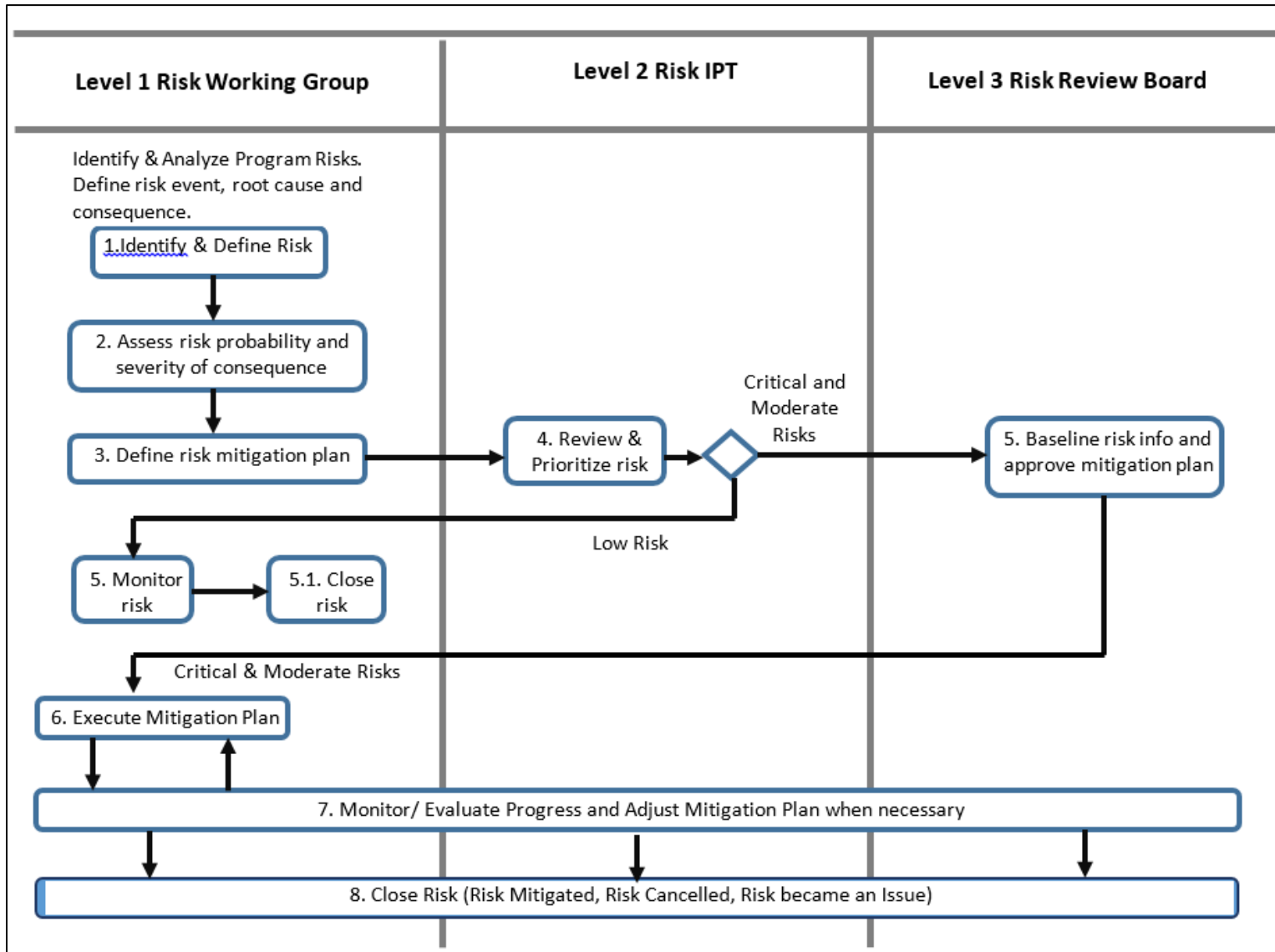


Figure 2 Notional Risk Workflow

IMPLEMENTING RISK MANAGEMENT IN YOUR ORGANIZATION: WHAT TO CONSIDER

	Different Functions	Product Team Leads & Subject Matter Experts	Program Management
Communicate Importance of and Objectives for Risk Management		X	X
Define expected behaviors		X	X
Mentoring		X	X
Identify Risks	X	X	X
Define Root Cause, Analyze risks (likelihood and consequence) and define and review risk mitigation plans	X	X	X
Trace risks activities to Integrated Master Schedule	X	X	
Tie critical risks with program objectives (cost, performance and schedule) and Integrated Master Schedule	X	X	X
Review, prioritize and approve risks and mitigation plans		X	X
Mitigate and track risks	X	X	
Review and track critical and moderate risks regularly	X	X	X
Understand & Share Lessons Learned	X	X	X

