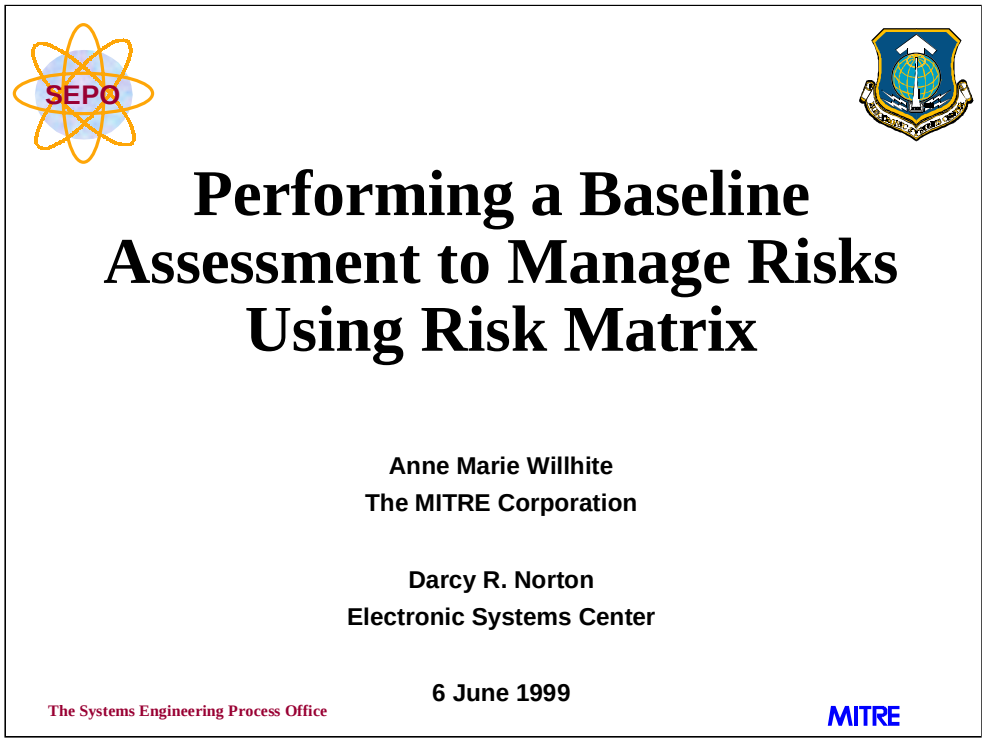
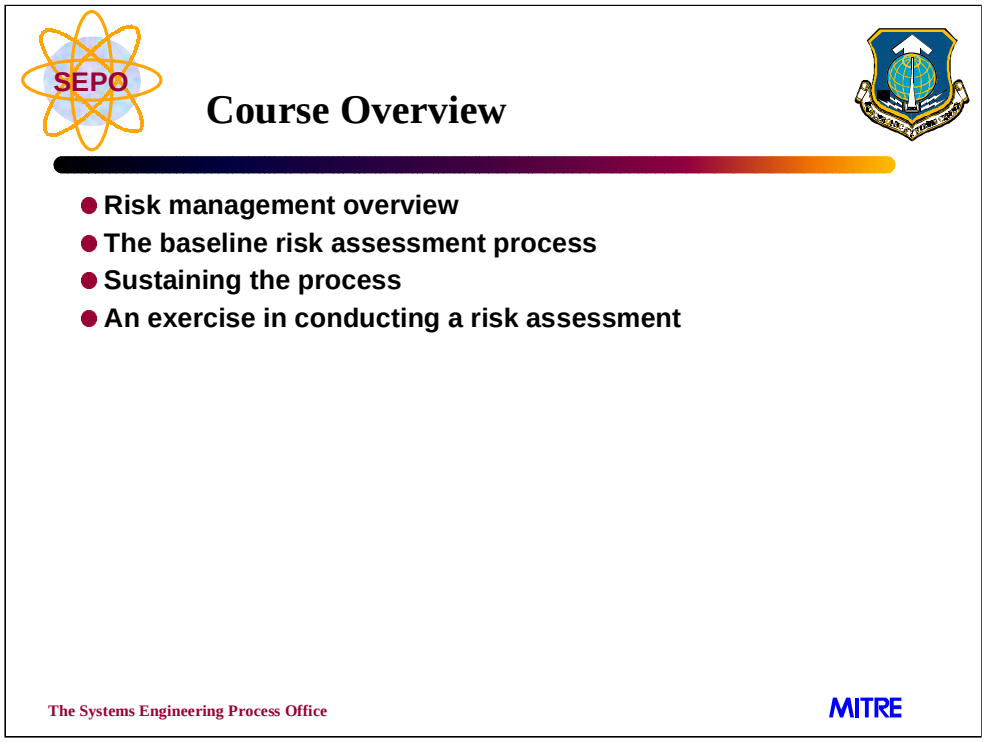


This baseline risk assessment process was created for the Air Force Electronic Systems Center's (ESC) Acquisition Development Office (ADO) to help programs perform early risk assessments (establish a risk baseline for the program) and to help facilitate risk management planning.

The baseline risk assessment process is a structured way to identify, prioritize, evaluate, and manage the impact of key risks on acquisition and development programs. The basic principles can be used by anyone who needs to manage risks.

The information in this tutorial is based on risk management research done at the MITRE Corporation, a collaboration between MITRE and the Software Engineering Institute (SEI), the original work ESC did in 1996 on the risk matrix process and the experiences of ADO in applying the process.



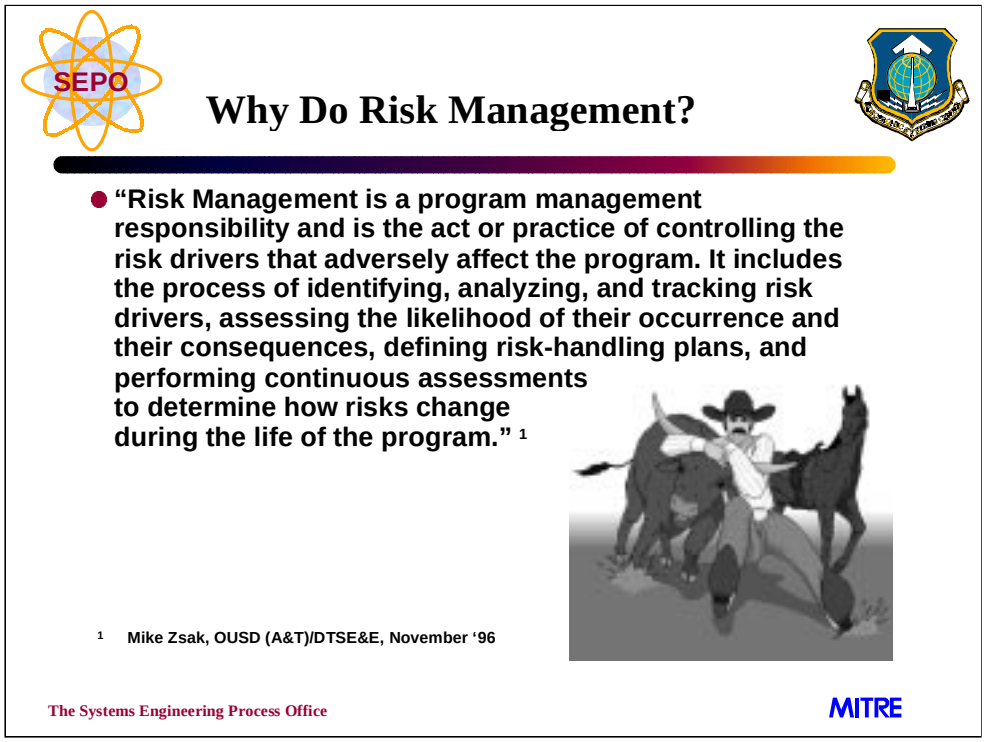
After this tutorial you will know:

- The importance of risk management
- A risk definition
- The basic components of a risk management process
- How to facilitate a baseline risk assessment
- How to identify risks
- How to classify and identify dependent risks
- How to write clear and quantifiable risk statements
- How to identify the risk time frame, impact and probability of occurrence
- How to rate and rank risks
- How to develop action plans and track risks

This process has been utilized primarily in the context of DOD programs. The concepts, however, are applicable to any activity where risks need to be managed.

Risk Management Overview

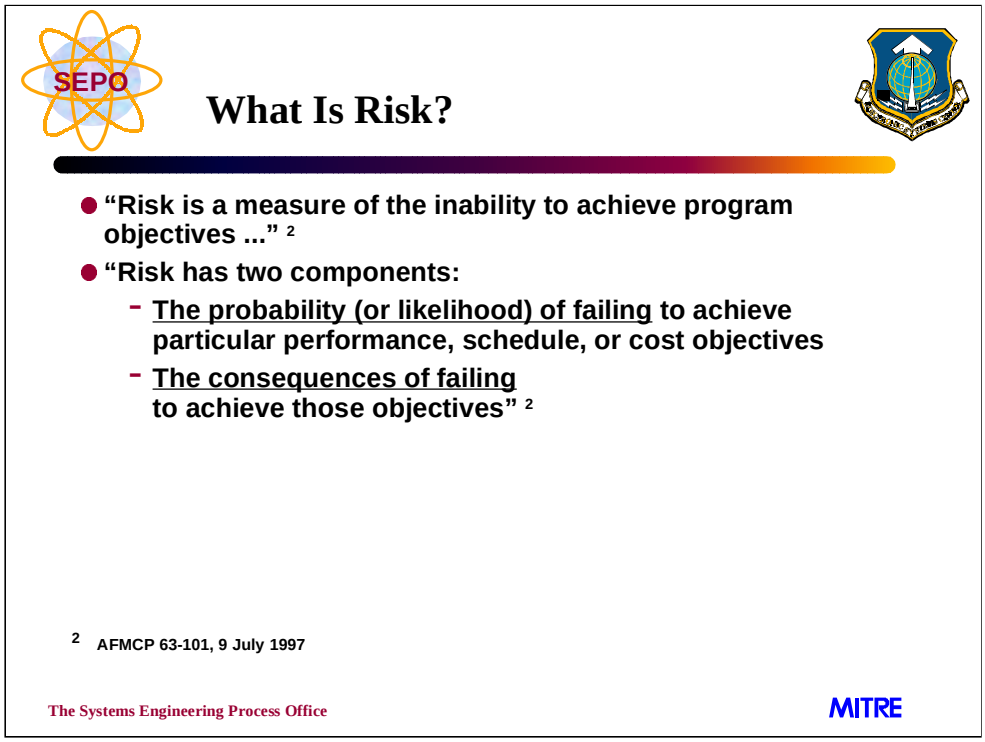
- Why do risk management?
- What is risk?
- The risk management process



Risk management is a fundamental activity of program management. As described by OUSD, Director, Test, Systems Engineering and Evaluation's Mike Zsak, risk management should include the following key activities:

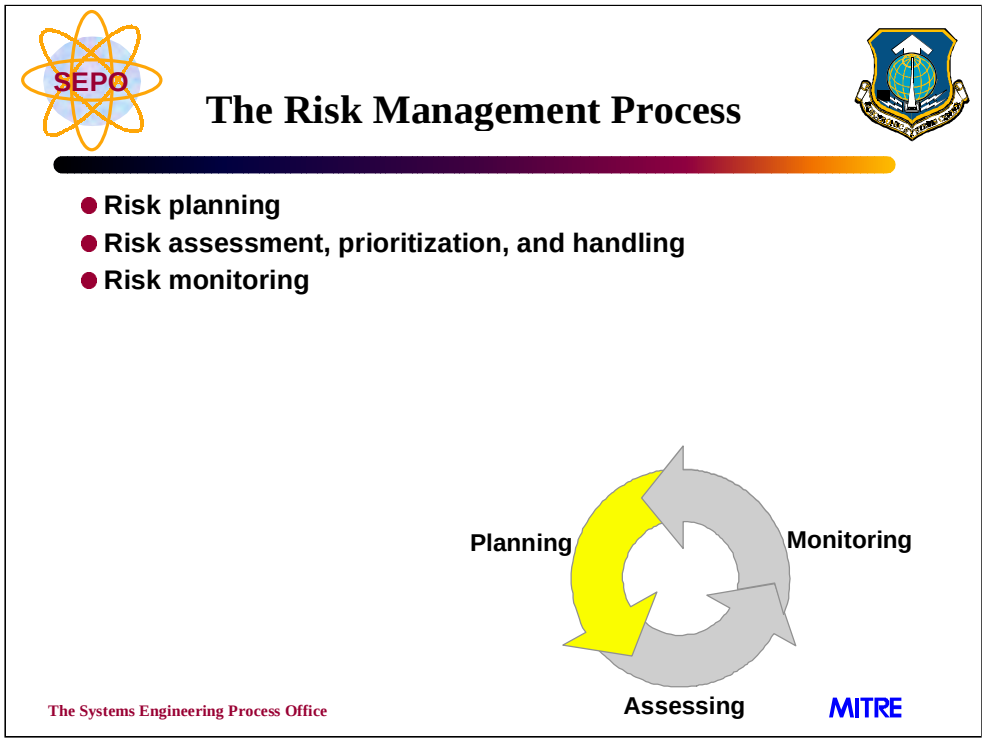
- Identifying and analyzing risks
- Assessing the likelihood of occurrence and consequences of risk
- Defining risk handling plans
- Tracking risk
- Reassessing risk

The challenges in today's changing environment require sustainable risk management processes. Given the climate of reduced funding, prioritized risks can be used to determine where best to allocate program resources. Today's rapid acquisition approaches imply that requirements will be changing over the life of the program. As requirements change, risks change as well. Therefore, programs need to pay greater attention to risk management to be successful.

