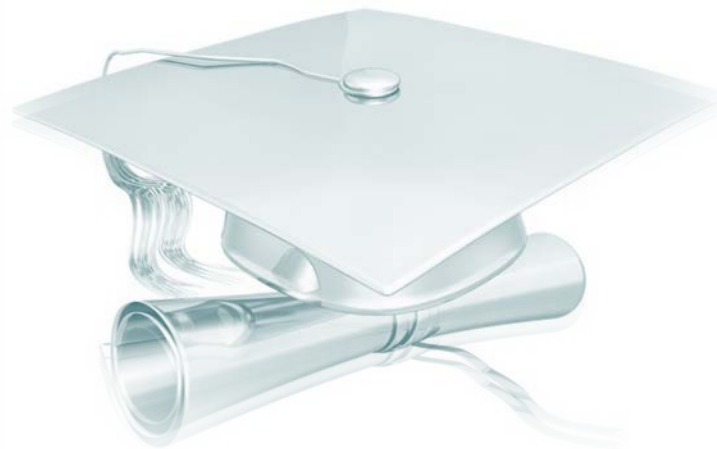




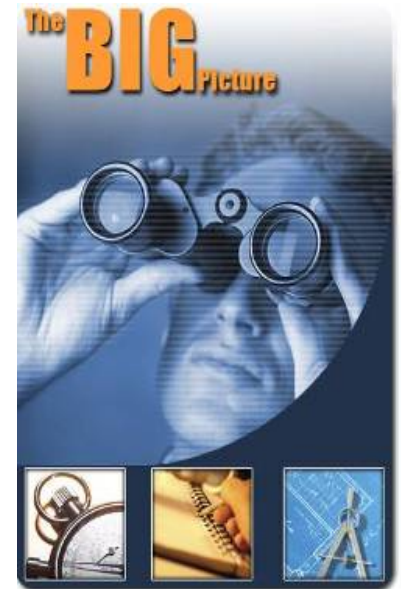
# Risk and Opportunity Management - Overview



# Webinar Learning Objectives

At the end of this Webinar, you will:

- Understand the 5 step Risk and Opportunity Management (R&OM) process
- Recognize R&OM as a tool for success
- Have a working, participatory knowledge of the R&O Management process
- Understand the various roles in the R&O Management process



# Why do we perform Risk & Opportunity Management?

1. Because it's required by  
Corporate Policy



2. Because it improves the probability  
of program success

# Definitions

- **Risk** - A potential problem or threat that could affect the program's ability to meet its performance, cost, schedule, financial, or other objectives



What Might Go Wrong?

- **Opportunity** - A potential enhancement or positive impact that could improve the program's ability to meet its performance, cost, schedule, financial, or other objectives



What Might Be Improved?

*Threats and Enhancements to our Objectives*



# Definitions

## Risk and Opportunity Management –

The continuous, proactive process of:

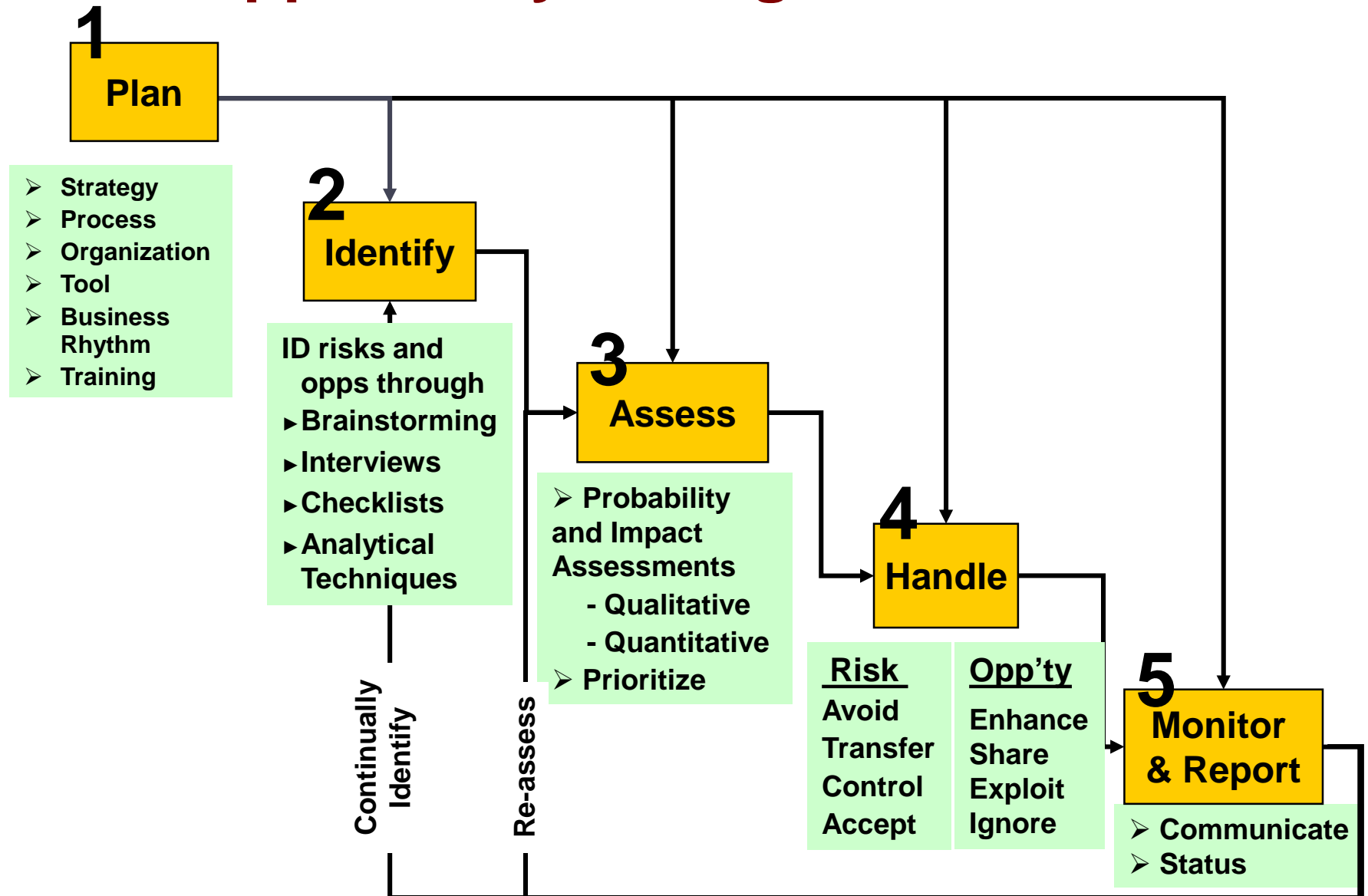
identifying program risks and opportunities,

assessing them for potential action,

implementing action plans,

and monitoring those plans to completion.

# Risk / Opportunity Management Process





# Risk & Opportunity Management Plan

## Requirements:

- Lockheed Martin CPS-070B
- Local Command Media
- RFP or contract requirements

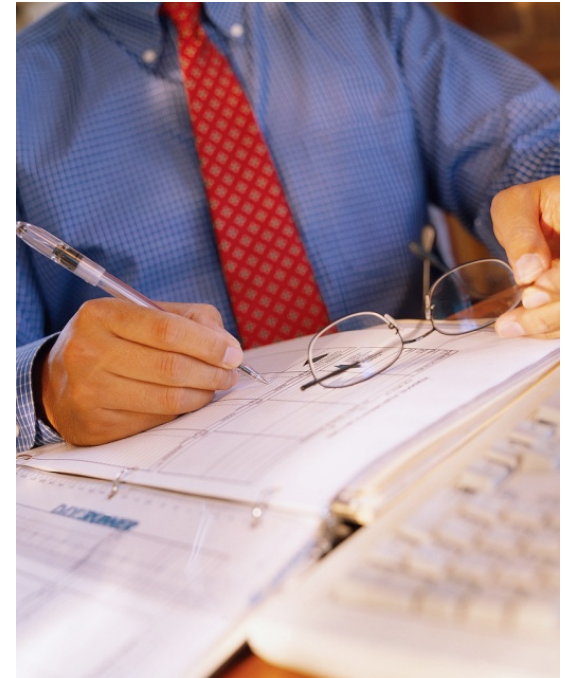
**Who?**

**What?**

**When?**

**Why?**

**How?**





## ***Stop and Think . . .***

1. Is there a Risk / Opportunity Management policy or process in your organization?





Plan

Identify

Assess

Handle

Monitor



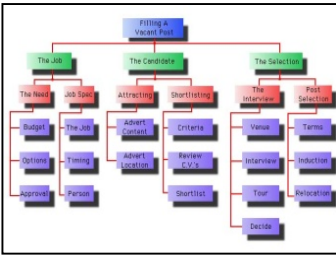
## Roles and Responsibilities

- Initiators
- Owners
- R/O Manager
- R/O Management Board

# Identification – How?



**Program Documentation**



**WBS Analysis**



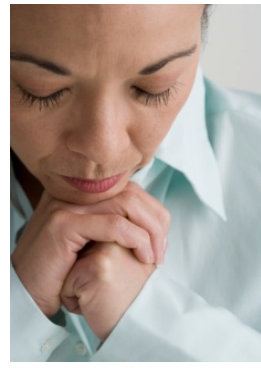
**Expert Interviews and Reviews**



**Taxonomies, Checklists, Common risk lists Lessons learned**



**Brainstorming**



**Anyone, anytime**



# Identification - Where can we find risk?

## □ Potential Risk Areas

- Technical, quality or performance pressures
  - Uncertain requirements
  - Ability to meet program requirements
  - Security risks
  - Reliance on unproven or complex technology
  - Unprecedented efforts - history unavailable
  - Inadequate resource availability (infrastructure and people)
  - Subcontractor / supplier history – poor or unknown
  - Infeasible or immature design
  - Inadequate communication
  - External risks – customer, shifting legal or regulatory environment
- 
- Ask - what could go wrong? Why? When? How? Where?
  - Where is there uncertainty?



