U.S. General Services Administration

GSA Federal Acquisition Training Symposium

April 25 – 26, 2017
Huntsville, AL

Learn > Discuss > Connect > Interact

Risk, Issue, and Opportunity Management

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Defense Acquisition University
South Region

April 25th, 2017

From the Under Secretary of Defense for Acquisition, Technology, and Logistics

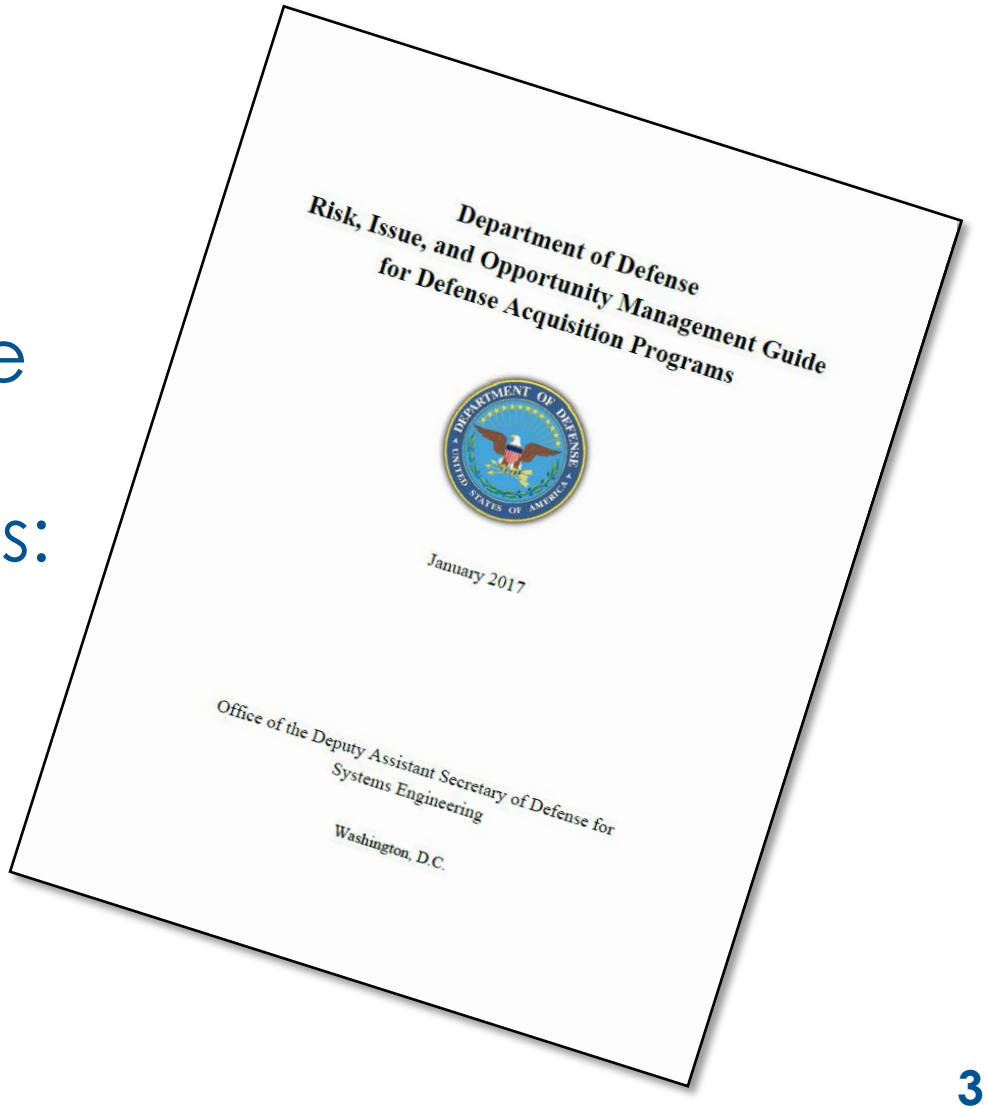
Risk and Risk Mitigation—Don't Be a Spectator

