Risk, Issue, and Opportunity Management

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- Our task as managers involves optimization—what are the highest-payoff risk-mitigation investments we can make with the resources available?

- I expect our managers to demonstrate that they have analyzed this problem and made good judgments about how best to use the resources they have to mitigate the program’s risk.
New Guide
Overview

- DoD Risk Management Guidance
- Risk Management
- Issue Management
- Opportunity Management
- DAU Risk Management Workshop
Risk, Issue, and Opportunity Relationship
Learn > Discuss > Connect

Risk, Issue, or Opportunity?
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Risk, Issue, or Opportunity?
“If you don’t actively attack the risks, they will actively attack you.”

Tom Gilb
Principles of Software Engineering Management

“Bad news isn’t wine. It doesn’t improve with age.”

Colin Powell

“Opportunity is missed by most people because it is dressed in overalls and looks like work.”

Thomas Edison
Risk Management Overview
Risk Management – Whose job?

Program manager
Chief engineer
Integrated Product Team Leads
Earned value managers
Production planners
Quality assurance
Logisticians
Risk Management obstacles

I know what I’m doing....

If I don’t know… then no one can blame me

Issues vs. risks

Who is in charge?

Going through the motions
Risk and Issue Management Overview

- Process Planning: What are the program’s risk and issue management processes?
- Identification: What has, can, or will go wrong?
- Monitoring: How has the risk or issue changed?
- Analysis: What is the likelihood of the risk and the consequence of the risk or issue?
- Mitigation / Correction: What, if anything, will be done about the risk or issue?

Communication and Feedback
Risk Definition

- Risk is the combination of
  - the probability of an undesired event or condition and
  - the consequences, impact, or severity of the undesired event, were it to occur.

- The undesired event may be programmatic or technical, and either internal or external to the program.
Risk Planning

“Plans are nothing… planning is everything”  DDE
Framing assumptions and ground rules

- **Framing Assumptions**
  - Consider and **document** assumptions
  - Assumptions may introduce risks if they prove invalid

- **Ground Rules**
  - Time frame - risk is evaluated “as of today” (not after planned mitigation, avoidance, etc.)
  - Time of risk event - when risk hypothetically will occur
  - WBS level – dig to low levels to identify causal factors
Aligning Government and Contractor Risk Management

- Government, Prime Contractor and associated Subcontractors should employ **consistent** Risk Management processes
- **Share** Risk Management information
- **Integrate** Risk Management with:
  - Requirements Development
  - Design, Integration, and Test
  - System Support and Sustainment
  - Schedule Tracking
  - Performance measurement
  - Earned Value Management (EVM)
  - Cost Estimating
  - Issue Management; etc…
Risk Identification

- **Process Planning**: What are the program’s risk and issue management processes?
- **Identification**: What has, can, or will go wrong?
- **Analysis**: What is the likelihood of the risk and the consequence of the risk or issue?
- **Mitigation / Correction**: What, if anything, will be done about the risk or issue?
- **Monitoring**: How has the risk or issue changed?

Communication and Feedback
Identifying Risk: What Can Go Wrong?

I cannot imagine any conditions which would cause a ship to founder. I cannot conceive of any vital disaster happening to this vessel. Modern shipbuilding has gone beyond that...

Captain E.J. Smith, 1906, about the Adriatic (Captain of Titanic on the evening on 14 April, 1912)
Risk Identification

All program personnel are encouraged to identify candidate risks.

Cast your net wide at first! Do not ignore areas or eliminate ideas early in the process.
Approaches to Risk ID

- **Product based evaluation**
  - Uses Work Breakdown Structure
  - Looks at system architecture
  - Identifies program relationships

- **Process based evaluation**
  - Focuses on processes used to define, develop and test a system
  - Looks at internal organizational processes

- **Scenario based evaluation**
  - Risks from a customer and supplier point of view
  - Requires knowledge of customers and suppliers, or their inputs/time
Risk Analysis

- **Process Planning**: What are the program’s risk and issue management processes?
- **Identification**: What has, can, or will go wrong?
- **Communication and Feedback**: How has the risk or issue changed?
- **Analysis**: What is the likelihood of the risk and the consequence of the risk or issue?
- **Mitigation / Correction**: What, if anything, will be done about the risk or issue?
Analyzing Risk: What Do Risks Mean?