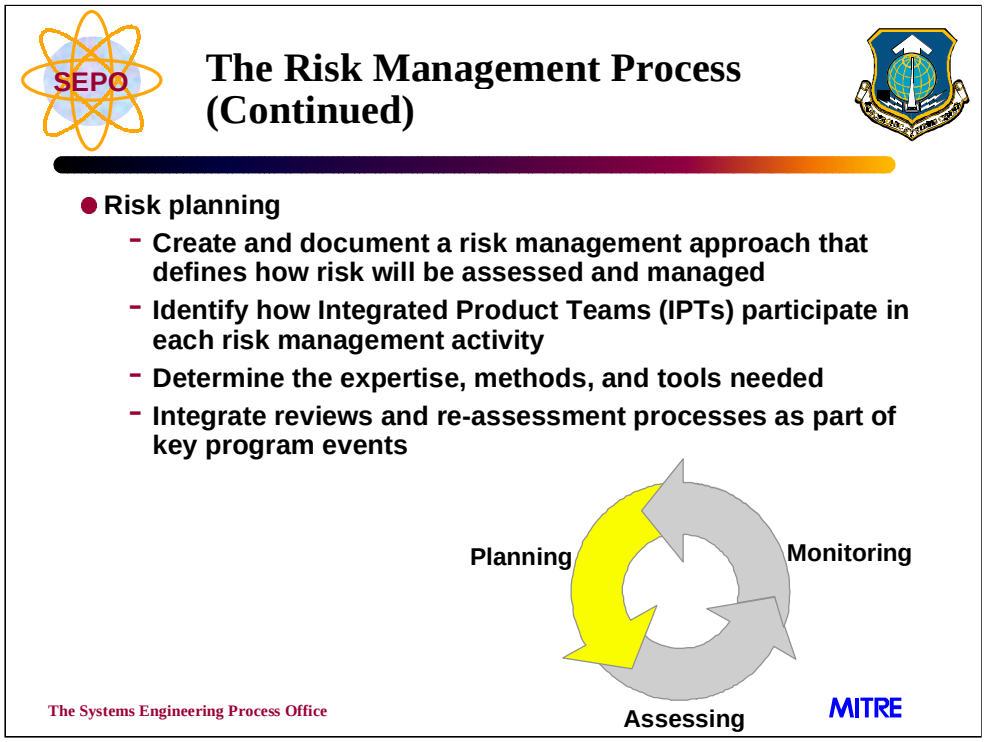


Risks are events or occurrences that prevent us from achieving the program cost, schedule, and performance objectives. Risk contains two important parts: the probability that the risk will occur and the consequences to the program as a result of that occurrence.

It is important to distinguish risk management, which is forward looking, from problem management, which is reactive. Risk management helps us avoid the "fire fighting" mentality by dealing with risks before they become problems.

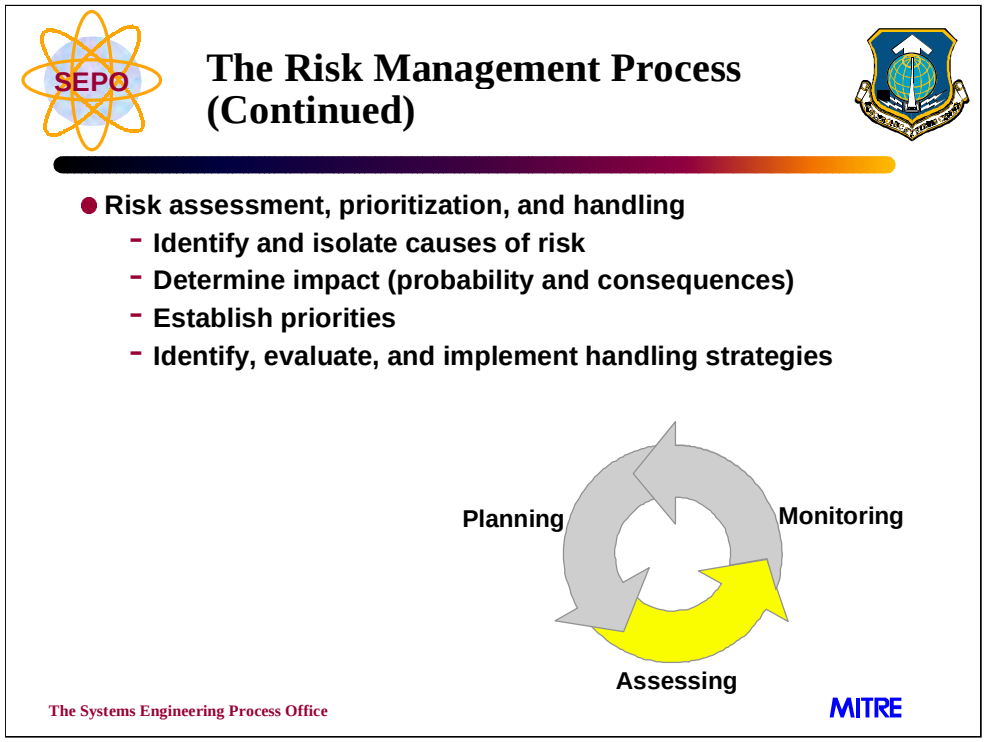


The basic risk management process includes three key phases. These phases address the activities of planning, identifying, assessing impact, prioritizing, developing action plans and managing and monitoring risks.

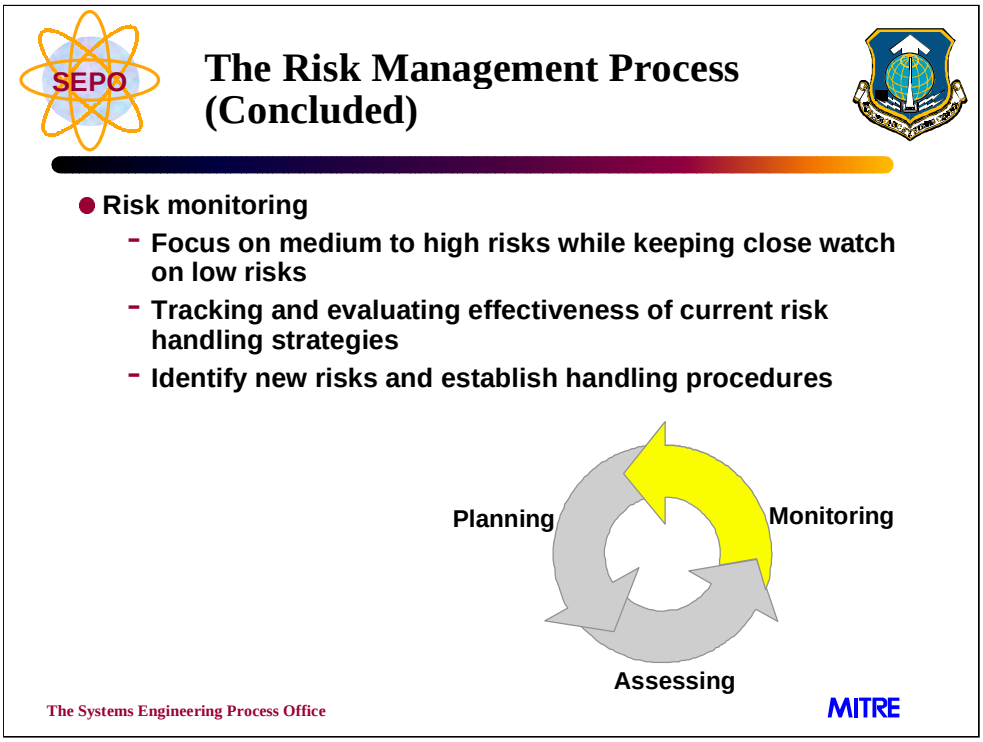


The process begins with a risk management approach that defines how risks will be assessed and managed. The approach identifies how the Integrated Product Teams (IPTs) participate in each risk management activity, the methods and tools to be used, and a process for reviews and re-assessments tied to key program events.

IPTs can consist of a number of different participants in the project. For example, government program office and engineering and management support contractors, prime and subcontractors, representatives from the operational user and test organizations. The approach to risk management and the roles and responsibilities of the various participants should be identified and documented.

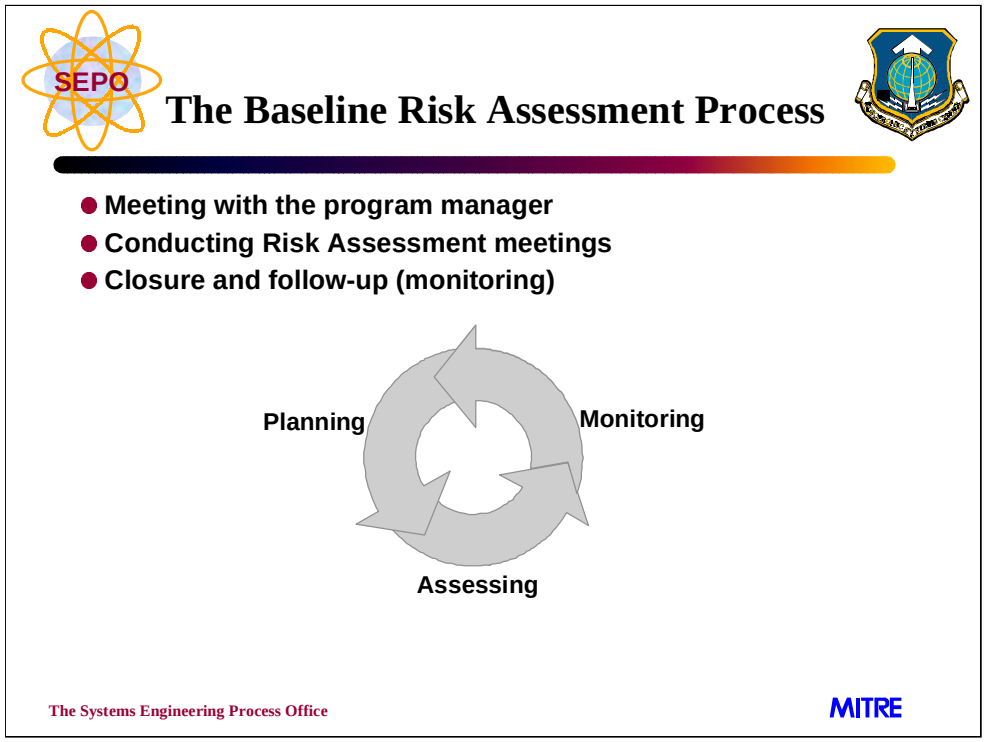


The assessment phase addresses identification, prioritization and handling activities. It enables programs to identify the risks with the highest probability of occurrence and impact so that resources can be effectively applied.



Risk monitoring focuses our efforts on three key areas:

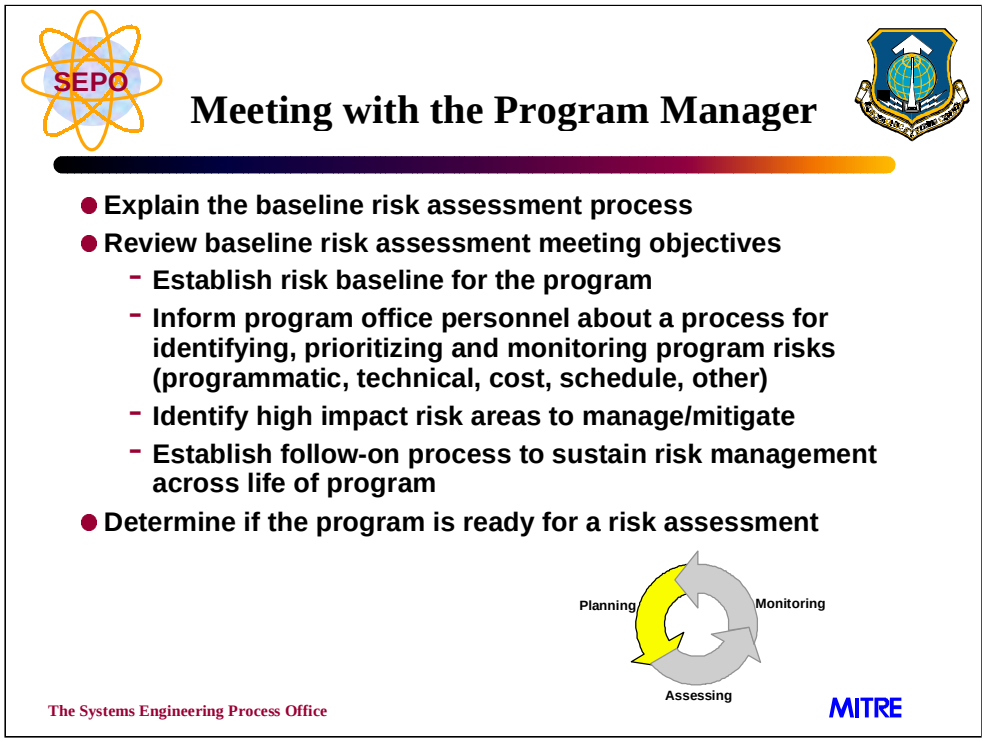
- Monitoring medium to high risks, while keeping close watch on low risks.
- Evaluating the effectiveness of risk handling and establishing alternative approaches if needed
- Identifying new risks through periodic reassessment activities
  - Through assessment activities associated with specific program phases (from pre-award to post award, from one 18-month cycle to the next, from a study phase to an engineering manufacturing development phase)
  - Through assessment activities associated with key program events (demonstrable program milestones at selected intervals throughout the program, approximately every six months)
  - As they are identified in the day-to-day activities of the program and in Integrated Product Teams (IPTs) participation
- Establishing action plans or risk handling procedures



The baseline risk assessment process consists of the following components:

- The planning meeting with the program manager
- The actual conduct of the assessment (risk identification and analysis, likelihood of occurrence and consequences, and definition of handling plans)
- The closure and follow up activities (tracking and reassessment).