Frank Kendall

- 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

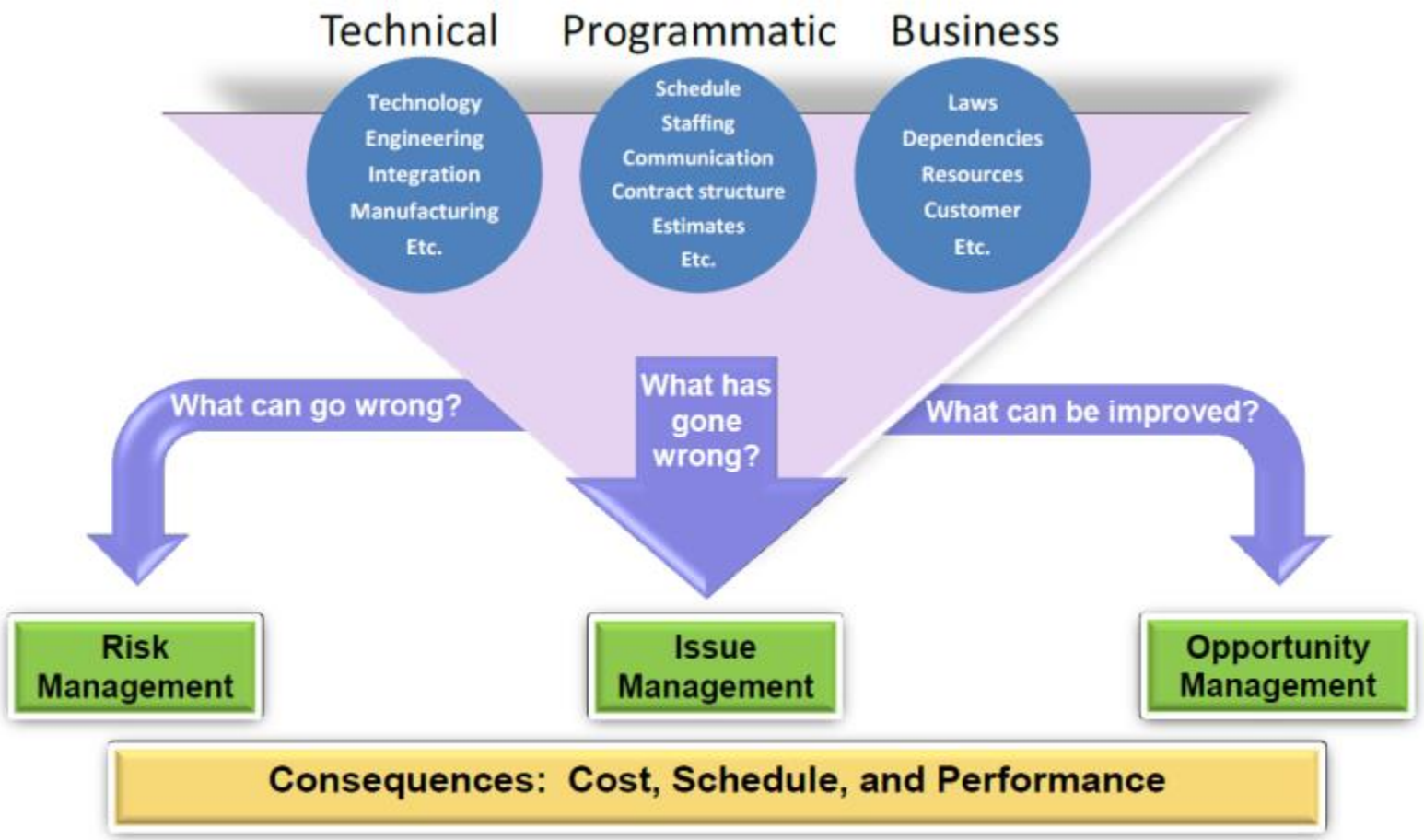
Risk, Issue, and Opportunity Management Guide for Defense Acquisition Programs: January 2017



Overview

- DoD Risk Management Guidance
- Risk Management 
- Issue Management 
- Opportunity Management 
- DAU Risk Management Workshop

Risk, Issue, and Opportunity Relationship

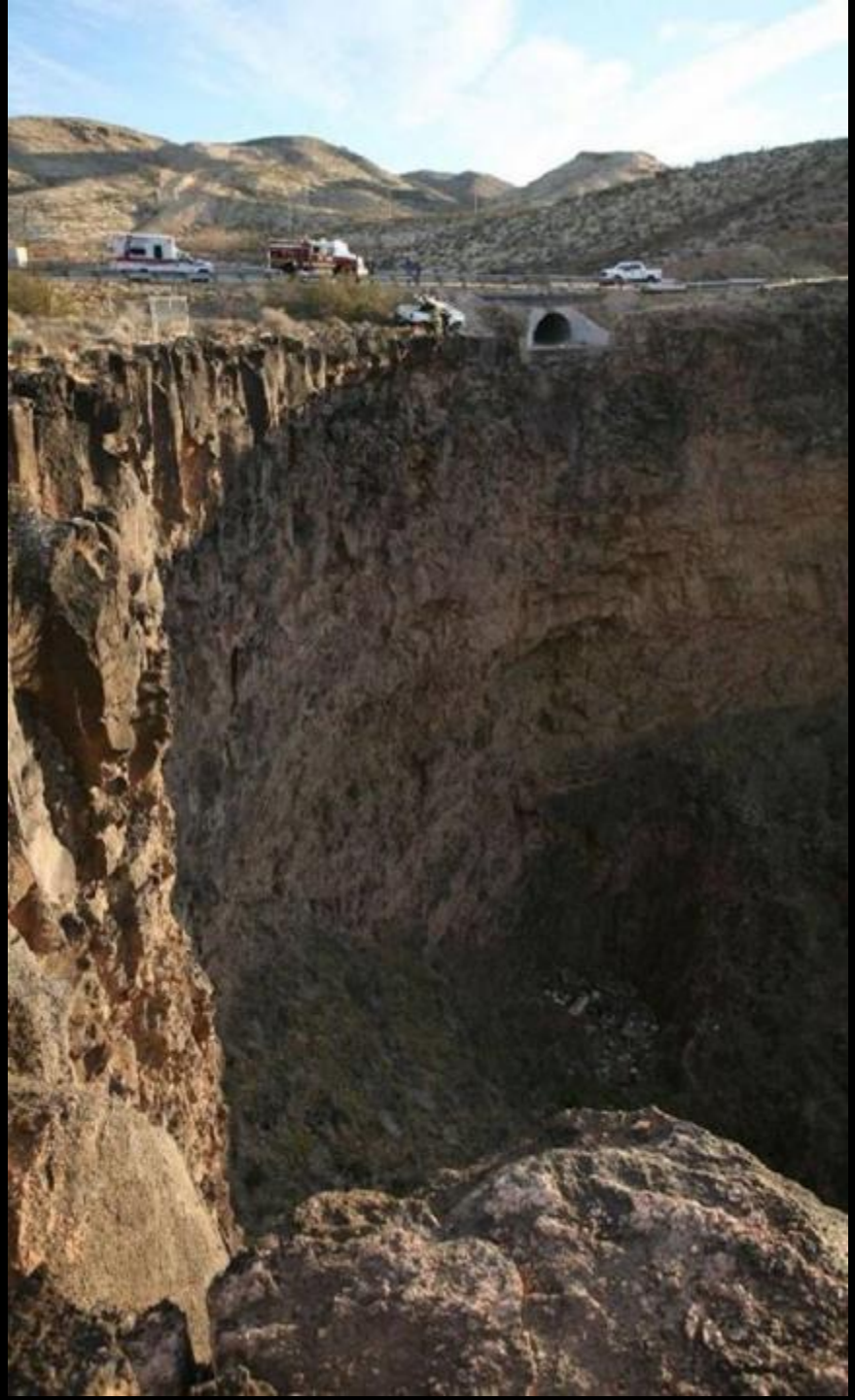


Risk, Issue, or Opportunity ?