- Estimate Likelihood/Consequence
  - Technical Performance
  - Schedule
  - Cost

- Determine the Risk Level
  - Use consistent predefined likelihood and consequence criteria

- Government and Contractor should use common framework

- Use Quantitative Data when possible
A Weak Risk Statement

- Makes an overly general observation:
  - Weak: If the high vacancy rate in engineering staff persists, then the program staffing will be inadequate.

- Identifies an issue rather than a risk:
  - Weak: Fatigue cracks discovered in already produced vehicles may shorten service life unless remedied.

- Diverts focus from the program’s controllable activities:
  - Weak: If the program’s funding is withheld due to poor test results, then the program schedule will be jeopardized.
Risk Statement Forms

IF (some event)
THEN (some consequence)

WE MIGHT NOT (some promise)
BECAUSE (some reason)

THERE IS (some probability)
THAT (some risk event) MAY OCCUR,
RESULTING IN (some consequence)
Root Cause Determination

We Might Not:  

Because:

- Meet Availability Requirements
- Engine Does Not Start
- Glow Plug Failed
- Glow Plug Remains On After Start
- Counterfeit Circuit Boards
Root Risk Event

If
Some negative event occurs

Then
Something bad may result

Purchase Counterfeit Circuit Boards

“Root Risk Event”

Series of Events

Fail to Meet Availability Requirements

“Consequence”
DoD Risk Reporting Matrix

Tailored to program - Programs can break out cost or consolidate
Risk Analysis
Risks are characterized as [HIGH, MODERATE, or LOW] based on rating thresholds. These Risk Level estimates help programs manage risks and prioritize handling efforts.

This difficult but important step in the risk management process helps the program determine resource allocation and appropriate handling strategies.
Expected Monetary Value

- Programs should compare cost burdened risk and cost of handling strategies.

- Cost exposure of a risk can be expressed as its EMV, which is the likelihood of the risk multiplied by the cost consequence of the risk if realized.

- Cost of the risk handling effort is then subtracted from the risk exposure to determine the “likely” return on investment (ROI).
Risk Mitigation

- Process Planning: What are the program’s risk and issue management processes?
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- Analysis: What is the likelihood of the risk and the consequence of the risk or issue?
- Mitigation / Correction: What, if anything, will be done about the risk or issue?
Four Fundamental Strategies

Avoid
Eliminate the risk event or condition

Control
Act to reduce risk to an acceptable level

Accept
Accept the level of risk (but continue to track)

Transfer
Assign risk responsibility to another entity
Risk Mitigation Approaches

Multiple Development Efforts:
- Alternative Design
- Design of Experiments
- Mockups
- Technology Maturation
- Early Prototyping
- Process Proofing
- Reviews, Walk-throughs, and Inspections

Ways to Mow Down Risk

- Robust Design
- Demonstration Events
- Models and Simulation
Risk Handling?

- Meet Availability Requirements
- Engine Does Not Start
  - Why?
- Glow Plug Failed
  - Why?
- Glow Plug Remains On After Start
  - Why?
- Counterfeit Circuit Boards
  - Why?

Mitigate?
- Change Availability Requirement
- Start Engine in Warmed Shelter
- More Spare Glow Plugs
- Circuit Redesign
- Certified Supplier

Not My Problem
Risk Burn-Down

Burn-down plan consists of 6 steps, tied to the project schedule, that allow the program to control and retire risks

1. Identify risk handling activities in a sequence
2. Define specific risk handling activities with objective, measurable outcomes
3. Assign a planned likelihood and consequence value to each risk handling activity
4. Estimate the start and finish dates for each risk handling activity
5. Put risk handling activities into the program schedule
6. Plot risk level versus time to show relative risk burn-down/reduction contribution of each activity
Mitigation Tracking Tool: Burn-down Chart