Plan

Opportunity

Identify

Assessment

Assess

Handle

Monitor



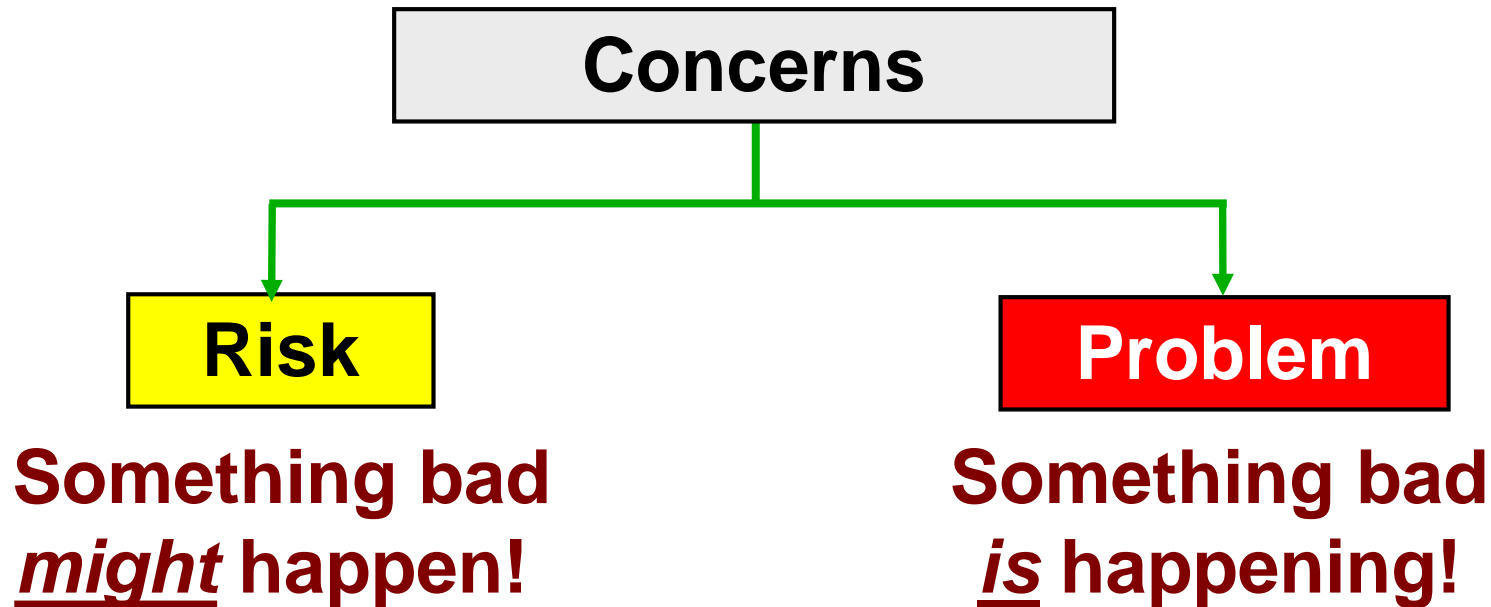
# Identification - Where can we find opportunity?

## □ Potential Opportunity Areas

- Use of COTS (Commercial Off The Shelf)
- Supplier competition
- Test by similarity and analysis
- Automation
- Lean manufacturing
- Question non-value added requirements
- Use of commercial parts
- Agile development

## □ Ask - what can we do to save time and money?

# Risks vs. Problems / Issues



Risks are **Potential** Problems



## ***Stop and Think . . .***

Consider the following scenario:

Your objective is to have a meeting with a customer to review your current proposal. The plan is to leave work at 5:00 PM, travel 30 miles to the airport, take a flight at 7:30, arrive at 8:30, and meet in the hotel at the airport. ***What are some of the risk areas?***