Learn > Discuss > Connect > Interact

Risk, Issue, or Opportunity?

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

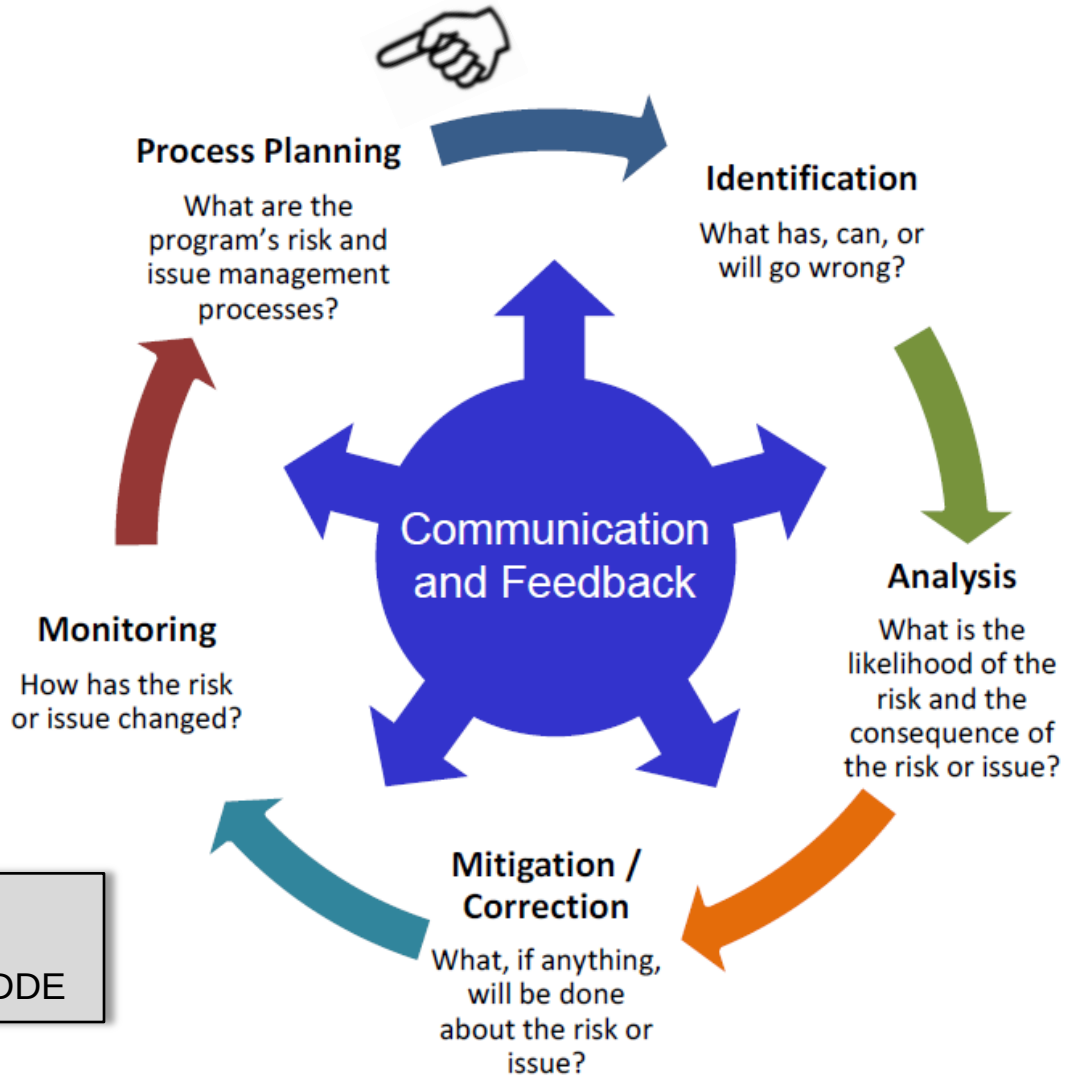
Risk and Issue Management Overview

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



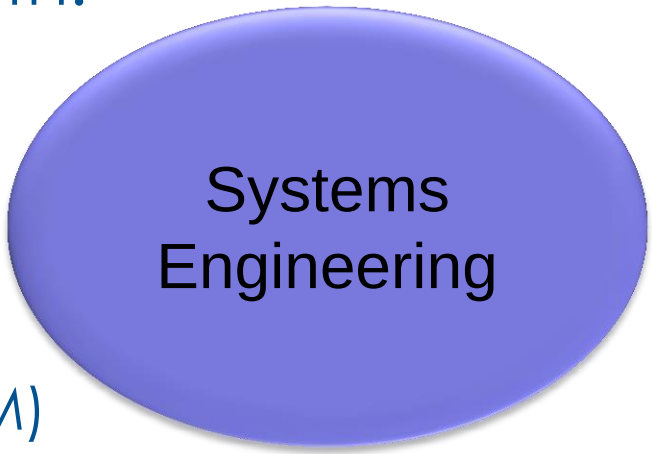
"Plans are nothing…
planning is everything" DDE