This process follows three phases (planning, assessing, and monitoring) identified earlier.



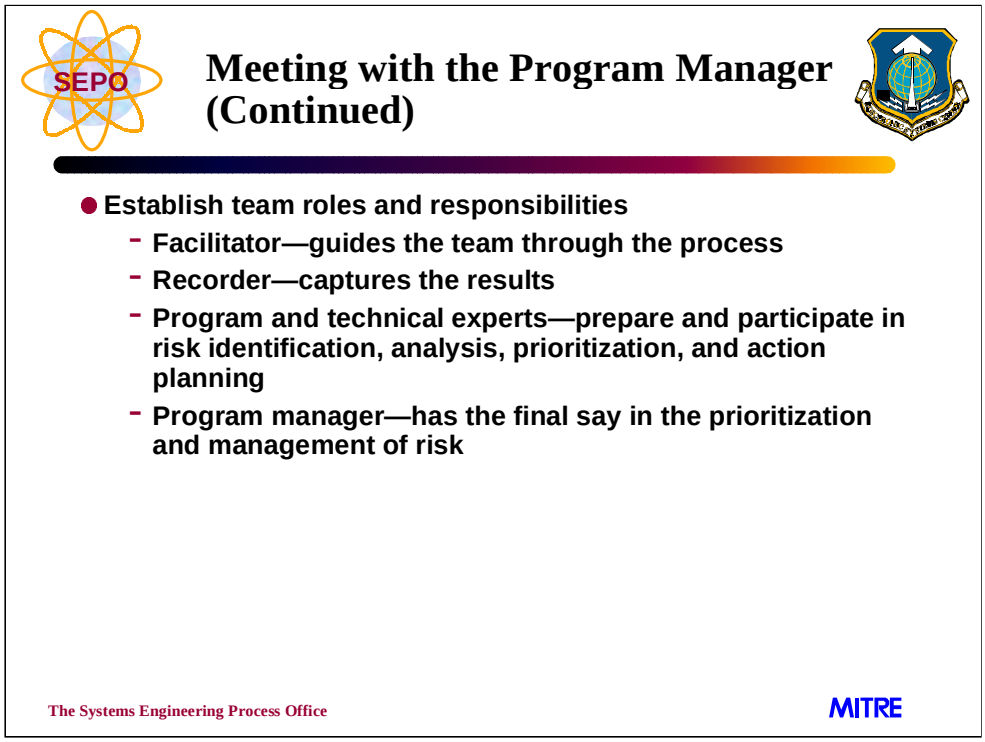
The purpose of the planning meeting with the program manager is to explain the process being used for the baseline risk assessment and set the agenda for the meeting.

This meeting sets the objectives for the baseline risk assessment and allows for discussion of alternative approaches for risk management. The objectives of the baseline risk assessment meeting are to:

- Establish the risk baseline for the program
- Identify high impact risk areas and handling strategies
- Provide the program office team with a process for follow-on risk assessments

The emphasis is on the identification of risks related to a specific period of time (for example, contract award and the first eighteen months of the contract).

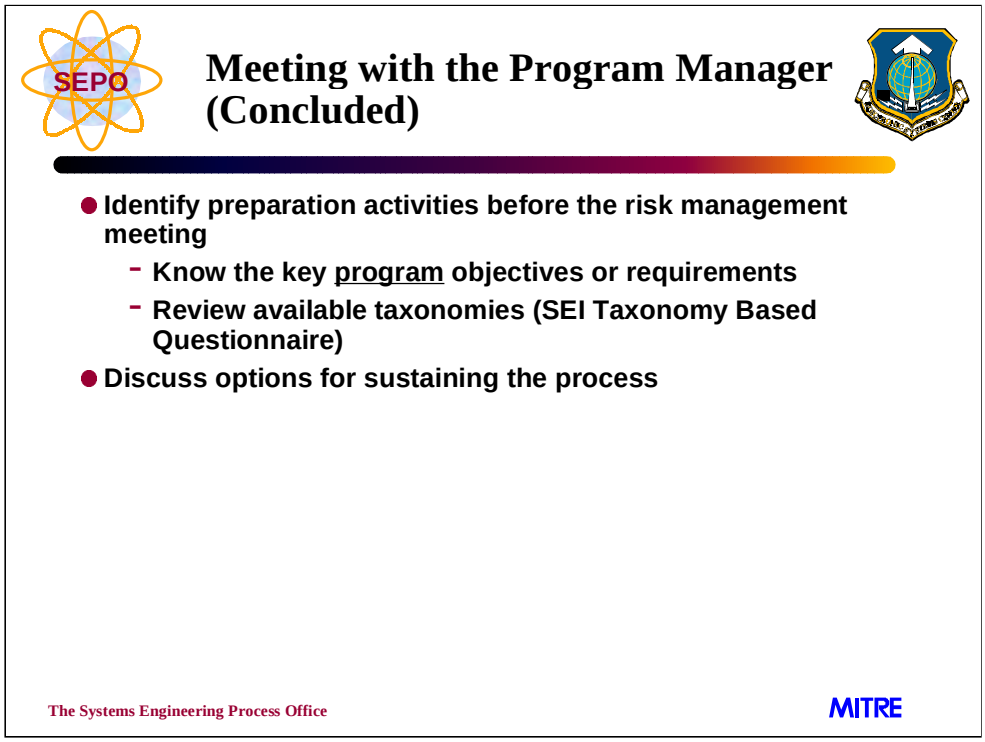
This meeting is also used to determine if the program or activity is ready for a risk assessment. For example, understanding the requirements or objectives of the activity is a key entry criteria to the risk assessment process. If the program cannot clearly articulate what they are trying to accomplish within the specified interval of time, they are not ready for a risk assessment and need to spend more time clarifying their objectives or requirements.



Program managers need to ensure that the right people attend the baseline risk assessment meeting. Roles and responsibilities of the program team should include:

- A facilitator to help the team through the process
- A recorder to capture the information
- Program and technical experts, including contractors where appropriate, who can provide a broad range of perspectives on program risks.
- The program manager, who is responsible for the program and has the final say in the prioritization and management of risk.

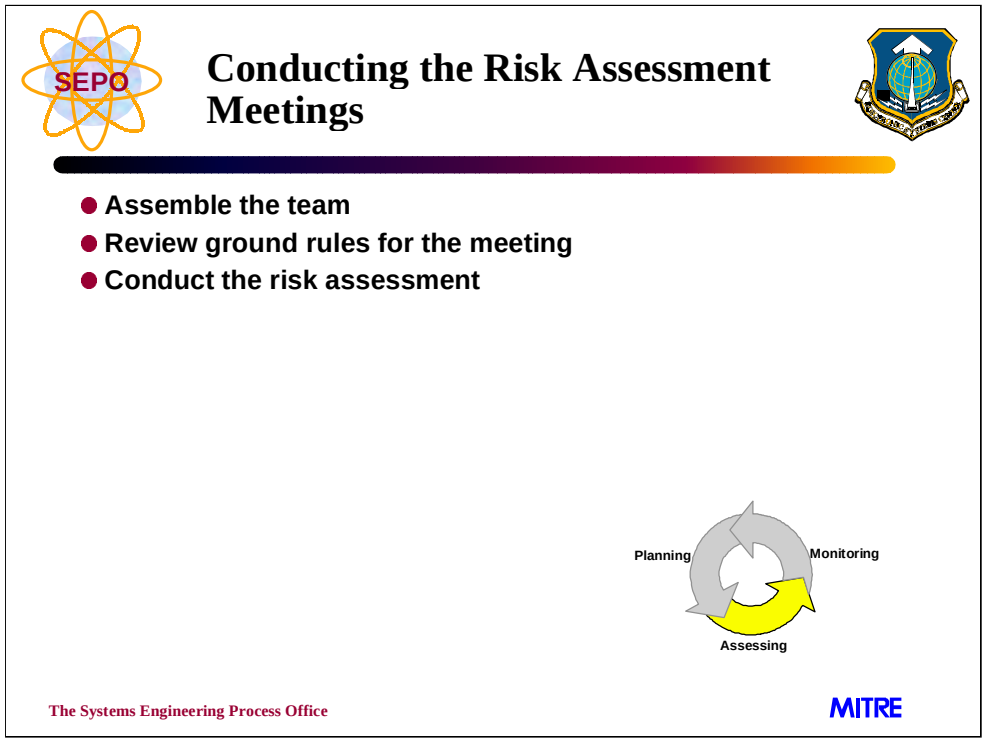
A good representation of the appropriate disciplines is necessary to identify the risks. No one group has knowledge of all of the program risks. The number of attendees, however should be not more than 10-12 to keep the meeting manageable.



Before attending the meeting, the program team should know the key program objectives or requirements (the overall goal of the program or activity including critical performance parameters specified by the users) as well as cost, schedule and other program requirements or constraints. The team should also know about the operational, political, and technology environments and the program funding status.

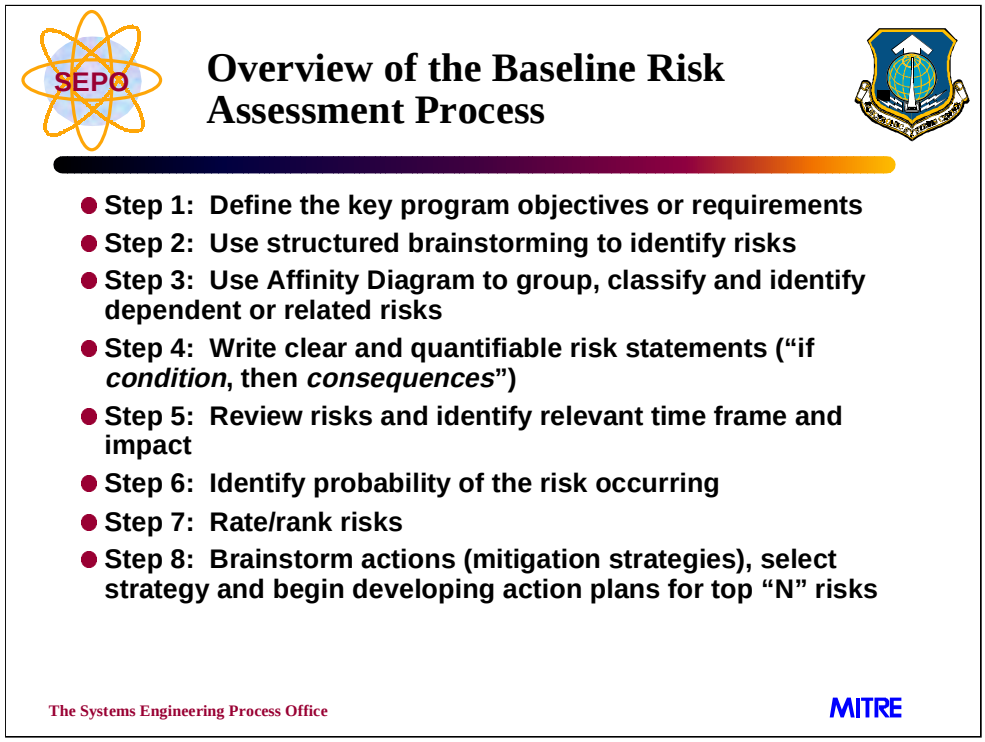
Review of available risk taxonomies can be useful individual preparation for an assessment. The SEI Taxonomy Based Questionnaire is particularly useful for software intensive systems. It addresses risks associated with requirements, development environments, and programmatic concerns.

Before concluding the meeting, it's a good idea to discuss reasonable options for sustaining the process that fit the needs of the program. Is the program manager comfortable with this approach? Should areas be tailored to facilitate sustainment? How does the program manager envision continuing the process following the baseline assessment?



The initial process takes place in a single session. The amount of time allocated to conducting the risk meeting depends on the program, the number of participants involved, and how well the program requirements are understood. Some programs have taken as much as four days to do the initial baseline while others have completed the work in four hours. Limiting the number of participants to 10-12 helps expedite the process. The more people involved, the longer it takes to complete the structured brainstorming, to create affinity diagramming, and to achieve consensus on the risks.

The team members are assembled, they've done their homework, and it's time to get started. Reviewing ground rules for the meeting includes roles and responsibilities, the meeting agenda, and a process for brainstorming that gives everyone an equal voice, with the program manger making the final decisions.



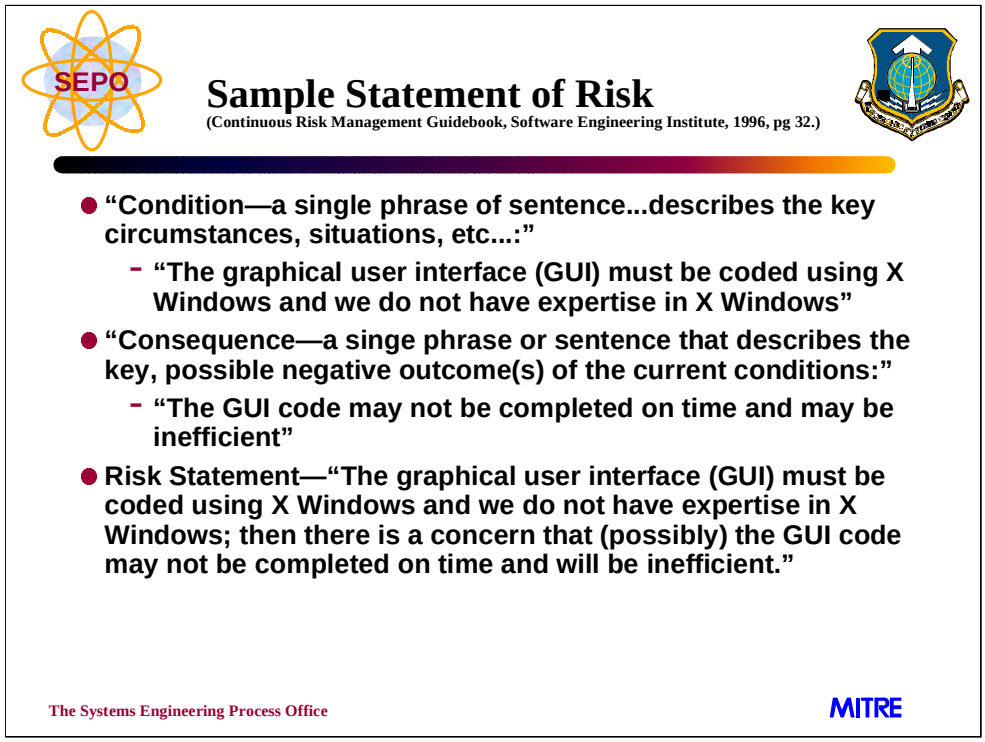
Using a consensus forum, the team identifies key program objectives or requirements and constraints. The recorder captures them on a flip chart or on a PC connected to a projection system. They are placed in a visible location so that participants can use them to identify risks.