“Burn-down Chart”
Records the detailed steps planned for risk mitigation

- ▲ = Complete
- ▲ = Pending

(1) = Install higher efficiency magnets (Static test results)
(2) = Improve generator power output (Bench test)
(3) = Flight test of UAV

Initial Date  | 1 month | 2 months | 3 months | 4 months | 5 months | 6 months
---|---|---|---|---|---|---
Current Date

- - - = Planned
- - - = Actual
Risk Monitoring

- Process Planning: What are the program’s risk and issue management processes?
- Identification: What has, can, or will go wrong?
- Analysis: What is the likelihood of the risk and the consequence of the risk or issue?
- Mitigation/Correction: What, if anything, will be done about the risk or issue?
- Monitoring: How has the risk or issue changed?
Risk Monitoring

- Answers the question: “How have the risks changed?”

- A means to systematically track and evaluate risk handling plans against established metrics throughout the acquisition process

- Iterative and recursive - feeds info back thru risk handling, risk analysis, risk identification, and risk planning steps as warranted
Example Risk Monitoring and Trend Matrix
Risk Monitoring Expectations

- Regular status updates for any changes to likelihood or consequence
- Regular schedule for PMO/Contractor review of risks
- Alert management when risk handling plans should be implemented or adjusted

- Alert the next level of management when ability to handle a risk exceeds the lower level’s authority or resources.

- Track actual versus planned implementation of progress
- Management indicator system over the entire program to monitor risk activity
- Review closed risks periodically to ensure their risk level has not changed
Issue Management
Issue Management

Communication and Feedback

Issue Process Planning
What is the program’s issue management process?

Issue Identification
What has or will go wrong?

Issue Analysis
What is the consequence of the issue?

Corrective Action
What, if anything, should be done about the issue?

Issue Monitoring
How has the issue changed?
Issues vs Risks

- Risks are potential future events
- An issue is an event or situation with negative consequences that has already occurred or is certain to occur
- This distinction between an issue and a risk differentiates how they are managed.
Risks and Issues

➢ Risks are Future Problems:
  Focus is on Future Consequences
  • Can be “closed” only after successful mitigation through controlling, avoiding, transferring, or accepting the risk
  • Examples
    – IF the sole source provider of a critical component goes out of business, THEN the program will be delayed by 6 months
    – IF proprietary interfaces are used, THEN maintenance and support costs will likely increase as the program matures

➢ Issues are Current Problems:
  Focus is on Real-Time Consequences
  • If the probability of occurrence is “near certainty” or if it has already occurred, it’s an issue
  • Examples
    – Release of engineering drawings is behind schedule
    – Test failure of components reveals a design shortfall
Issue Management

- Issue management applies resources to address and reduce the potential negative consequences associated with a past, present, or certain future event. Issues may occur when a previously identified risk is realized, or they may occur without prior recognition of a risk. In addition, issues may spawn new risks.

- Issue management and opportunity management are complementary to the risk management process. Programs should take advantage of the common practices between issue and risk management while recognizing and accounting for the distinctive characteristics of each.
Issue Management

➢ The key is to ensure proper focus on both issues and risks so that attention on current problems will not overtake efforts to manage risks and opportunities
Issue Reporting

- Approved issues should be analyzed using the program’s risk management consequence criteria.
- The program should evaluate the handling options in terms of cost, schedule, performance, and residual risk.
Issue Management Corrective Action

- Evaluate options in terms of cost, schedule, performance, and residual risk, and select the best option (or hybrid of options) consistent with program circumstances.

- The primary options for issues are:
  - **Ignore**: Accept the consequences without further action based on results of a cost/schedule/performance business case analysis; or
  - **Control**: Implement a plan to reduce issue consequences and residual risk to as low a level as practical or minimize impact on the program. This option typically applies to high and moderate consequence issues.
Issue Tracking

- Track resolution of issues against a corrective action plan.
  - Monitor the issue to collect actual versus planned cost, schedule, and performance information
  - Feed this information back to the previous process steps
  - Adjust the plan as warranted
  - Analyze potential changes in the issue, its level, and potential associated risks.