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

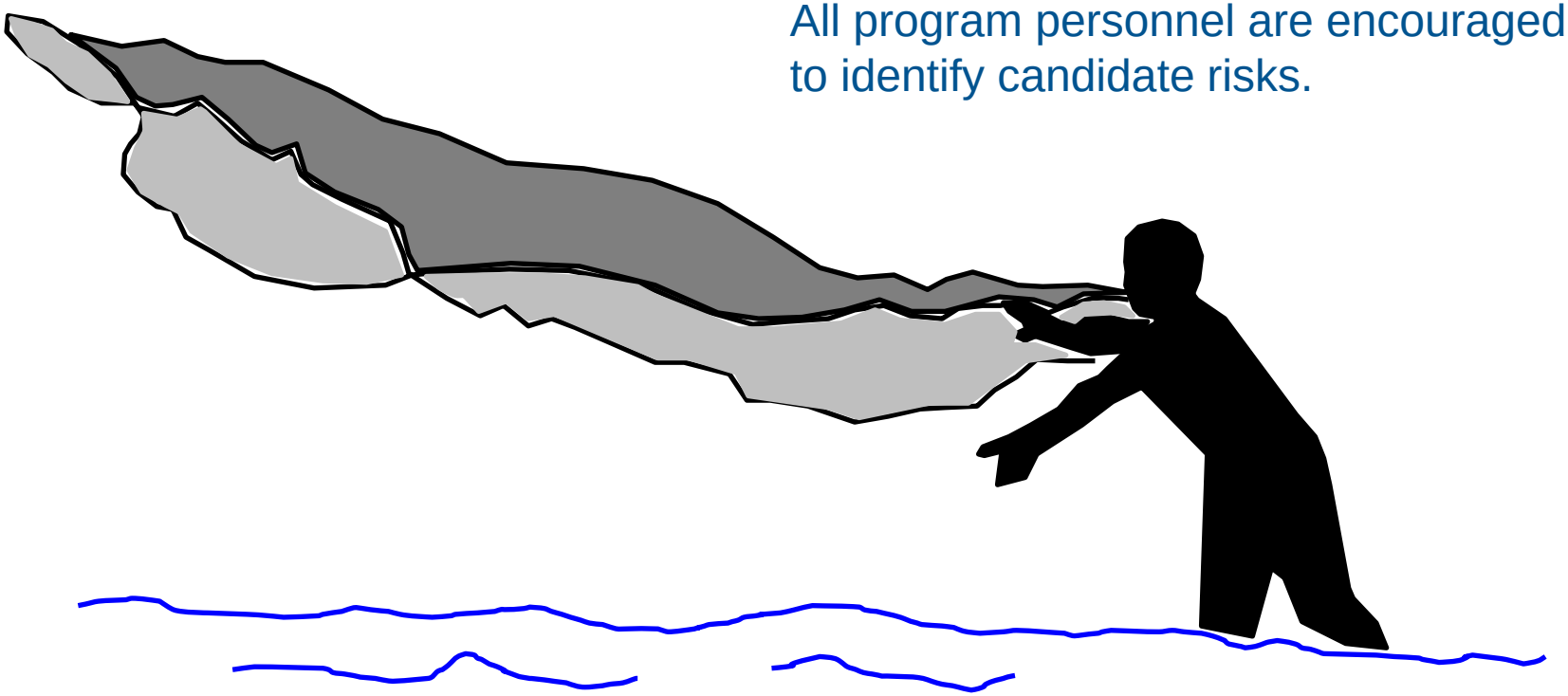
Identifying Risk: What Can Go Wrong?

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

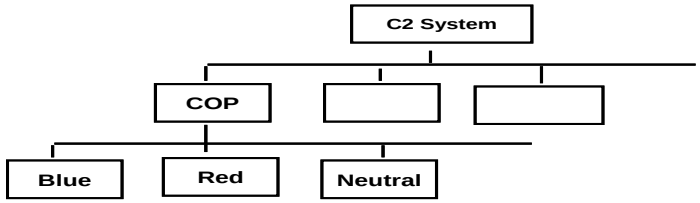
All program personnel are encouraged to identify candidate risks.



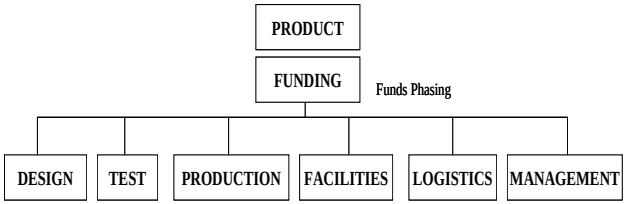
Cast your net wide at first! Do not ignore areas or eliminate ideas early in the process.

Approaches to Risk ID

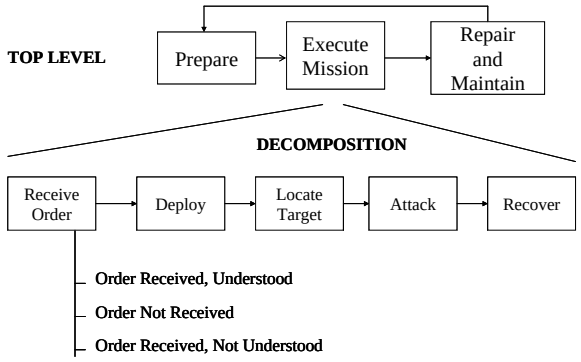
- Product based evaluation
  - Uses Work Breakdown Structure
  - Looks at system architecture
  - Identifies program relationships