Next, the structured brainstorming begins. One method is for each team member to use yellow sticky pads to record risks. Each participant then reads their identified risk (or pass, if none is identified), and posts it on a board or wall. Questions may be asked for clarification, but participants should withhold judgment or criticism at this time. For this activity, focus on risks related to a specific interval of time.

Once the risks have been identified, they are grouped using affinity techniques. When forming the groups, consider dependencies. This can facilitate risk handling later.

Risks should be clearly stated and actionable. A helpful approach is to think in terms of an if *condition,* then *consequences.* Review the risks in each category and write the risk statement, which is captured by the recorder.

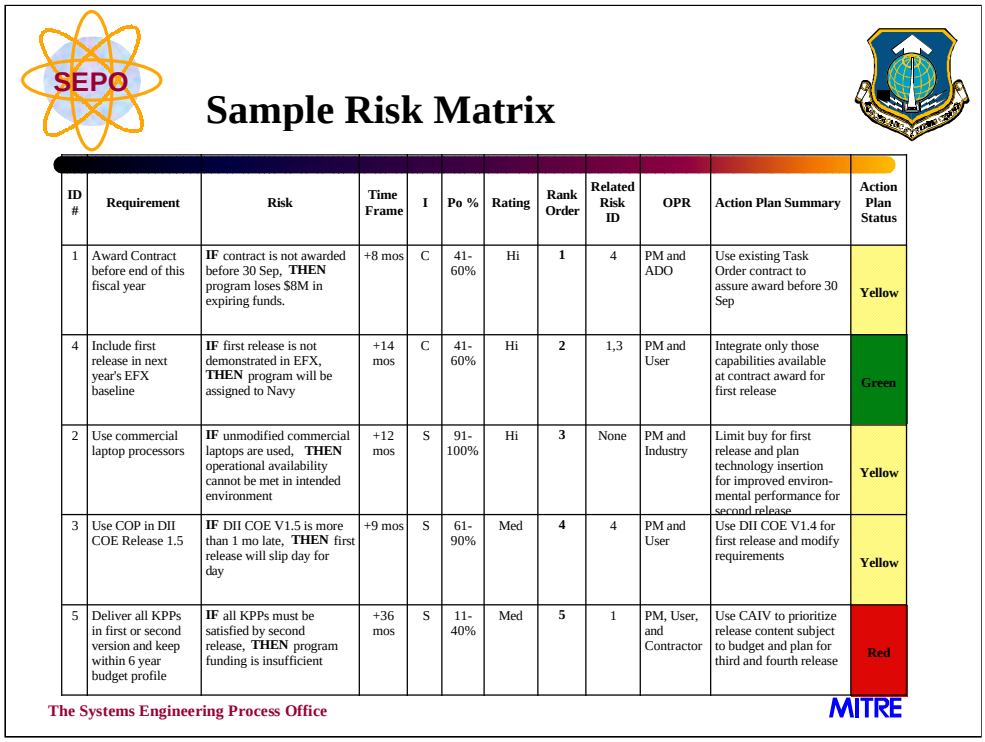
Review the risks and identify relevant timeframe, impact, and probability of occurrence. Then, prioritize or rank risks. Use the Risk Matrix tool. Do a common sense check. Identify high priority risks to manage and establish agreement between the program manager and team.



Here is an example of a risk statement. The process of creating risk statements is very helpful in turning a list of program worries into a list of risks for which action plans can be generated. In addition the process of creating risk statements is helpful not only in clarifying what the issues are, but providing the team a common understanding of the issues.

Another Example

- **Condition— "The system must use Common Operational Picture (COP) in DII COE Release 1.5 and we are not sure if it will be available when needed"**
- **Consequence— "Release 1 may not be ready on time and the program will experience a day for schedule slip"**
- **Risk Statement— "IF *DII COE version 1.5 is more than 1 month late*,THEN *program xyz release 1 will experience a day for day schedule slip"***



ID #	Requirement	Risk	Time Frame	I	Po %	Rating	Rank Order	Related Risk ID	OPR	Action Plan Summary	Action Plan Status
1	Award Contract before end of this fiscal year	**IF** contract is not awarded before 30 Sep, **THEN** program loses $8M in expiring funds.	+8 mos	C	41-60%	Hi	**1**	4	PM and ADO	Use existing Task Order contract to assure award before 30 Sep	**Yellow**
4	Include first release in next year's EFX baseline	**IF** first release is not demonstrated in EFX, **THEN** program will be assigned to Navy	+14 mos	C	41-60%	Hi	**2**	1,3	PM and User	Integrate only those capabilities available at contract award for first release	**Green**
2	Use commercial laptop processors	**IF** unmodified commercial laptops are used, **THEN** operational availability cannot be met in intended environment	+12 mos	S	91-100%	Hi	**3**	None	PM and Industry	Limit buy for first release and plan technology insertion for improved environ-mental performance for second release	**Yellow**
3	Use COP in DII COE Release 1.5	**IF** DII COE V1.5 is more than 1 mo late, **THEN** first release will slip day for day	+9 mos	S	61-90%	Med	**4**	4	PM and User	Use DII COE V1.4 for first release and modify requirements	**Yellow**
5	Deliver all KPPs in first or second version and keep within 6 year budget profile	**IF** all KPPs must be satisfied by second release, **THEN** program funding is insufficient	+36 mos	S	11-40%	Med	**5**	1	PM, User, and Contractor	Use CAIV to prioritize release content subject to budget and plan for third and fourth release	**Red**

This chart illustrates a example of a risk matrix:

Column 1 identifies the risk number.

Column 2 contains the requirement statement

Column 3 captures the corresponding risk statement

Column 4 establishes the timeframe for when the risk is likely to occur.

Column 5 contains the impact rating.

Column 6 identifies the probability of occurrence associated with the risk.

Column 7 provides a high, medium and low ranking based on probability and impact ratings.

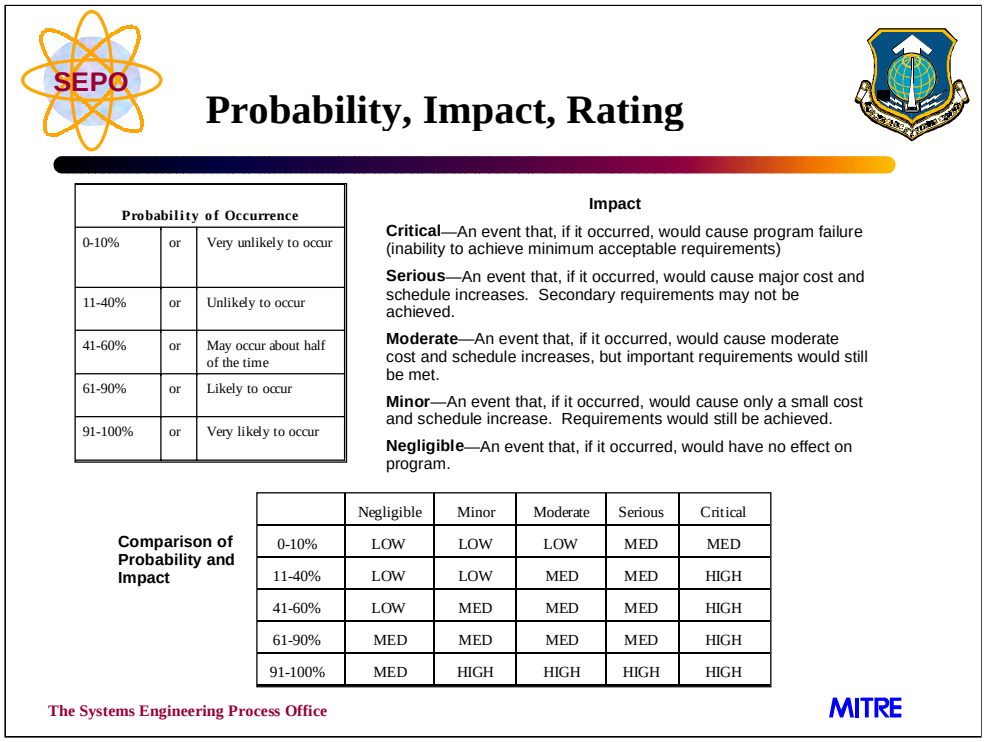
Column 8 provides a Borda ranking generated by the risk matrix application. The Borda method ranks risks from most-to-least critical on the basis of multiple evaluation criteria.

Column 9 identifies the risk number of risks which are dependent to this risk

Column 10 identifies the organization responsible for managing the risk.

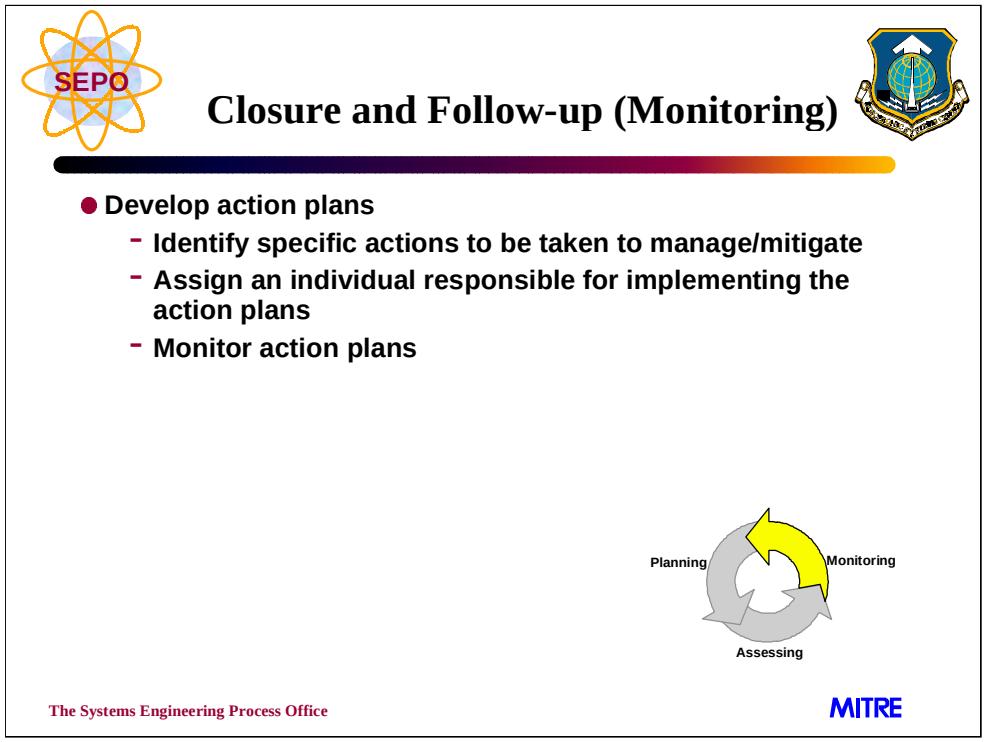
Column 11 provides a summary of the action plan or mitigation strategy.

Column 12 provides the overall status of the action plan.

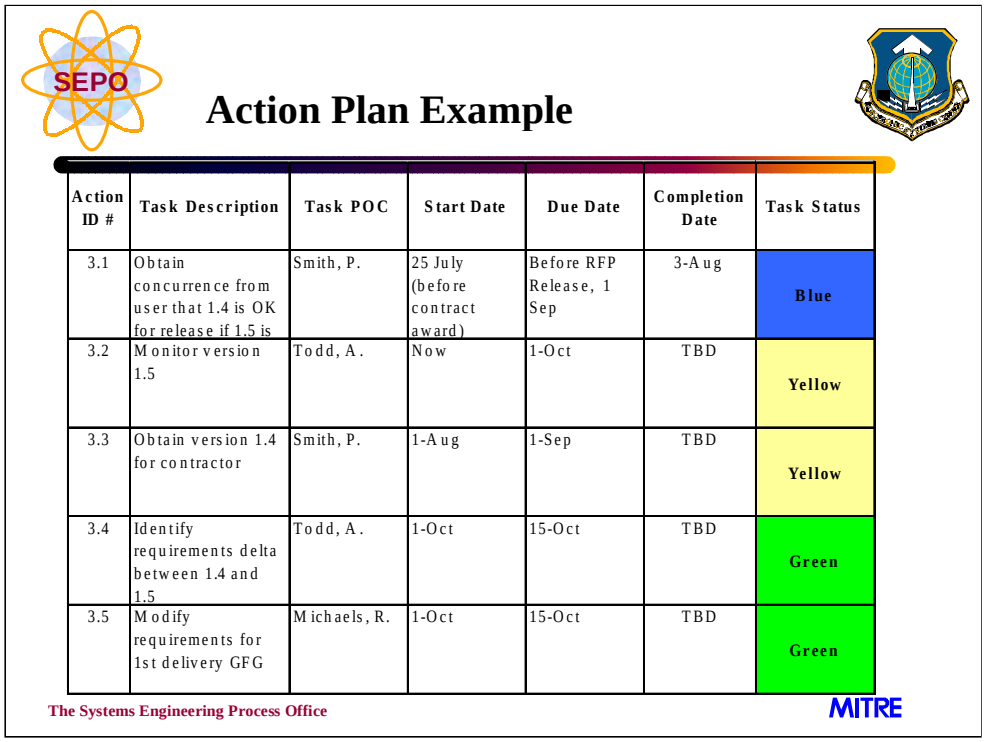


This chart illustrates the probability, impact and ratings information utilized in the risk matrix process.