Figure 3 Stakeholder Involvement

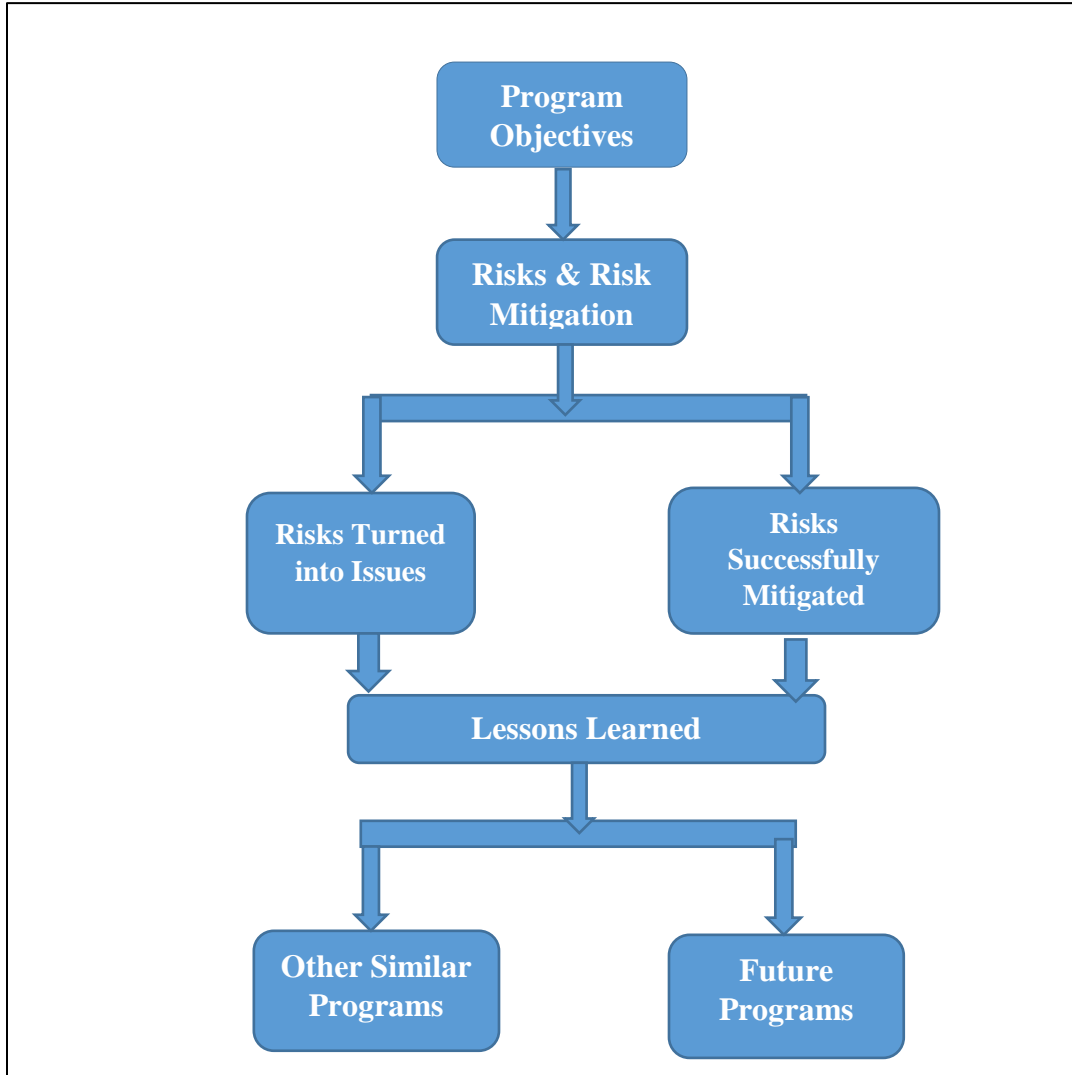


Figure 4 Sharing Lessons Learned Across Multiple Programs

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%

Figure 5 Typical Likelihood Definitions for a DoD Program [Ref 5]

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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>schedule 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 & Evaluation; TPM: Technical Performance Measure

Figure 6 Typical Definitions for Consequence: Cost, Schedule and Performance for a DoD Program [Ref 5]

Level	Likelihood	Expected or actual frequency experienced
1	Rare	May only occur in exceptional circumstances; simple process; no previous incidence of non-compliance
2	Unlikely	Could occur at some time; less than 25% chance of occurring; non-complex process &/or existence of checks and balances
3	Possible	Might occur at some time; 25 – 50% chance of occurring; previous audits/reports indicate non-compliance; complex process with extensive checks & balances; impacting factors outside control of organisation
4	Likely	Will probably occur in most circumstances; 50-75% chance of occurring; complex process with some checks & balances; impacting factors outside control of organisation
5	Almost certain	Can be expected to occur in most circumstances; more than 75% chance of occurring; complex process with minimal checks & balances; impacting factors outside control of organisation

Figure 7 An Example – Likelihood Definitions for a Community Health Service Organization [Ref 6]