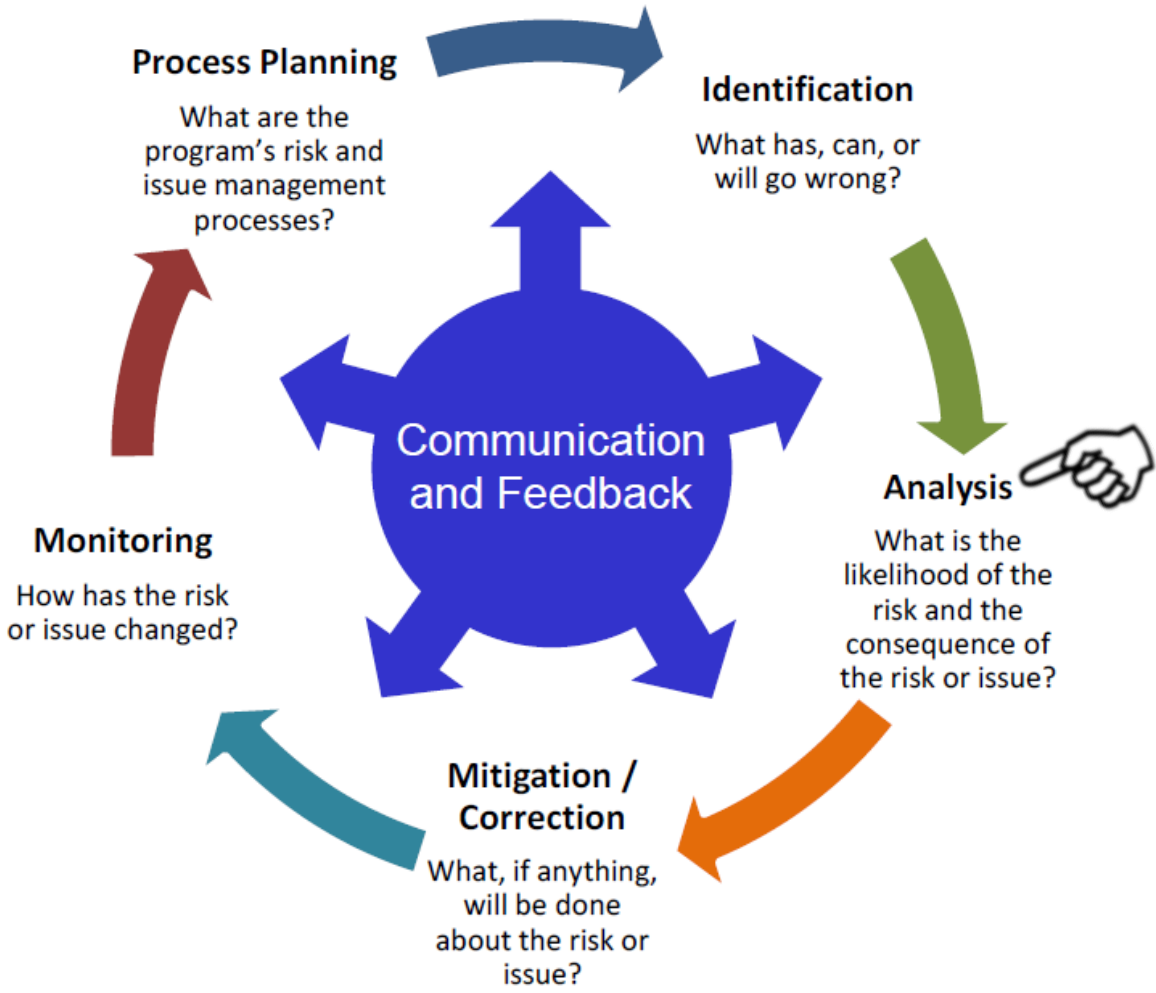
- Process based evaluation
  - Focuses on processes used to define, develop and test a system
  - Looks at internal organizational processes



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



Risk Analysis



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

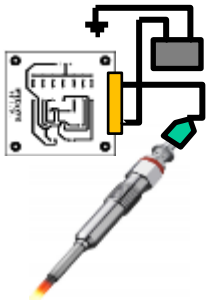
Why?

Engine Does Not Start

Why?

Glow Plug Failed

Why?



Glow Plug Remains On After Start

Why?

Counterfeit Circuit Boards

Root Risk Event

If

Some negative event occurs

Purchase Counterfeit Circuit Boards

"Root Risk Event"

Series of Events

Then

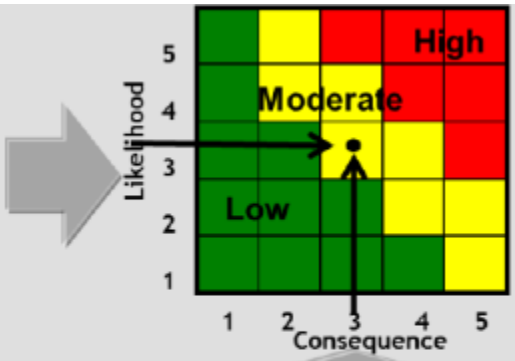
Something bad may result

Fail to Meet Availability Requirements

"Consequence"

DoD Risk Reporting Matrix

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



Level	Cost			Schedule	Performance
	RDT&E	Procurement	Operations & Maintenance		
1	Minimal impact: <1% increase over most recent cost estimate; or; <$A dollars	Minimal impact: < $A or < 1% of budget	Minimal or no impact on O&M	Minimal or no impact	Minimal or no consequences to meeting technical performance or supportability requirements Design margins will still be met
2	Minor impact: 1% - <3% increase over most recent cost estimate; or, $A - ≤ $B	Minor impact: 1% - <3% increase over unit production cost baseline; or, $A - ≤ $B	Increase of x- y% over program's cost estimate	Able to meet key dates. Does not significantly decrease program total float	Minor reduction in technical performance or supportability; can be tolerated with little or no impact on program. Design margins will be reduced, but within acceptable limits
3	Moderate impact: 3% -<5% increase over most recent cost estimate; or, $B - ≤ $C; manageable with reserves	Moderate impact: 3% -<5% increase over unit production cost baseline; or, $B - ≤ $C; or 1/10 of significant Nunn-McCurdy (N-M) breach	Increase of y - z% over program's cost estimate	Minor schedule slip. Able to meet key milestones. Significantly decreasing program total float. Impacting the critical path	Moderate reduction in technical performance or supportability with limited impact on program objectives. Design or supportability margins are significantly reduced and jeopardize achieving performance threshold
	reserves		cost KSA	Schedule slip puts funding at risk	available
5	Major impact. 10% or greater increase over cost estimate; or >$D. Program success in jeopardy	Major impact: 8% or more increase over unit production cost baseline; or, >$D or; 1/2 of a significant N-M breach)	Exceeds lifecycle ownership cost KSA. Ability to sustain system in jeopardy	Schedule slip that requires a major schedule re-baselining; Failing to meet milestone dates and/or other key dates; Failing to meet the program or project completion date	Severe degradation in technical performance or supportability; cannot meet KPP or key technical/supportability threshold; Will jeopardize program success