Car trouble

Local Traffic

Local Weather

Long security lines

Aircraft problems

Flight delays of inbound aircraft

Destination weather



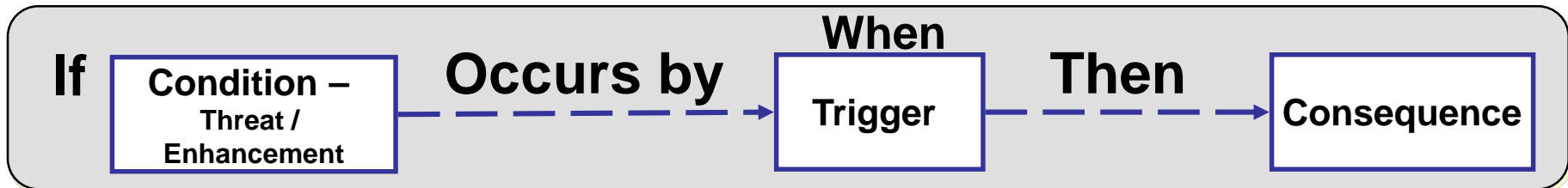
## Identification –

### Building a Risk or Opportunity Description

- *R/O Title*
- *R/O Statement*
- *Context Information*

# Risk & Opportunity Statements

Using “If / When / Then” to document an identified risk or opportunity:



***Risk Statement Example: If the XSTAR helicopter fails to meet the 20G frontal impact specification before initial testing in 2017, then the fuselage design must be modified and the program schedule could slip***

***Opportunity Statement Example: If we develop a common design for our cast housings before CDR, then we can reduce the amount of tooling, reduce non-recurring costs, and could improve schedule***





# Risk / Opportunity Statements (cont.)

Using “If / When / Then” to document an identified risk or opportunity:

When a condition exists that could lead to a risk or opportunity event

Given **(condition)** there is a possibility  
**(during this time period)** that **(consequence)** will occur.

***Risk Statement Example: Given that subcontractor XYZ has poor performance history with software development, there is a possibility that during HW/SW integration that they will deliver late with a significant number of defects.***

***Opportunity Statement Example: Given the rapid changes in technology, there is a possibility that by System Integration and Test a lower cost, higher reliability alternative will be available.***

## Identification –

### Building a Risk or Opportunity Description

- ***Context Information – details about the risk or opportunity that help to “tell the story”***
  - *Root cause*
  - *Who, what, when, where and why*

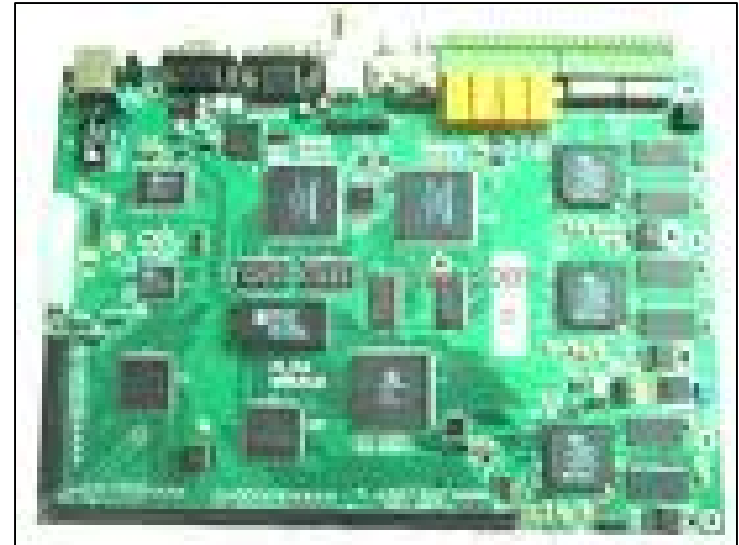


# Risk Example



**Risk Title:** Red Module Assembly Failure

**Risk Statement :** Given that Red module will undergo redesign in an area that affects testing, there is a possibility that it could fail qualification test in month 16



**Context Information:**

- ***Red module failed testing during development program, leading to significant schedule and cost impacts***
- ***Redesigned for producibility and part obsolescence for this program***
- ***There have been a number of board layout and parts lists changes***
- ***A key connector that was used to help pass testing needs to be changed***



# Opportunity Example



**Opportunity Title:** *Replace MPTE (Multi Purpose Test Equipment) with Personal Computer*

**Opportunity Statement :** *If SW engineering expands the test code in the lab test equipment before manufacturing begins they can be used instead of the MPTEs*

**Context Information:**

- *Four MPTE's are planned for factory test during production*
- *Early use of lab test equipment on the prototypes indicates that lab testers may be sufficient for initial test and troubleshooting in the factory*
- *Minimal additional software (est. 10k lines of code) needed*
- *Potential to save the cost of two MPTEs*



# Assessment

- Each Risk or Opportunity is analyzed and assessed:
  - What is the Probability that it will happen?
  - What is the Impact if it does happen?
- Qualitative Assessment – determines initial rating and priorities
- Quantitative Assessment – finalizes priorities, provides cost and schedule information