Level & descriptor	Health Impacts	Critical services interruption	Organizational outcomes/objectives	Reputation and image per issue	Non-compliance
Insignificant (1)	First aid or equivalent only	No material disruption	Little impact	Non-headline exposure, not at fault; no impact	Innocent procedural breach; evidence of good faith; little impact
Minor (2)	Routine medical attention required (up to 2 wks incapacity)	Short term temporary suspension – backlog cleared < 1 day	Inconvenient delays	Non-headline exposure, clear fault settled quickly; negligible impact	Breach; objection/complaint lodged; minor harm with investigation
Moderate (3)	Increased level medical attention (2 wks to 3 mths incapacity)	Medium term temporary suspension – backlog cleared by additional resources	Material delays; marginal under-achievement of target performance	Repeated non-headline exposure; slow resolution; Ministerial enquiry/briefing	Negligent breach; lack of good faith evident; performance review initiated
Major (4)	Severe health crisis (incapacity beyond 3 mths)	Prolonged suspension of work – additional resources required; performance affected	Significant delays; performance significantly under target	Headline profile; repeated exposure; at fault or unresolved complexities; ministerial involvement	Deliberate breach or gross negligence; formal investigation; disciplinary action; ministerial involvement
Catastrophic (5)	Multiple severe health crises/injury or death	Indeterminate prolonged suspension of work; non performance	Non achievement of objective/outcome; performance failure	Maximum high level headline exposure; Ministerial censure; loss of credibility	Serious, wilful breach; criminal negligence or act; prosecution; dismissal; ministerial censure

Figure 8 An Example – Consequence Definitions for a Community Health Service Organization [Ref 6]

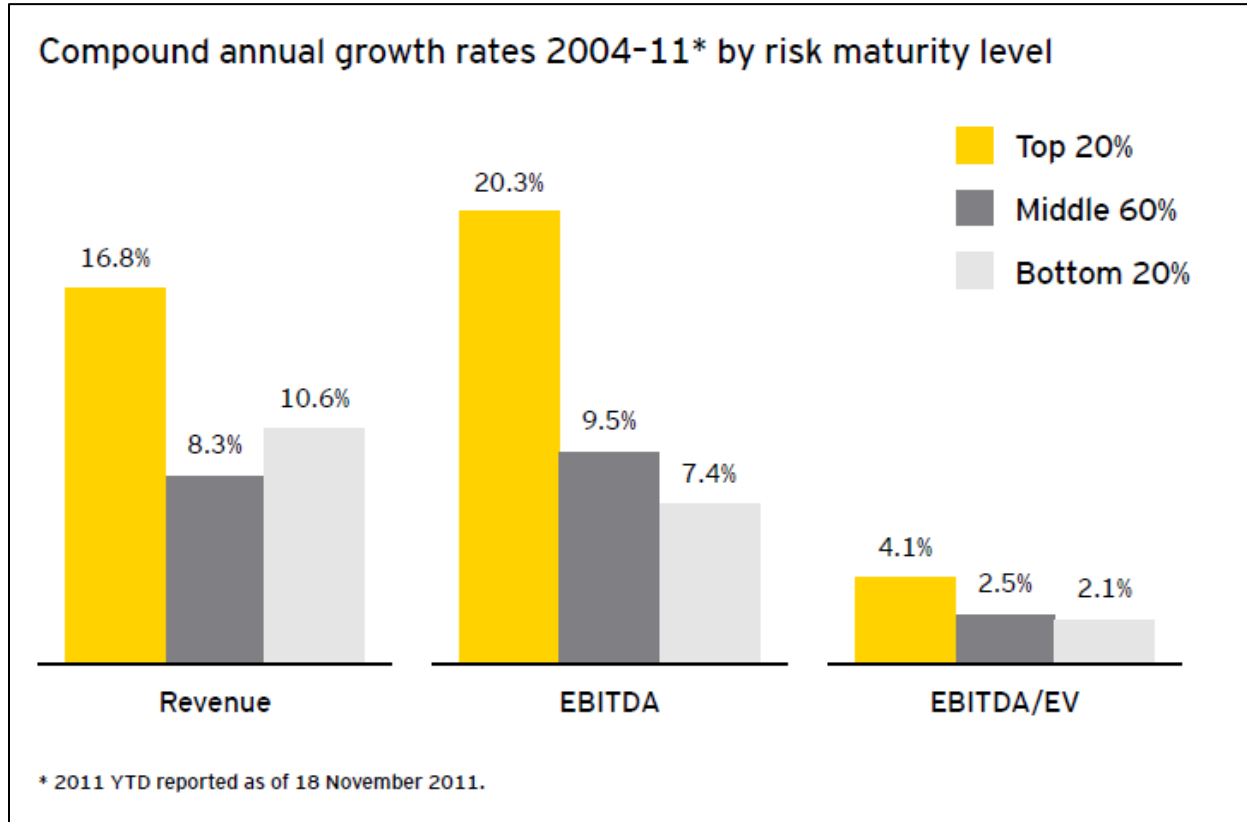


Figure 9 Correlation of Financial Performance & Risk Management [Ref 2]