Note: If you are using the risk matrix excel application, it is not necessary to use the comparison of probability and impact table as the the Borda algorithm implemented within the tool will provide a 1 to N risk ranking. For more details about this feature, see *Risk Matrix User's Guide* (Engert 1999).



Following the risk assessment meeting, the program office team develops action plans for each of the top risks they are to manage. The team identifies specific actions, which may be a series of tasks, and individuals or IPTs responsible for working them. Each action plan should also have an individual or IPT responsible for monitoring the progress of the tasks and reporting the status to management.

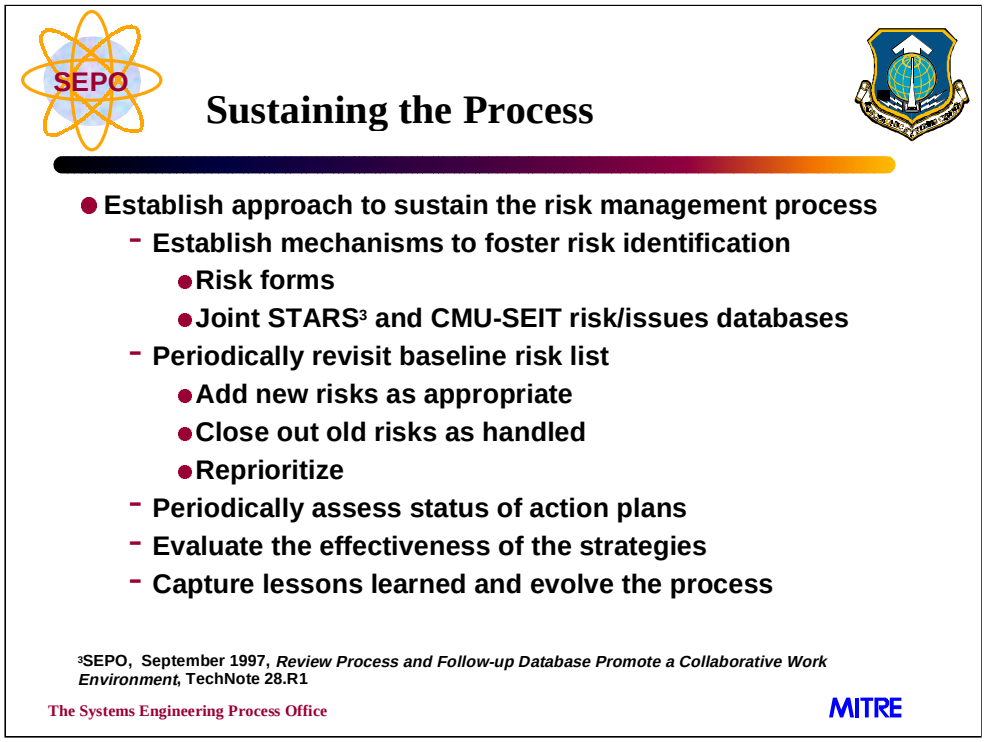


Action ID #	Task Description	Task POC	Start Date	Due Date	Completion Date	Task Status
3.1	Obtain concurrence from user that 1.4 is OK for release if 1.5 is	Smith, P.	25 July (before contract award)	Before RFP Release, 1 Sep	3-Aug	Blue
3.2	Monitor version 1.5	Todd, A.	Now	1-Oct	TBD	Yellow
3.3	Obtain version 1.4 for contractor	Smith, P.	1-Aug	1-Sep	TBD	Yellow
3.4	Identify requirements delta between 1.4 and 1.5	Todd, A.	1-Oct	15-Oct	TBD	Green
3.5	Modify requirements for 1st delivery GFG	Michaels, R.	1-Oct	15-Oct	TBD	Green

This sample action plan contains several tasks, identifies a responsible point of contact (POC), a schedule for completion, and a color code identifying the status of the task. Note that the action ID tracks to risk ID number 3 on the sample risk matrix. This is the action plan for the risk associated with using COP version 1.5. This plan is used to track and report status.

An action plan might consist of one or more tasks per POC, depending on the nature and significance of the risk. Blue means the task has been completed, green means the task is on schedule, and yellow means that the task may not be completed on schedule. If a task was not executable, it would be colored red.

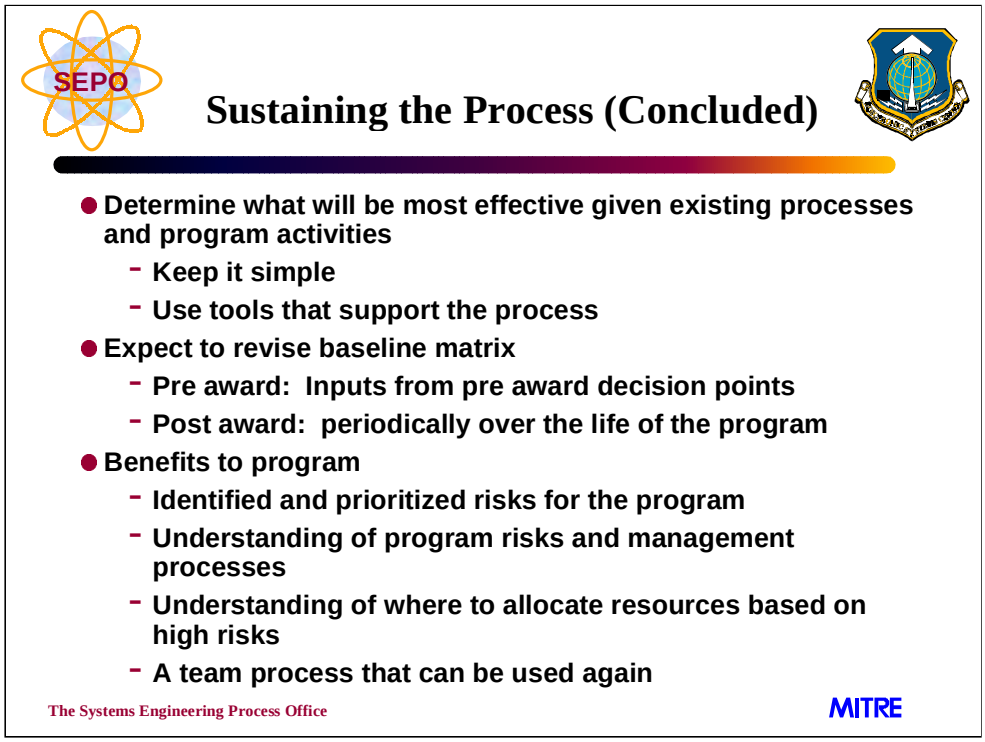
The Risk Matrix tool has an automated feature to assist programs with this task by computing a probability of failure with each color. The participants need only to enter the information about the task and assign a color denoting its status. The formula in the application calculates the probability of action plan failure (Papf). If the status colors are assessed periodically for all action plan tasks and plotted over time, high-level graphics can be displayed to show the status and changes in each risk during the risk handling stage of the process. For more details about this feature, see *Risk Matrix User's Guide* (Engert 1999).



Risks tend to evolve and change over the life of a program. To sustain a risk management process, periodically revisit the baseline risk list. Make sure low priority risks have not become medium or high. Add new risks, close out old risks, and reprioritize the list based on the current situation.

The program should conduct periodic risk assessments. The program also needs to consider mechanisms for helping identifying risks as the program develops. Examples are risk forms and risk/issues databases.[3] Periodically, new risks need to be prioritized against the master risk list.

Action plans also need to be monitored. When assessing the status of action plans, consider the effectiveness of the strategies (mitigation tasks) being applied. If something does not appear to be working, find out why it isn't. Look for root causes and try to increase the effectiveness of the task, or establish an alternative approach or task that might be more effective.



The approach to risk management should be simple and easy to follow. Find existing mechanisms on the program that will support its risk management objectives. For example, if there are monthly reviews on the program, that might be a good time to revisit the status of action plans. Let risks be handled at the lowest level possible, for example, within the IPTs. Risks that cannot be addressed within an IPT due to insufficient resources, or because the risk spans several IPTS, should be elevated to the program leadership level for resolution. Keep the process simple, and use tools (like the Risk Matrix Excel tool) that support the process.

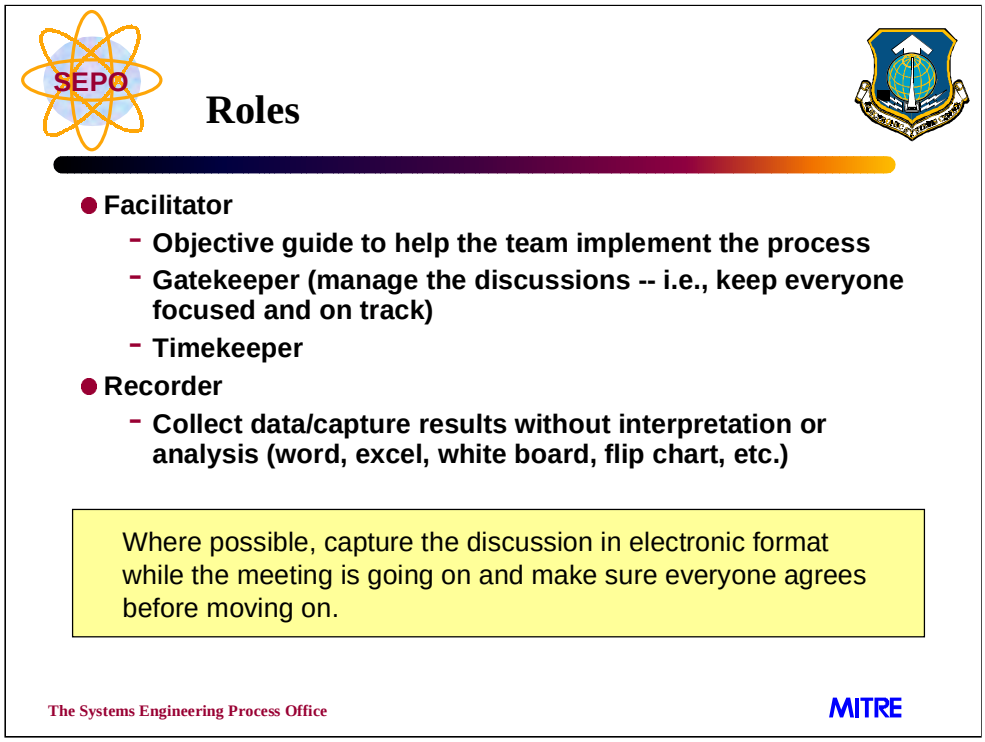
The risk assessment conducted prior to contract award is just the beginning. The risk matrix will evolve as the program evolves. Feedback throughout the program needs to be factored into the baseline risks.

The baseline risk assessment provides the program with an initial list of risks and a basic process to identify, prioritize and manage risks. It helps determine where to apply program resources and can be used to justify particular resources. This team process should be repeated periodically throughout the life of the program to sustain risk management on programs.

An Exercise in Conducting a Risk Assessment

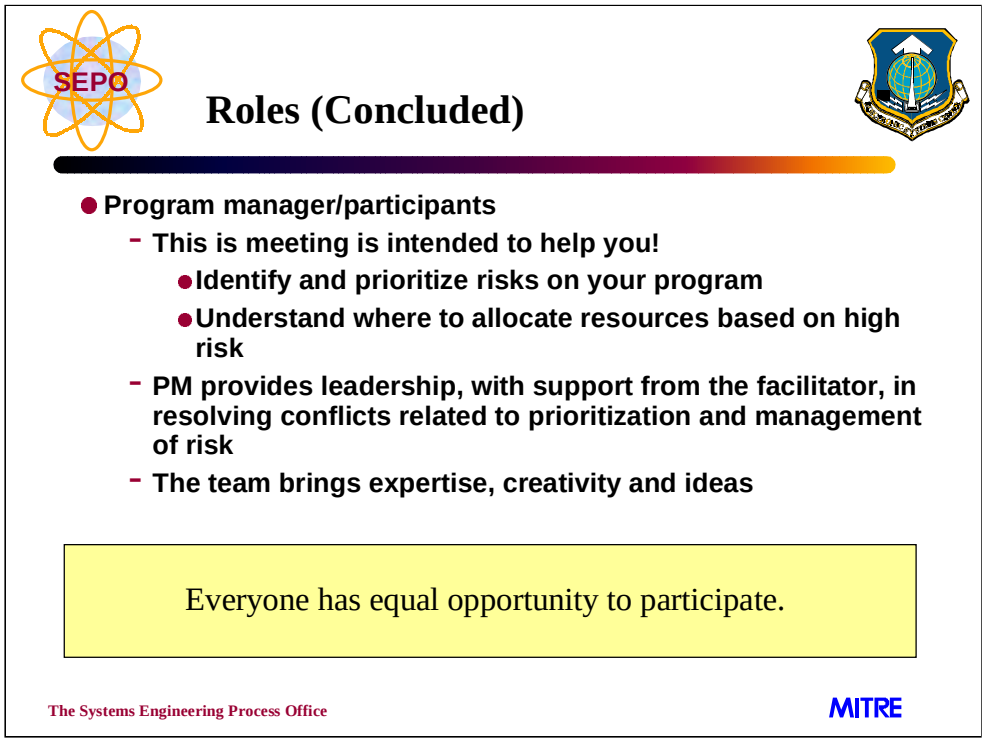
Objective

- Provide learning opportunity and “hands on” experience with
  - The process
  - The facilitation techniques