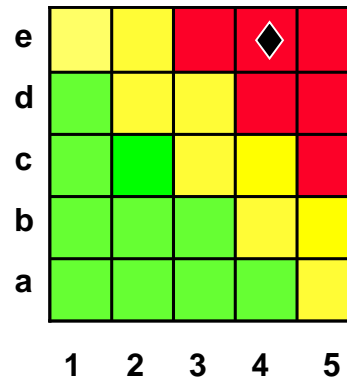
*The assessment steps helps to ensure that R/Os most likely to happen with the greatest impact will receive needed attention*

# Qualitative Assessment - Risk

Level	Probability
e	Near Certain
d	Highly Likely
c	Likely
b	Unlikely
a	Remote



Probability



Impact



Risk Rating	
<b>High</b>	Unacceptable, Major disruption likely. Different approach may be required. Priority management attention required.
<b>Moderate</b>	Some disruption. Different approach may be required. Additional management attention required.
<b>Low</b>	Minimum impact. Minimal oversight needed to ensure risk remains low.

Level	Cost Impact	Schedule Impact	Technical Impact
1	<3% of contract value	Can absorb schedule slip within margin or with no impact. Does not impact critical path >1 month	Essentially no impact to product performance; no system impact.
2	3% - 5% of contract value ✓	On critical path but workaround possible with minimal impact to milestone by 2 to 3 months	Minor impact at product level; no impact to system
3	5% - 7% of contract value	On critical path and/or delays milestone by 4 to 5 months ✓	Minor impact at system level; may prevent meeting requirements at product level.
4	7% - 10% of contract value	On critical path and/or delays milestone by 5 to 6 months	Significant degradation to system performance level. ✓
5	>10% of contract value	On critical path and/or delays milestone by greater than >6 months	Unacceptable; Cannot achieve system level requirements.



# ***Stop and Think . . .***

Back to our scenario:

It's 70 degrees and clear through tonight. For some reason your "check engine" light came on this morning. You also heard that construction started on the interstate over the weekend , and that is the fastest route to the airport.

***How do these conditions influence the probability and impact assessments of our risks?***

Car trouble

Local Traffic

Local Weather

Long security lines

Aircraft problems

Flight delays of inbound aircraft

Destination weather

# Handling - Risk

- Based on the risk assessment and the program's ROM (Risk / Opportunity Management) board decision, a handling strategy is selected

Risk Handling Strategy	Description	Application
Avoid	Seeks to eliminate the event leading to the risk while staying within the current PMB (Program Management Baseline)	Early life cycle decision - change requirements, design, acquisition method. Or threats that come up during the POP (Period Of Performance) that do not require task funding.
Transfer	Seeks to allocate the risk to another party, one that is better able to deal with it	Buy insurance, transfer responsibility to the customer. Used when threat is out of contract scope.
Control	Seeks to reduce (or eliminate) the impact, probability, or both, of the risk to some acceptable level. The program must go outside the PMB and fund activities that are approved by the Program's ROM board	Usually contains multiple activities that are created with a BCR (Baseline Change Request) and tracked in the programs IMS (Integrated Master Schedule) and also tracked in parallel in the programs ROM database as funded mitigation steps with start/finish dates that match the IMS.
Accept	Acknowledges that some risks are not feasible to mitigate, cannot be avoided, cannot be transferred, and/or are not high enough priority/impact to expend resources	Very low consequence and/or scarce funding for mitigation. Should be placed on a watch list and examined periodically for changes in conditions. Might consider developing contingency actions and triggers.





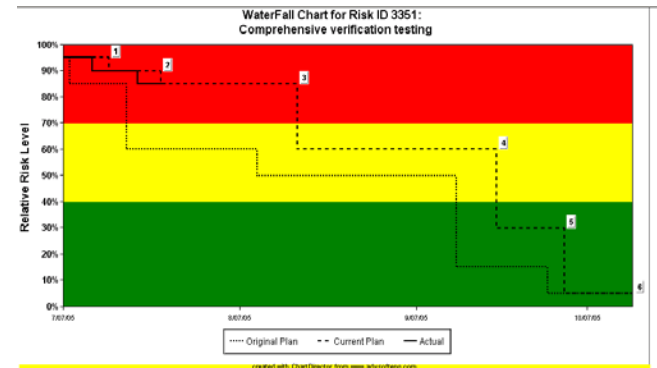
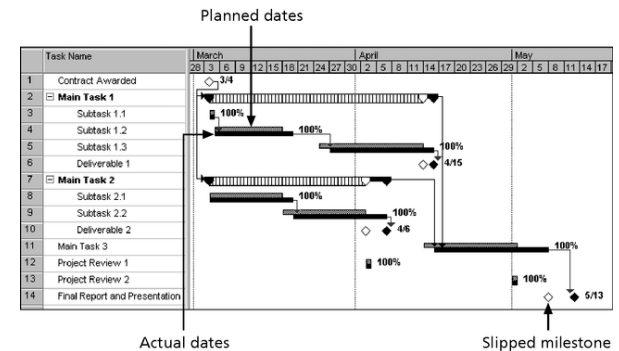
# Handling - Opportunity