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

Risk	Likelihood	Consequence Cost	Exposure	Cost to Handle	Return on Investment
Risk 1:	20%	$10M	$2M	$1M	$1M
Risk 2:	70%	$10M	$7M	$1M	$6M
Risk 3:	40%	$36M	$9M	$2M	$7M
Risk 4:	60%	$5M	$3M	$.5M	$2.5M
Total		**$61M**	**$21M**	**$4.5M**	

- 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

Four Fundamental Strategies

Avoid

Eliminate the risk event or condition

Control

Act to reduce risk to an acceptable level

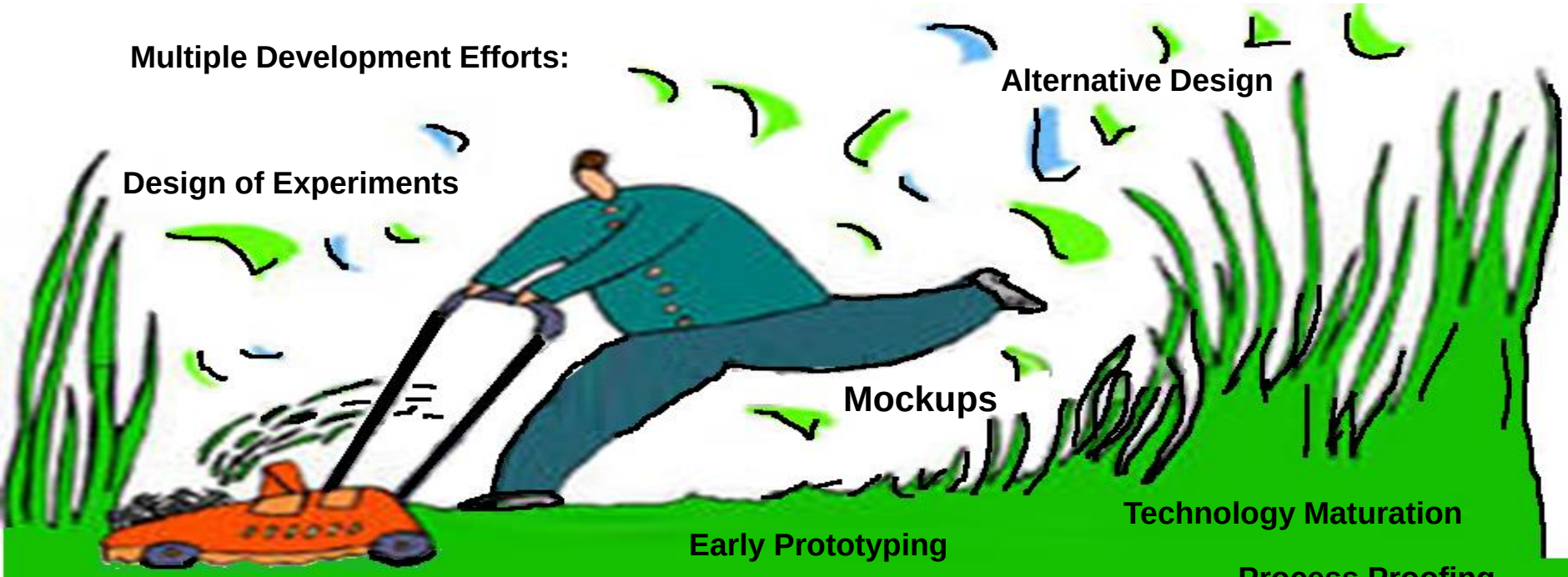
Accept

Accept the level of risk (but continue to track)

Transfer

Assign risk responsibility another entity

Risk Mitigation Approaches



Risk Handling?

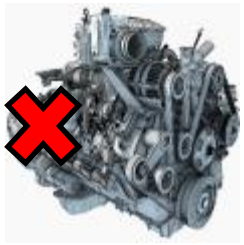
Meet Availability Requirements

Mitigate?

Not My Problem

Change Availability Requirement

Why?



Engine Does Not Start

Mitigate?

Start Engine in Warmed Shelter

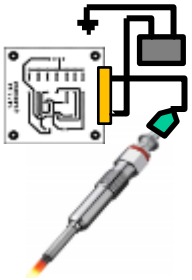
Why?

Glow Plug Failed

Mitigate?

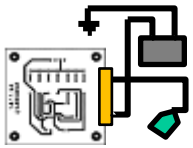
More Spare Glow Plugs

Why?



Glow Plug Remains On After Start

Mitigate?



Circuit Redesign

Why?

Counterfeit Circuit Boards

Mitigate?