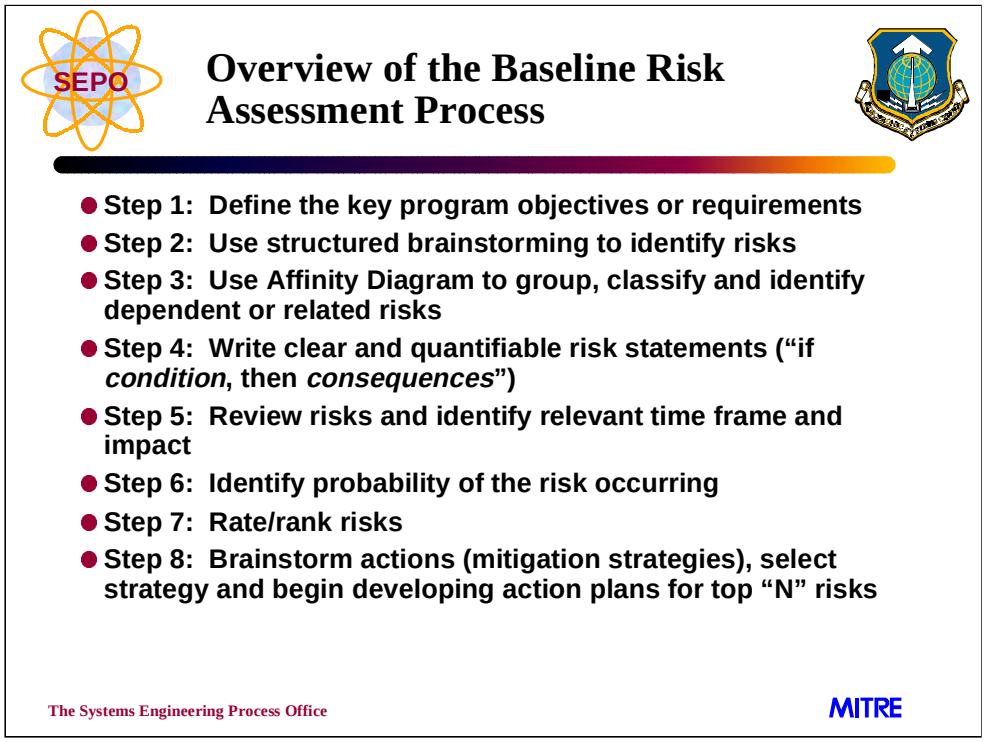
The facilitator acts as the objective guide to help the team through the risk identification, assessment, prioritization, and ranking process. The facilitator also helps the program get started on the action planning and works with the program to ensure the process is sustainable by the program office team

The recorder is responsible for capturing the results of the meeting as agreed to by the participants. This is done during the meeting using the Risk Matrix tool and white board or flip charts.



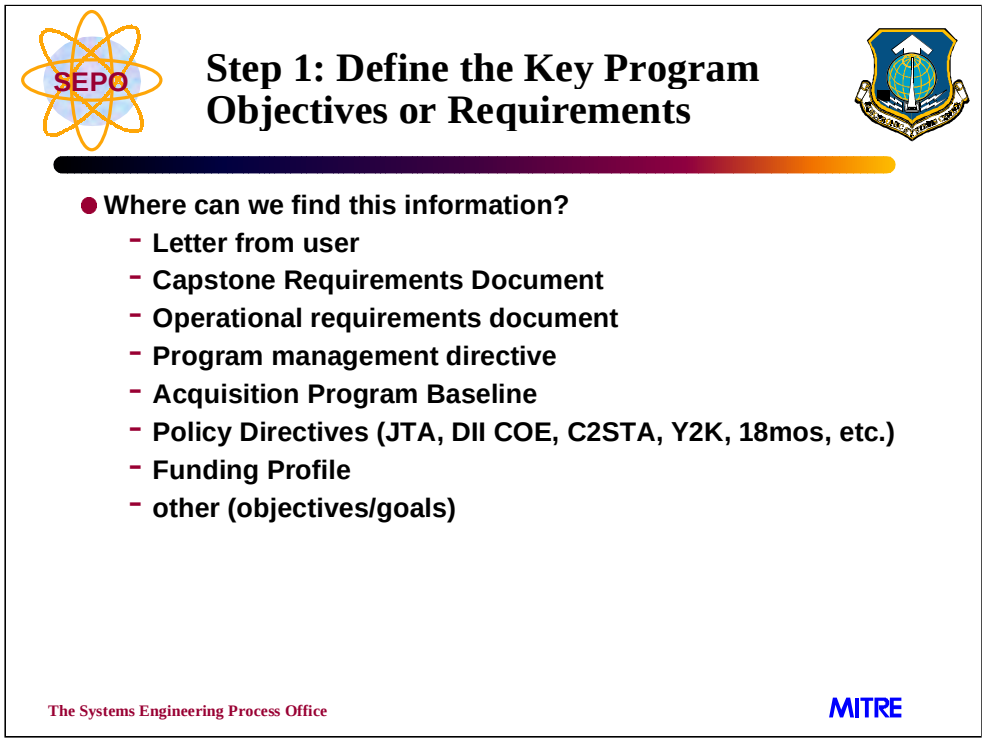
The PM provides the leadership for the meeting, with the risk facilitator's support, in resolving conflicts related to prioritization and management of risk.

The team members contribute their expertise, creativity and ideas. No one group has knowledge of all the risks. Therefore, a good representation of the various disciplines used on the program is necessary to identify the risks. The number of attendees, however, should not exceed 10 to keep the meeting manageable.



The initial process takes place in a single session. The amount of time allocated to conducting the risk meeting depends on the program, the number of participants involved, and how well the program requirements are understood. Some programs have taken as much as four days to do the initial baseline while others have completed the work in four hours. Limiting the number of participants to 10-12 helps expedite the process. The more people involved, the longer it takes to complete the structured brainstorming, to create affinity diagramming, and to achieve consensus on the risks.

The steps used during the meeting are outlined on this chart.



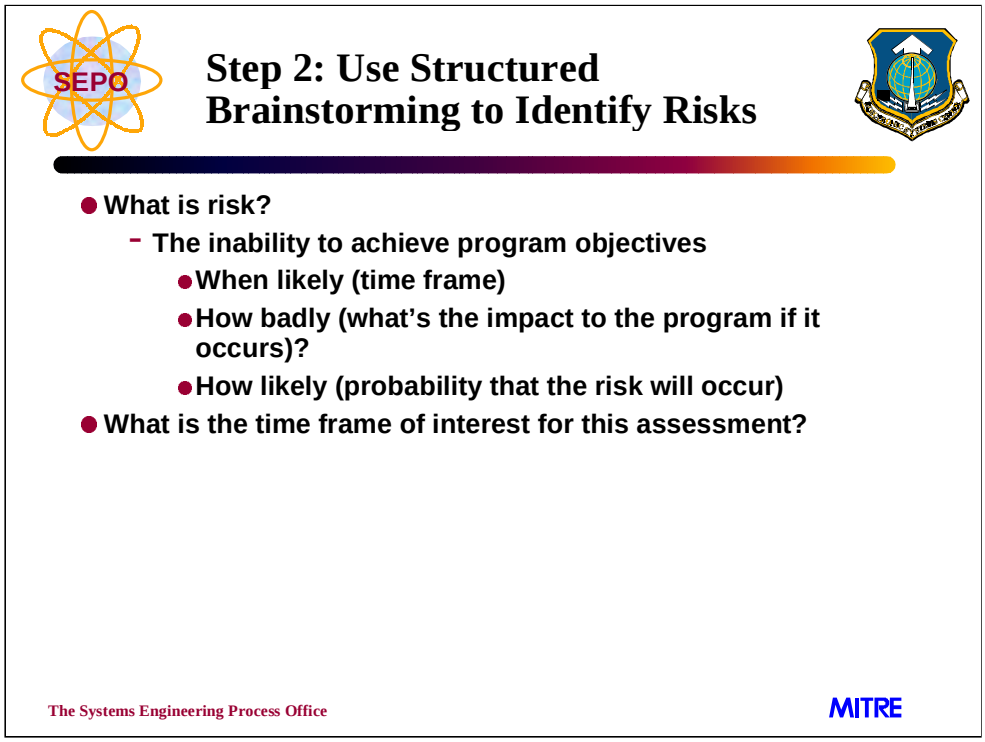
The purpose of this activity is to ensure that there is consensus and clear understanding of the program objectives or requirements (operational, key technical performance parameters, cost, schedule). Program requirements can be found in a number of places: capstone requirements document, operational requirements document (ORD), acquisition program baseline (APB), program management directive, policy directives (joint technical architecture, defense information infrastructure common operating environment, year 2000, command and control system target architecture, spiral development, funding profile).

The requirements are captured using a white board, flip chart, or electronic media. The requirements are reviewed to ensure they are understood and all the members of the risk assessment team are in agreement. These requirements form the context for broadly identifying risks without limiting risks to technology availability. The requirements can be captured and mapped to risks using commercial requirements traceability tools or within the Risk Matrix tool itself.

Prior to conducting the risk assessment, it is important that the right team is assembled and that they understand the basic objectives or requirements for the program.

Step 1: Define the Key Program Objectives or Requirements (Concluded)

- How to do it:
  - Using a white board, flip chart, or electronic means
    - Review and capture the key program requirements
    - Review the list and make sure everyone agrees and we haven't forgotten anything
    - This is an aid to the risk identification that follows
  - Optional: enter the requirement list into the matrix



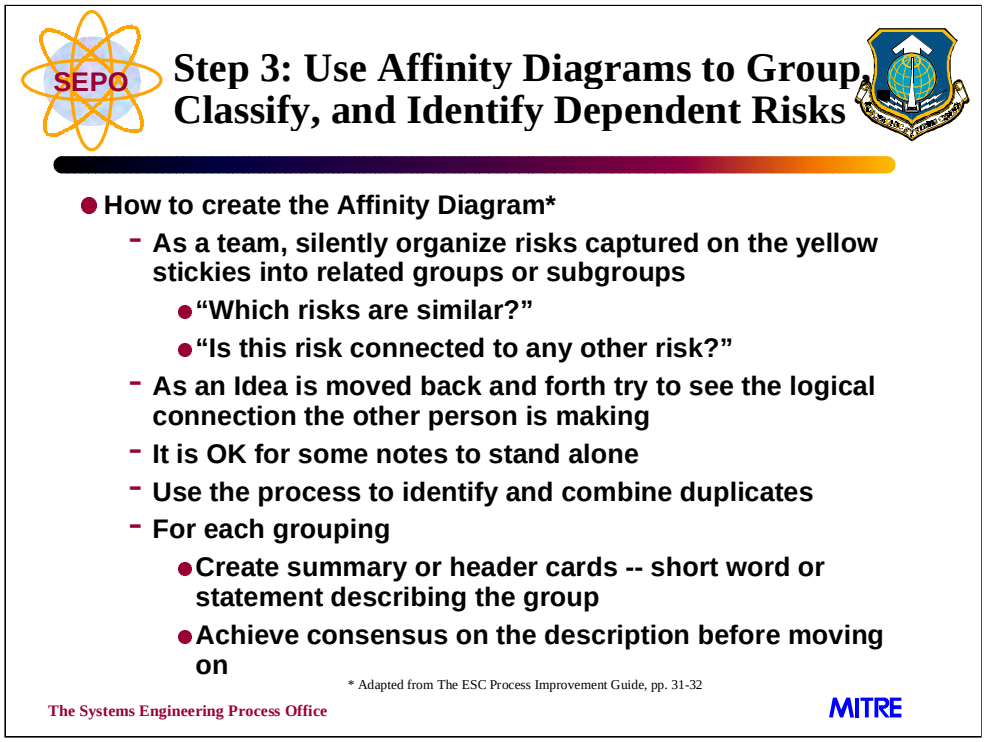
In identifying the risks, consider the following things: when is the risk likely to impact the program (timeframe), how badly will it affect our ability to achieve program objectives, and how likely is it to occur? For the purposes of the pre-award process, the timeframe under consideration is contract award and the first eighteen months on contract.

Risk identification is accomplished through structured brainstorming techniques to generate ideas. Each person writes his or her ideas on sticky notes. One idea per person is read aloud, or a participant can pass until the next round. Questions may be asked to clarify understanding, but participants should withhold judgement or criticism at this time. Each risk is posted on a board or wall. This process ensures that all the participants have an equal opportunity to express their concerns or risk areas. A complete round of "passes" ends the session and the participants are ready for the next step.