- Based on the opportunity assessment and the program's ROM board decision, a handling strategy is selected

Oppty. Handling Strategy	Description	Application
Enhance	Seeks to enhance the event leading to the opportunity while staying within the current PMB (Program Management Baseline)	Early life cycle decision - change requirements, design, acquisition method. Or a possible enhancement that comes up during the POP (Period Of Performance) that does not require additional task funding.
Share	Seeks to develop teaming/partnerships that will increase the opportunity's probability	Collaborate with suppliers, teammates or customers on the opportunity to increase probability and/or benefit.
Exploit	Seeks to increase (or facilitate) the impact, probability, or both, of the opportunity to an even more beneficial level. The program must go outside the PMB and fund activities that are approved by the Program's ROM board	Usually contains multiple activities that are created with a BCR (Baseline Change Request) and tracked in the programs IMS (Integrated Master Schedule) and also tracked in parallel in the programs ROM database as funded exploitation steps with start/finish dates that match the IMS. The cost/schedule needed to execute the tasks is analyzed for benefit.
Ignore	Not enough return on investment. Place on a Watch list to monitor	The benefit is not greater than the cost at this time given program funding and resources.

# Handling Plans

- Address root causes from the context information
- Action plan
  - Records steps in small increments
    - One task at a time
    - Measurable
    - Completion date
- Estimate time, resources and cost to complete plan
- Estimate the decrease in risk probability and impact--not probability of accomplishing step





# Handling Plan Guidelines

1. Create *sequential* and *forward looking* actions
2. Identify action *owner*, target dates, status for each step
3. Define contingency actions with *implementation criteria* and decision dates
4. Document criteria that justify changes in exposure
5. Add funded steps to the *IMS* (**Control** / **Exploit** only)
6. Owners must provide *status* at least monthly
7. Re-assess *probability* and *impact* when an action step is completed



# Risk Handling - Contingencies

- **Contingency Plans**

- Outlines what to do if the risk is coming true or a mitigation plan is not working
- Specify schedule decision points
  - Especially for steps that require time to implement

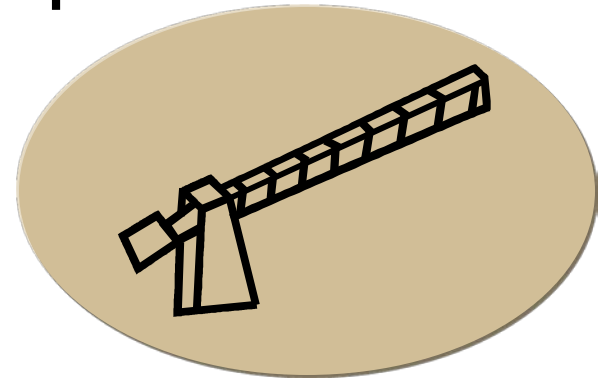
- **Example - A new battery offers added performance but may not pass qualification testing**

- A Mitigation plan could include:

- Additional reviews
- Early testing

- A Contingency plan includes

- Keeping the original production line in place to have the old battery available
  - Trigger – lead time for procuring the battery





# Risk Example

**Risk Title:** Red Module Failure

**Risk Statement :** Given that Red module will undergo redesign in an area that affects testing, there is a possibility that during qualification testing in month 16 it could fail the test.

**Context Information:**

- Red Module failed testing during development program, significant schedule and cost impact
- Redesigned for producibility and part obsolescence
- Board layout and parts lists changes
- Key connector that was used for EMI needs to be changed

**Risk Owner :** John Smith

**Strategy ‘Control’ - Mitigation Plan Approved by ROM Board**

- |  |      |         |
|--|------|---------|
| • Obtain testing consultant to conduct design peer reviews - | \$2k | } \$20k |
| • Conduct Detailed Design Review with SMEs -                 | \$5k |         |
| • Build additional Red Module prototype -                    | \$1k |         |
| • Conduct mini-quality test with prototype -                 | \$6k |         |
| • Update design based on results -                           | \$6k |         |

**Contingency Plan:** If lead times for parts prevents proto build in time for mini-quality testing, continue with late test and incorporate changes as permitted. If serious failures are discovered, consider rescheduling qualification test until design fixes are implemented.