Certified Supplier

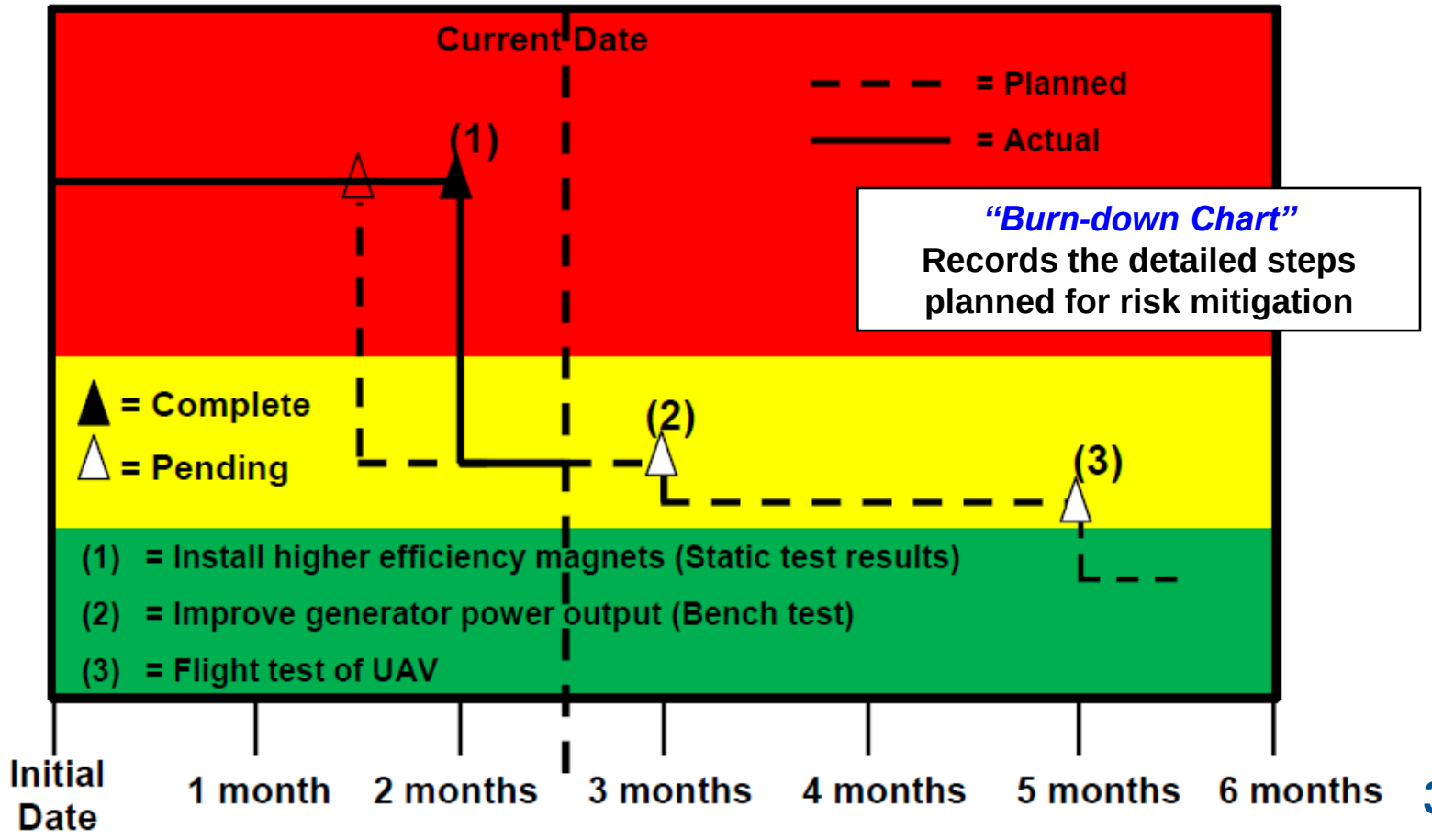
Risk Burn-Down

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

RISK PILE

Mitigation Tracking Tool: Burn-down Chart



Risk Monitoring

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 No	Risk Item Description	Risk Trend
31	Risk Title	↓
4	Risk Title	↓
18	Risk Title	↓
99	Risk Title	←
22	Risk Title	Retired

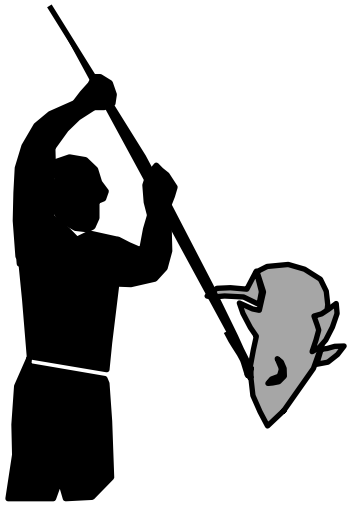
↓ = Likelihood decreasing
↑ = Likelihood increasing
← = Consequence decreasing
New = New risk added
Retired = Retired since last report