- Program risk/issue register should include issue tracking information.
Issue Management Expectations

- As the probability of occurrence of a risk increases, the program should anticipate the realization of the risk and put plans in place to address the consequences.
- Does this issue create residual risk? (establish a formal risk when appropriate)
- Document your issue management process (This process may share elements with the risk management process.)
  - Develop a plan to address, track, and review issues during regular meetings and reviews.
  - Track cost, schedule, and performance issues and report to the appropriate management level based upon the level of the consequence impacts.
Opportunity Management
Opportunity Management Overview

- Opportunity management identifies potential benefits to cost, schedule, and/or performance baseline.
- Opportunity management measures potential program improvement in terms of likelihood and benefits.
  - Opportunities should be evaluated for both advantages and disadvantages:
    - opportunity may be overstated and corresponding risks may be understated
    - all candidate opportunities should be thoroughly screened for potential risks
Opportunity Management Purpose

Opportunities Help Deliver Should-Cost Objectives
Opportunity Forecasting

- Identifying opportunities starts with forecasting potential enhancements within the program’s technical mission and stakeholder objectives.

- As opportunities emerge, the program can shift focus toward understanding how to take advantage of opportunities while continuing to manage risks and issues.

- Opportunity management measures potential program improvement in terms of likelihood and benefits.
Opportunity Management Process
Opportunity Identification

- Starts by forecasting potential enhancements within the program’s technical mission and stakeholder objectives
- Start before program execution, but continue throughout the program life cycle
- Look for system or program changes that yield reductions in total ownership cost.
  - Example: adherence to a modular open systems approach or securing appropriate government rights to a technical data package can offer opportunities in sparing and competition for modifications.
Risk vs Opportunity Management Board

- Program Risk Management Board (RMB) typically also manages opportunities
  - (or may establish a separate Opportunity Management Board)

- Once candidate opportunities are identified, the program RMB should:
  - examine the opportunity
  - assign an owner
  - track it in the opportunity register
Opportunity Analysis

- Opportunity Analysis:
  - Perform a cost, schedule, and performance benefit analysis for each opportunity
  - Opportunities with sufficient potential should be evaluated relative to potential handling options.

- Applying **resources** to evaluate and implement opportunities may reduce available risk handling resources

- Must be balanced against the potential likelihood of achieving the desired benefits, and the degree of value added in meeting existing program requirements.
Opportunity Handling Options

- Evaluate potential benefits (and risk) in terms of cost, schedule, and performance, and select the best option (or hybrid of options)
  - **Pursue now** – Fund and implement a plan to realize the opportunity. (Determination of whether to pursue the opportunity will include evaluation of the return of any investment when the opportunity would be realized, the cost, additional resources required, risk, and time to capture.)
  - **Defer** – Pursue/cut-in later; for example, request funds for the next budget and request the S&T community mature the concept.
  - **Reevaluate** – Continuously evaluate the opportunity for changes in circumstances.
  - **Reject** – Intentionally ignore an opportunity because of cost, technical readiness, resources, schedule burden, and/or low probability of successful capture.
Opportunity Monitoring

- Collect actual versus planned cost, performance, schedule, and benefit information
- Feed this information back to the prior process steps
- Adjust the handling plan as warranted,
- Analyze potential changes in the opportunity level
- Examine potential risks and additional opportunities that may be identified.
Opportunity Management Sample
Opportunity Management Expectations

- Implement an active opportunity identification and evaluation process
- Evaluate and actively pursue high-return opportunities to improve the program life cycle cost, schedule, and performance baselines.
- Programs review risks, issues, and opportunities during regular program meetings
- Programs establish or integrate opportunity tracking and management mechanisms.
- Programs establish opportunity likelihood and benefit criteria in line with program “should-cost” objectives.
- Programs evaluate approved opportunities and manage any associated risks
DAU RM WORKSHOP overview

- Risk Management Overview
- Risk Management Process
  - Planning
  - Identification
  - Analysis
  - Handling (Mitigation)
  - Monitoring (Tracking)
  - Tools
- Issue Management
- Opportunity Management
- Next Steps
DAU Risk Management Workshop

Intended to use actual Program Data with Intact Teams to jump-start / invigorate Risk Management activities to enable program success.
Questions