# Opportunity Example

**Opportunity Title:** *Replace MPTE with Personal Computer*

**Opportunity Statement :** *If SW engineering expands the test code in the lab test equipment before manufacturing begins they can be used instead of the MPTEs*

**Context Information:**

- *Four Multi Purpose Test Equipment are planned for factory test during production*
- *Early use of lab test equipment on the prototypes indicates that lab testers may be sufficient for initial test and troubleshooting in the factory*
- *Minimal additional software (est. 10k lines of code) needed*
- *Potential to save the cost of two MPTEs*

**Risk Owner :** Les Stone

**Strategy ‘Exploit’ - Capture Plan Approved by ROM Board**

- |   |       |         |
|---|-------|---------|
| • <i>Develop and test factory test SW -</i>             | \$13k | } \$29k |
| • <i>Procure three PCs for factory use -</i>            | \$6k  |         |
| • <i>Load PCs, verify test capabilities in lab -</i>    | \$4k  |         |
| • <i>Update test plans and procedures -</i>             | \$2k  |         |
| • <i>Support factory test as needed for one month -</i> | \$4k  |         |

**Cost / Benefit Analysis:** *Current cost of MPTEs is \$250k per unit. Total handling costs for opportunity is \$29k, potential savings of \$471k ((2 MPTEs @ \$250k = \$500k) - \$29k = \$471k). Additional benefit of flexibility to use PCs for field testing.*



# ***Stop and Think . . .***

Continuing with our scenario:

It is determined that **Car Trouble** and **Local Traffic** are the highest risks.

***What are some potential handling activities?***

## **Car Trouble**

*Check your vehicle periodically*

*Find alternate transportation – taxi, shuttle, colleague*

## **Local Traffic**

*Listen to traffic report for delays*

*Leave early*

*Take alternate route*



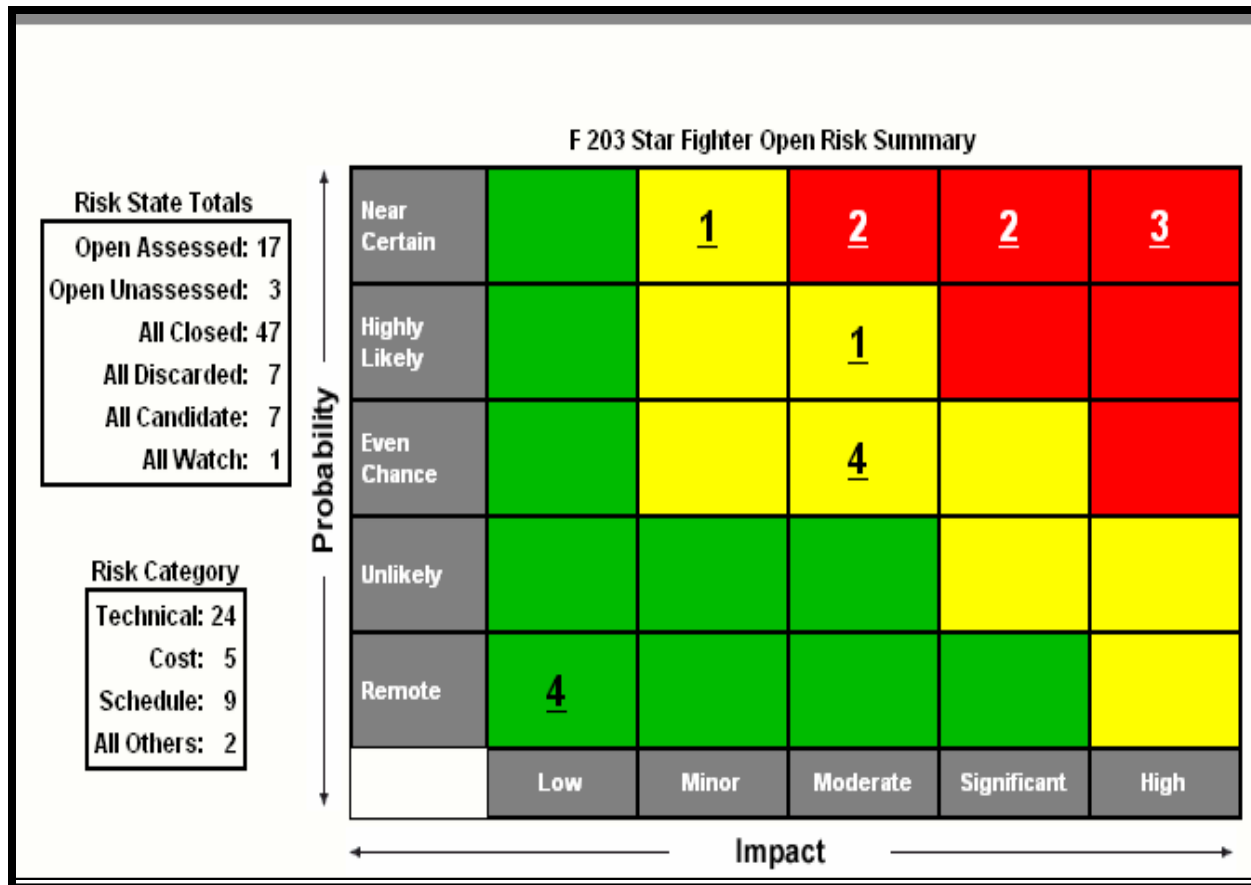
# Monitor and Report

- **Purpose**
  - **Communicate . . . To management, customer, program team**
  - **Status . . . Plans and actions to ensure risks and opportunities are being addressed**