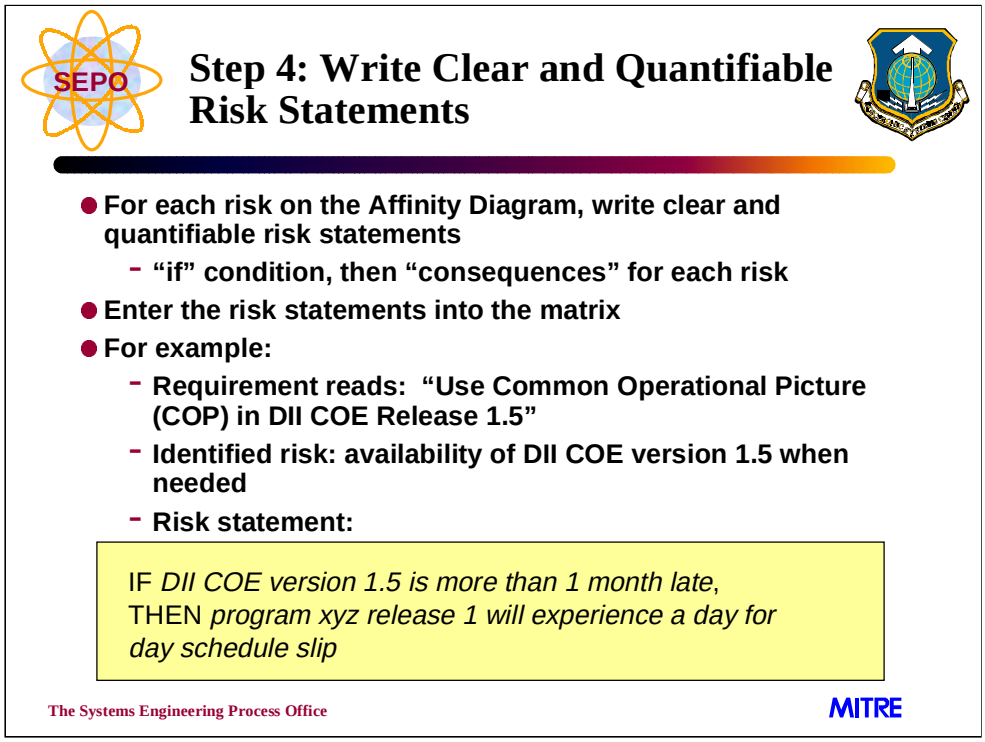
Step 2: Use Structured Brainstorming to Identify Risks (Concluded)

- How to do structured brainstorming*
  - The goal is to generate ideas, therefore it is important to postpone judgement
  - Write each idea in silence on sticky notes
  - One idea per person in sequence, or “pass”
    - The idea is read aloud
    - Questions may be asked to clarify understanding not for analysis
  - A complete round of “passes” ends the session

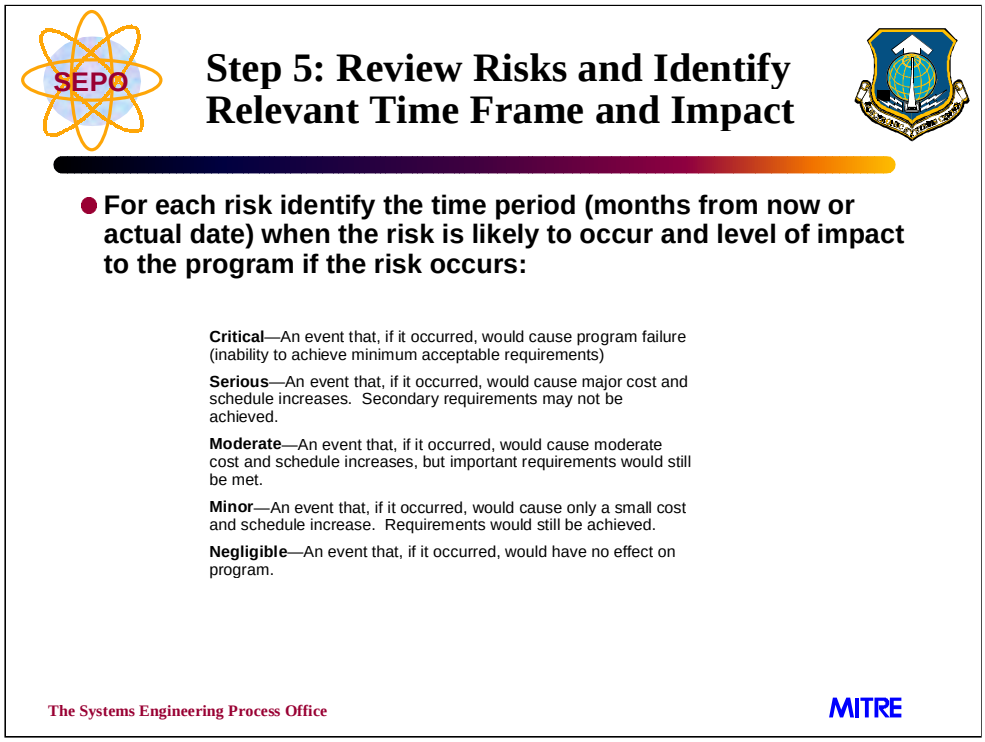
* Adapted from The ESC Process Improvement Guide, pp. 6-8



This step in the process uses classic affinity diagramming techniques to group related and dependent risk and determine risk categories. This approach works well because it lets the team determine the appropriate categories rather than having to force fit the risks into standard categories (cost, schedule, political, technical) that might not cover all the unique aspects of a program. The team silently organizes the sticky notes from the brainstorming activity into related groups. The intent is to group similar risks under a single category and identify related risks. Identification of dependent risks will aid in constructing action plans that address not only the risks but also other risks that might be affected by the proposed mitigation strategies. This activity helps the team achieve consensus on the grouping and helps eliminate or consolidate duplicate risks that might have been generated during the brainstorming phase.

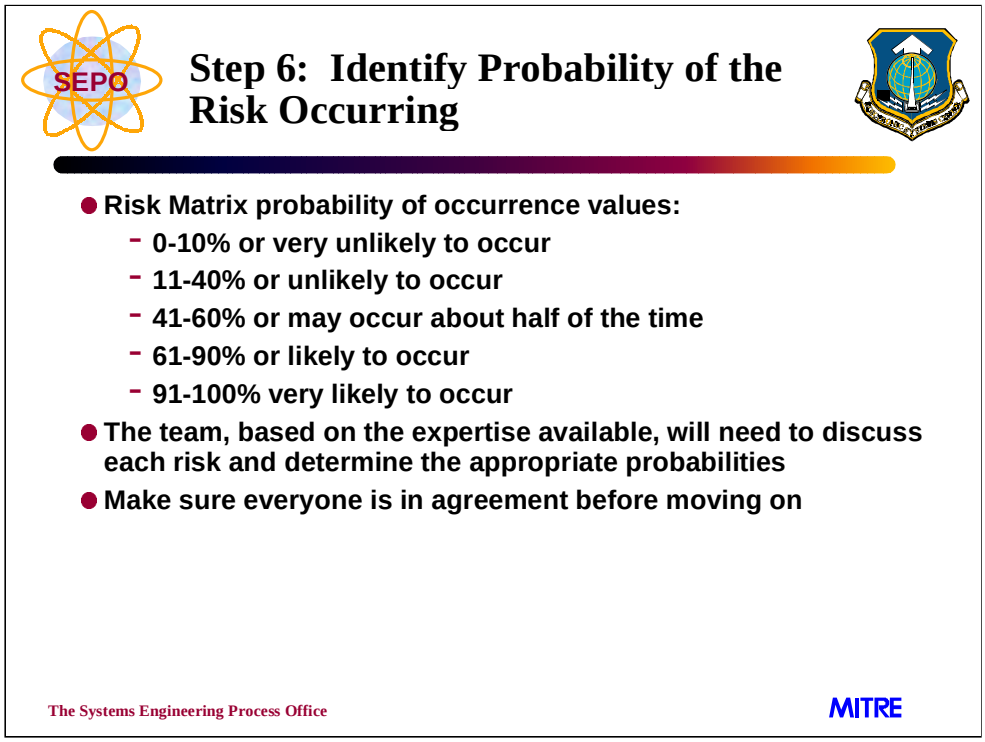


This step is important because it facilitates communication among the team members about the meaning of the risks and makes it easier to generate action plans and mitigation strategies. Going through each risk statement, the team transforms each into an "if" condition, then "consequences" statement (CMU/SEI) and make sure everyone agrees with the words used. At this point, the recorder enters each risk statement into the Risk Matrix.

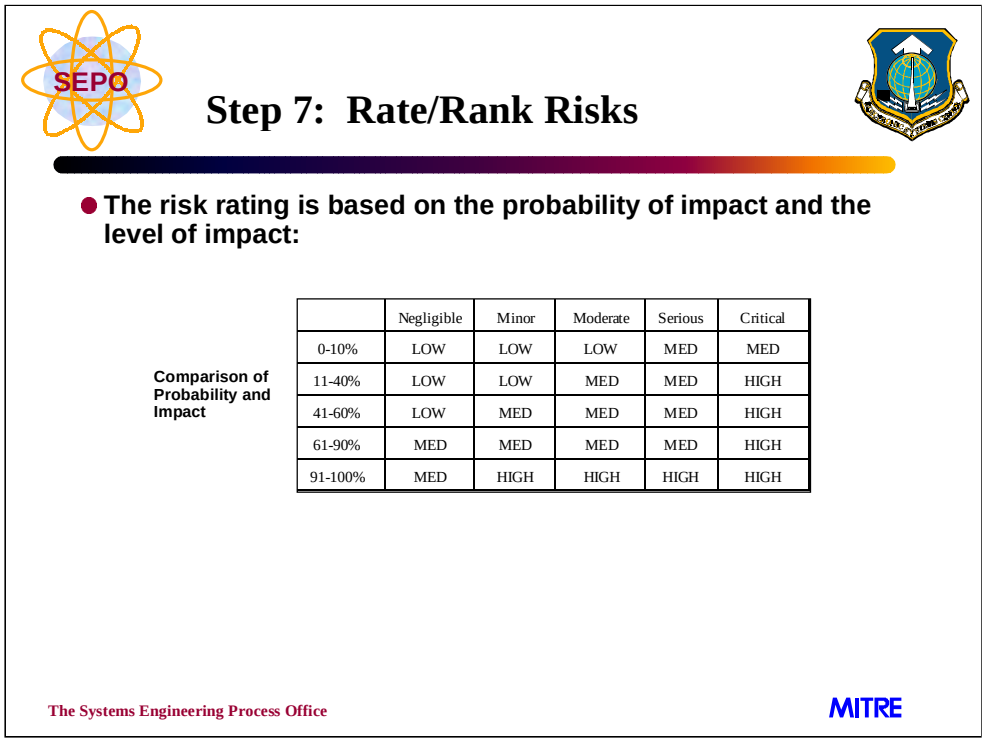


Originally, steps 5,6, and 7 were done serially, but it works more effectively to combine the steps so that they are completed once for each risk statement before moving to the next. This combination helps teams progress, makes it easier to do all three steps because the risk statement is fresh in everyone's mind, and saves time by not addressing each risk three times. The steps for this process follow:

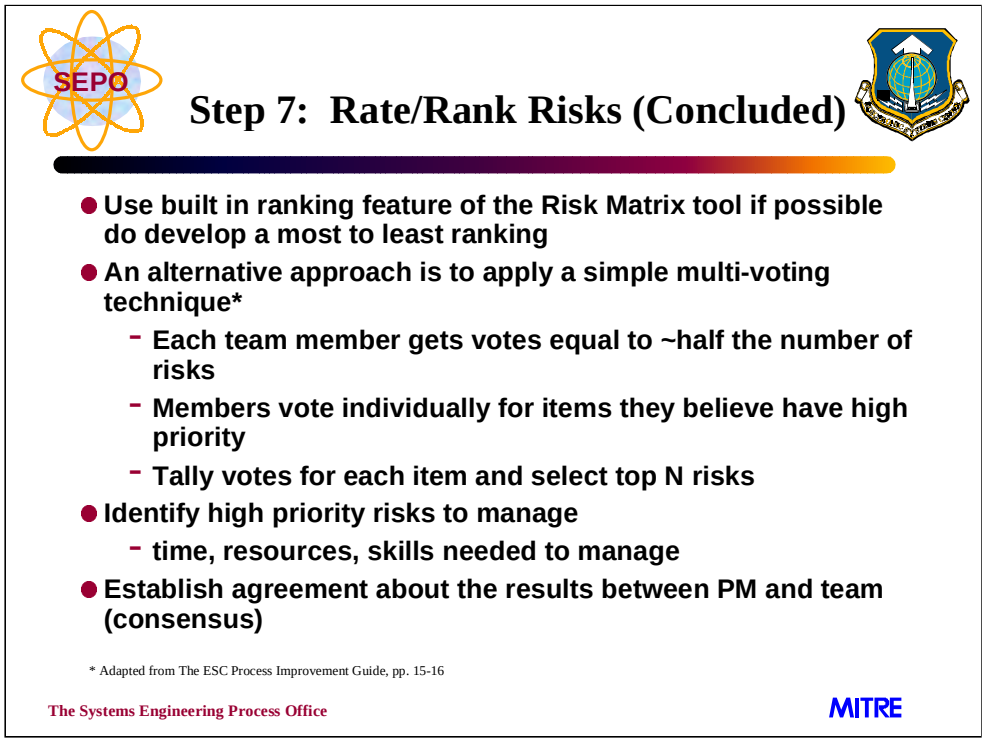
The first risk is read and the group identifies the time period (months from now or actual date) when the risk is likely to occur and the level of impact to the program if it occurs.



Next is the probability of the risk occurring. The team discusses each risk and agrees upon the appropriate probabilities.



The risk rating is based on the probability of impact and the level of impact. The table provides a comparison of probability and impact used to determine the rating. This results in a risk rating of high, medium, and low for each risk.