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

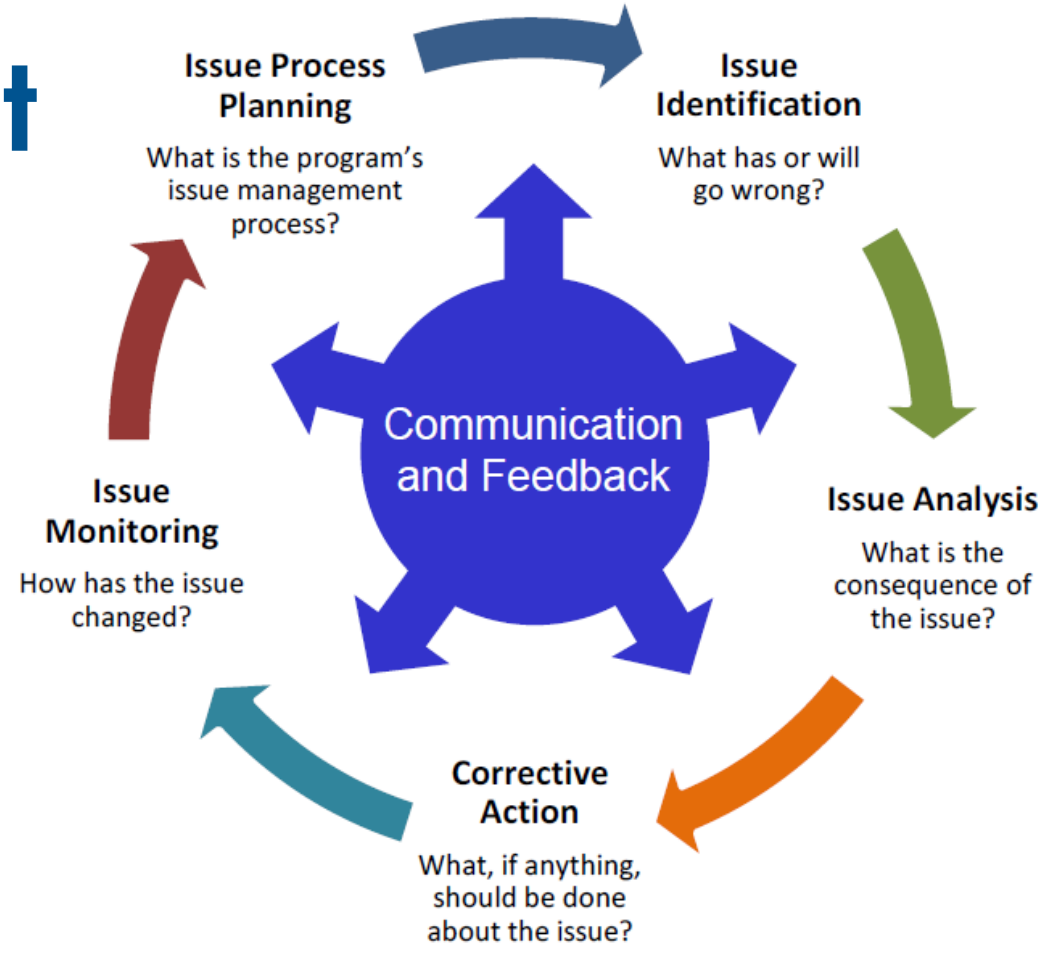
- Alert the next level of management when ability to handle a risk exceeds the lower level's authority or resources.

- 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



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

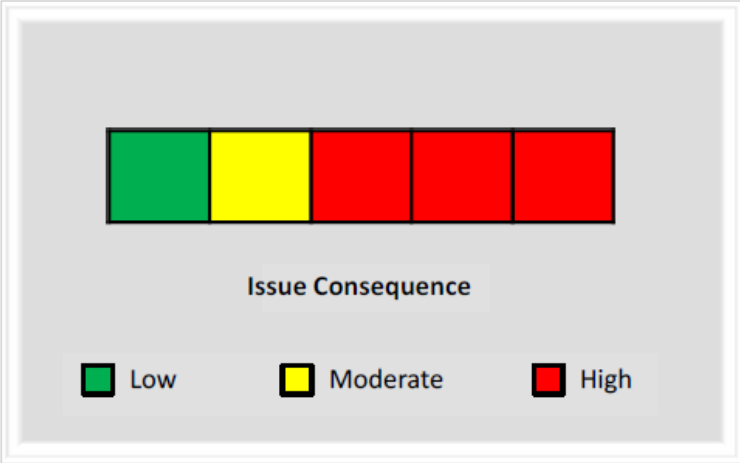


Figure 3-13. Issue Consequence Reporting Matrix

- 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

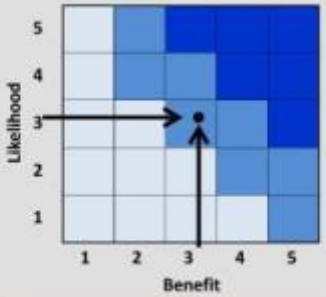
- Evaluate potential benefits (and risk) in terms of cost, schedule, and performance, and select the best option (or hybrid of options)
  - **Pursue now** – Fund and implement a plan to realize the opportunity. (Determination of whether to pursue the opportunity will include evaluation of the return 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

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%



Level	Cost			Schedule	Performance
	RDT&E	Procurement	Operations & Maintenance		
5	Significant cost benefit of >$W; or reduces costs by >q% of budget	Significant cost benefit of >$D or; reduces production unit cost by >q%	Significant cost benefit for O&M savings	Exceptional benefit in meeting major milestones and improving critical path	Exceptional benefit to design margin, system performance and requirements
4	Major cost benefit $Z - <$W; or reduces costs by p% - <q% of budget	Major cost benefit of $C - <$D or; reduces production unit cost by p% - <q%	Major cost benefit for O&M savings	Major benefit in meeting major milestones and improving critical path	Major benefit to design margin, system performance or requirements
3	Cost benefit of $Y - <$Z; or reduces costs by n%- <p% of budget	Moderate cost benefit of $B - <$C or; reduces production unit cost by n% - <p%	Moderate Cost benefit for O&M savings	Moderate benefit in meeting major milestones	Moderate benefit to design margin, system performance or requirements
2	Minor cost benefit of $X - <$Y; or reduces costs by m%- <n% of budget	Minor cost benefit of $A - <$B or; reduces production unit cost by m%- <n%	Minor cost benefit for O&M savings	Minor benefit in meeting lower level milestones	Minor benefit to design margin, system performance or requirements
1	Minimal cost benefit of <$X; or reduces costs by <m% of budget	Minimal cost benefit of <$A or; reduces production unit cost by <.5%	Minimal cost benefit for O&M savings	Minimal benefit to improving overall schedule	Negligible benefit to design margin, system performance or requirements

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

Intro	Risk **Culture**	Risk **Planning**	Lunch	Risk ID Part 1	Risk ID Part 2
Risk Analysis	Risk Mitigation Part 1	Lunch	Risk Mitigation Part 2	Risk **Monitoring**	Risk Tools

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

Questions