# Monitor – All Risks

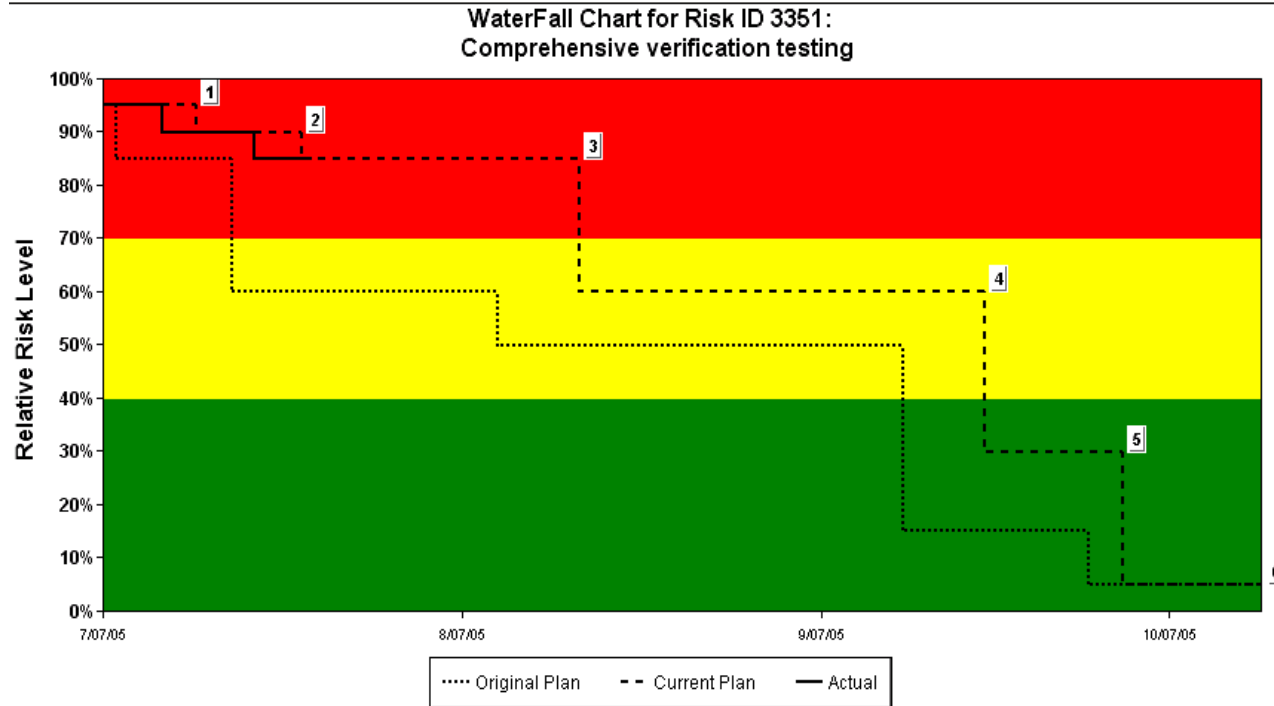
A 5 X 5 matrix displays number of risks in the H, M, or L range





# Monitor – Individual Risks

A Risk Waterfall Chart displays the incremental “burn down” as the handling actions are planned and completed



## Ask –

- *Will these actions reduce probability and impact?*
- *Are they completing on time?*
- *Are they working?*
- *What do we need to do differently?*

#	Action Step	Date	Probability	Impact	Level
1	Complete Design	7/15	Near Certain	Significant	90%
2	EMI expert design review	7/24	Near Certain	Moderate	85%
3	Assemble Prototype	8/17	Highly Likely	Moderate	60%
4	Conduct limited pre-qualification test	9/21	Unlikely	Moderate	30%
5	Troubleshoot failures	10/03	Remote	Low	5%
6	Update Design	10/15	Remote	Low	5%



# Risk & Opportunity Mgt. Basics

- **What are the possible threats (or enhancements) to our success?**
- **What are the chances they will be realized, and what will they do to us if realized?**
- **Which are priorities and require action?**
- **What are the actions? Do we need funded tasks?**
- **Are the actions working, and what do we do if they're not?**

*Constantly Ask – Is our R&O process meeting the program's needs?*

# Risk / Opportunity Management Process