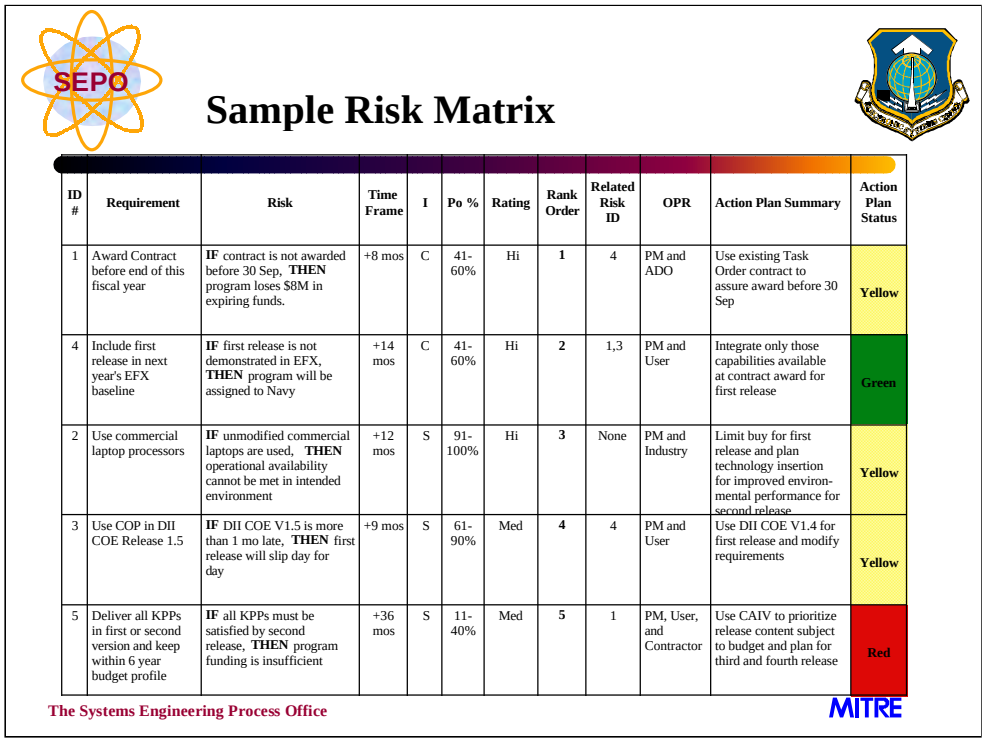


Once a Risk Matrix is populated, questions often arise such as: *Which risk is most critical? Where should resources be allocated to eliminate the most troublesome areas of the program?*

Because the rating method used in the previous chart only supports three distinct ratings (High, Medium, or Low), it necessarily yields an ordering with many ties. For example, in the Sample Risk Matrix on the next chart, three risks tie for first place (the High designations) and two risks tie for the second place (the Medium designations). In an actual application of Risk Matrix (not shown here), seven risks tied for first place, thirty-two for second place, and nineteen for third place. With so many ties, it can be difficult to isolate the most critical areas of risk from those that are less threatening to the program.

To deal with ties, MITRE incorporated a simple technique from voting theory into the Risk Matrix software application. The technique is known as the *Borda* method (Borda 1781). When applied to Risk Matrix, the Borda method *ranks* risks from most-to-least critical on the basis of multiple evaluation. For a detailed explanation of how this method works, see *Risk Matrix: An Approach for Identifying, Assessing, and Ranking Program Risks* (Garvey 1998).

Most ESC programs develop the rating and use the Risk Matrix Tool and Borda ranking method to achieve a rank ordered list of risks. However, it is important to remember that these tools cannot replace human judgement, but they can aid in analysis of the data. Therefore, the participants need to give careful consideration to the data, identify the high priority risks (top “N”) that the program needs to manage (time, resources, skills), and reach an agreement with the program manager and the all team members about the risks and priorities.



ID #	Requirement	Risk	Time Frame	I	Po %	Rating	Rank Order	Related Risk ID	OPR	Action Plan Summary	Action Plan Status
1	Award Contract before end of this fiscal year	**IF** contract is not awarded before 30 Sep, **THEN** program loses $8M in expiring funds.	+8 mos	C	41-60%	Hi	**1**	4	PM and ADO	Use existing Task Order contract to assure award before 30 Sep	**Yellow**
4	Include first release in next year's EFX baseline	**IF** first release is not demonstrated in EFX, **THEN** program will be assigned to Navy	+14 mos	C	41-60%	Hi	**2**	1,3	PM and User	Integrate only those capabilities available at contract award for first release	**Green**
2	Use commercial laptop processors	**IF** unmodified commercial laptops are used, **THEN** operational availability cannot be met in intended environment	+12 mos	S	91-100%	Hi	**3**	None	PM and Industry	Limit buy for first release and plan technology insertion for improved environ-mental performance for second release	**Yellow**
3	Use COP in DII COE Release 1.5	**IF** DII COE V1.5 is more than 1 mo late, **THEN** first release will slip day for day	+9 mos	S	61-90%	Med	**4**	4	PM and User	Use DII COE V1.4 for first release and modify requirements	**Yellow**
5	Deliver all KPPs in first or second version and keep within 6 year budget profile	**IF** all KPPs must be satisfied by second release, **THEN** program funding is insufficient	+36 mos	S	11-40%	Med	**5**	1	PM, User, and Contractor	Use CAIV to prioritize release content subject to budget and plan for third and fourth release	**Red**

This chart illustrates a example of a risk matrix:

Column 1 identifies the risk number.

Column 2 contains the requirement statement

Column 3 captures the corresponding risk statement

Column 4 establishes the timeframe for when the risk is likely to occur.

Column 5 contains the impact rating.

Column 6 identifies the probability of occurrence associated with the risk.

Column 7 provides a high, medium and low ranking based on probability and impact ratings.

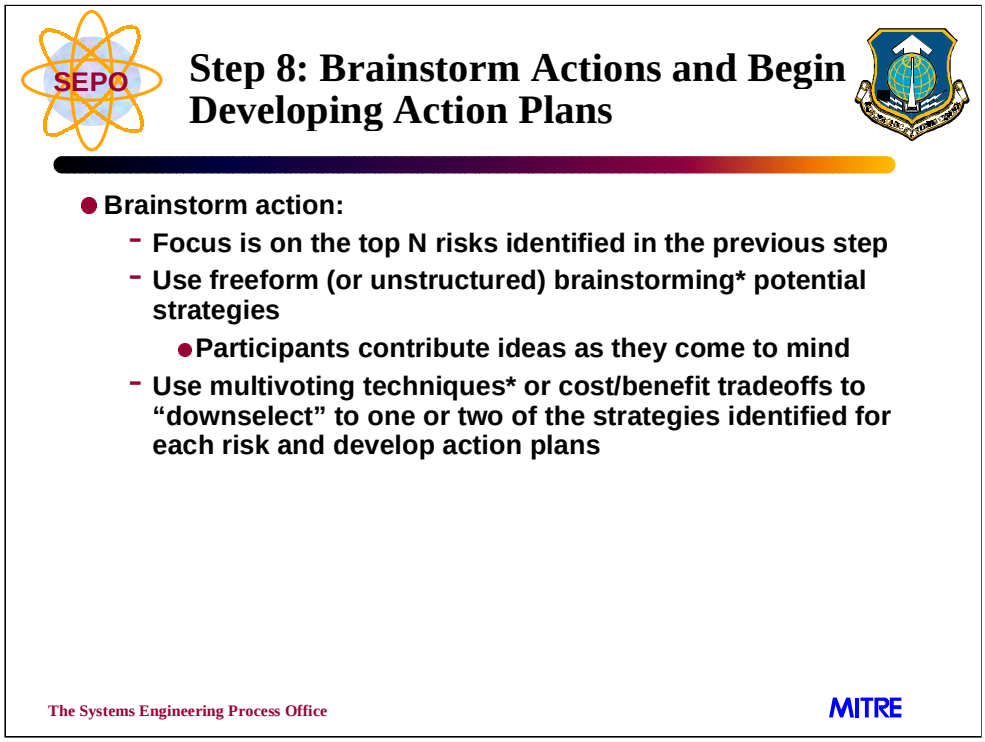
Column 8 provides a Borda ranking generated by the risk matrix application. The Borda method ranks risks from most-to-least critical on the basis of multiple evaluation criteria.

Column 9 identifies the risk number of risks which are dependent to this risk

Column 10 identifies the organization responsible for managing the risk.

Column 11 provides a summary of the action plan or mitigation strategy.

Column 12 provides the overall status of the action plan.

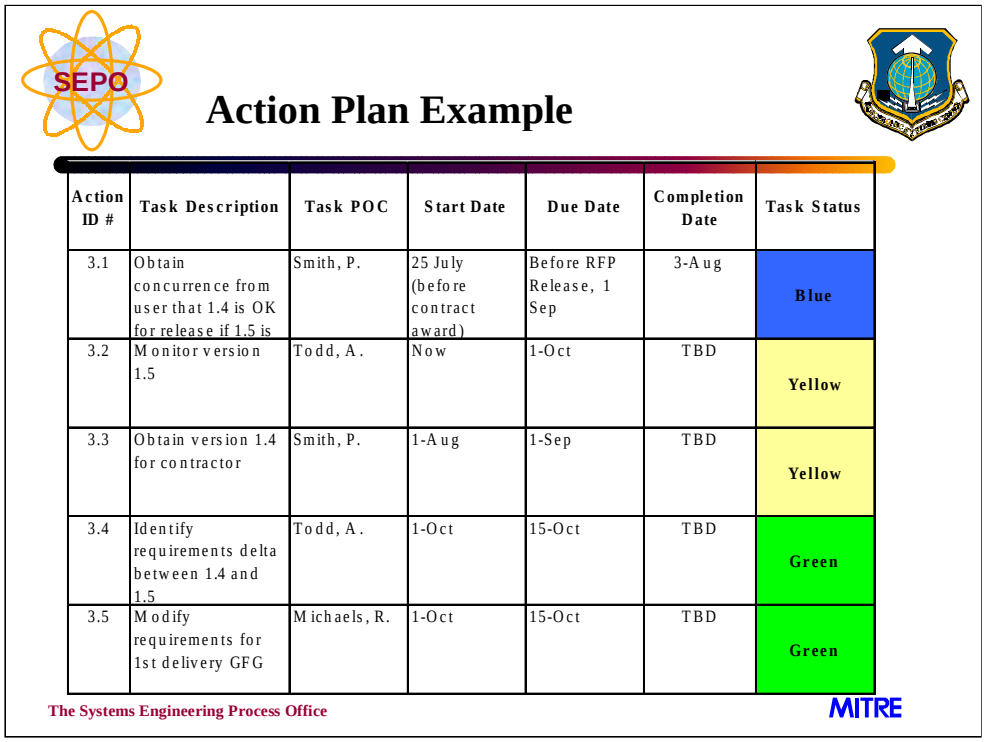


This activity focuses on the "top N risk" identified in the previous step. This step can be accomplished using a freeform (or unstructured) brainstorming method to identify potential mitigation strategies. For each risk, participants contribute ideas as they come to mind. These ideas are captured on a white board or flip charts. Multi-voting techniques or cost/benefit tradeoffs can then be used to "downselect" to the strategy for a particular risk. A summary statement for the mitigation approach is captured. Responsible individuals are assigned to implement the action plans, which are monitored on a regular basis. Monitoring of action plans may take place at a monthly program review, or quarterly, depending on the needs of the program.

During the risk assessment meeting, the ADO typically walks through some of the risk on the list, usually selecting a couple of the high priority risks to practice the concept. Because this step is rather lengthy, the participants complete this task at a separate meeting using the concepts they learned. Table 5 provides a sample action plan for the example risk 3 in Table 1.

Step 8: Brainstorm Actions and Begin Developing Action Plans (Concluded)

- Assign each risk needing an action plan to a the appropriate organization to manage
- Each organization will assign an action plan point of contact to monitor and report status on the plan



This sample action plan contains several tasks, identifies a responsible point of contact (POC), a schedule for completion, and a color code identifying the status of the task. Note that the action ID tracks to risk ID number 3 on the sample risk matrix. This is the action plan for the risk associated with using COP version 1.5. This plan is used to track and report status.

An action plan might consist of one or more tasks per POC, depending on the nature and significance of the risk. Blue means the task has been completed, green means the task is on schedule, and yellow means that the task may not be completed on schedule. If a task was not executable, it would be colored red.

The Risk Matrix tool has an automated feature to assist programs with this task by computing a probability of failure with each color. The participants need only to enter the information about the task and assign a color denoting its status. The formula in the application calculates the probability of action plan failure (Papf). If the status colors are assessed periodically for all action plan tasks and plotted over time, high-level graphics can be displayed to show the status and changes in each risk during the risk handling stage of the process. For more details about this feature, see *Risk Matrix User's Guide* (Engert 1999).

References

- AFMC, 1991, "The ESC Process Improvement Guide," Electronic Systems Center, Hanscom, AFB, MA
- AFMC/ENPI, July 1997, "Risk Management," AFMC Pamphlet 63-101, Headquarters Air Force Material Command, Wright-Patterson AFB
- Borda, J-C, "memoire sur les Elections au Scrutin," *Histoire de l'Academie Royale des Sciences*, Paris, 1781
- Carr, M.J., et. al., Taxonomy-Based Risk Identification, CMU/SEI-93-TR-6, Software Engineering Institute, June 1993
- CMU/SEI, 1996, "Continuous Risk Management Guidebook", Software Engineering Institute, Pittsburgh, PA (http://www.sei.cmu.edu/)
- Engert, P.A., "Risk Matrix User's Guide", Version 2.1,The MITRE Corporation, Bedford MA, 1999

References (Concluded)

- Garvey, P.R., and Z. F. Lansdowne, "Risk Matrix: An Approach for Identifying, Assessing, and Ranking Program Risks," *Air Force Journal of Logistics*, Vol. 22, No. 1, 1998
- Risk Matrix Tool, Version 2.1, The MITRE Corporation, Bedford, MA 1999 (http://www.mitre.org/resources/centers/sepo/risk/registration_form.html)
- SEPO, "Risk Matrix: A Tool That Helps Identify Project Risks for Better Resource Allocation," SEPO TechNote 15, The MITRE Corporation, Bedford, MA, January 1996 (http://www.mitre.org/resources/centers/sepo/)
- Willhite, Anne Marie, "Systems Engineering At MITRE: Risk Management" (MP96B0000120,R1), The MITRE Corporation, Bedford, MA, 1998 (http://www.mitre.org/resources/centers/sepo/index.html)
- Zsak, M., OUSD (A&T)/DTSE&E, Nov 1996, "Risk Management," Defense Acquisition Deskbook, Section 2.5.2