Risk Management



TARDEC Systems Engineering Workshop June 2, 2011

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Risk is the potential of <u>future</u> uncertainties in achieving program performance goals and objectives within established baselines of cost, performance and schedule constraints. A risk may be mitigated to prevent it from occurring or reduce its impact if it occurs

> If the item being described has already occurred in real time, it is an ISSUE and not a RISK.

The words IF, THEN and MAY in a problem statement indicates that something has not yet occurred, but has the potential to occur in the future, hence it is a risk.

The goal of risk management is to help ensure program cost, schedule and performance objectives are achieved at every stage in the life cycle.



"There is only one reason for risk management: To assure the program decision-makers learn about and deal with important risks before they turn into issues". - Carnegie Mellon University "Risk Management Overview for TACOM"

Benefits of Risk Management include:

- *Minimize or prevent cost overruns, schedule delays, and performance problems*
- Product and design quality are improved.
- Maximizing usage of resources.
- Promoting teamwork and system engineering.
- Communication to stakeholders and decision makers.



"The first step in the risk management process is to acknowledge the reality of risk. Denial is a common tactic that substitutes deliberate ignorance for thoughtful planning" - Charles Tremper



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for though

substitutes "Risk is like fire: If controlled it will help you ; if uncontrolled it will rise up and destroy you". - Theodore Roosevelt



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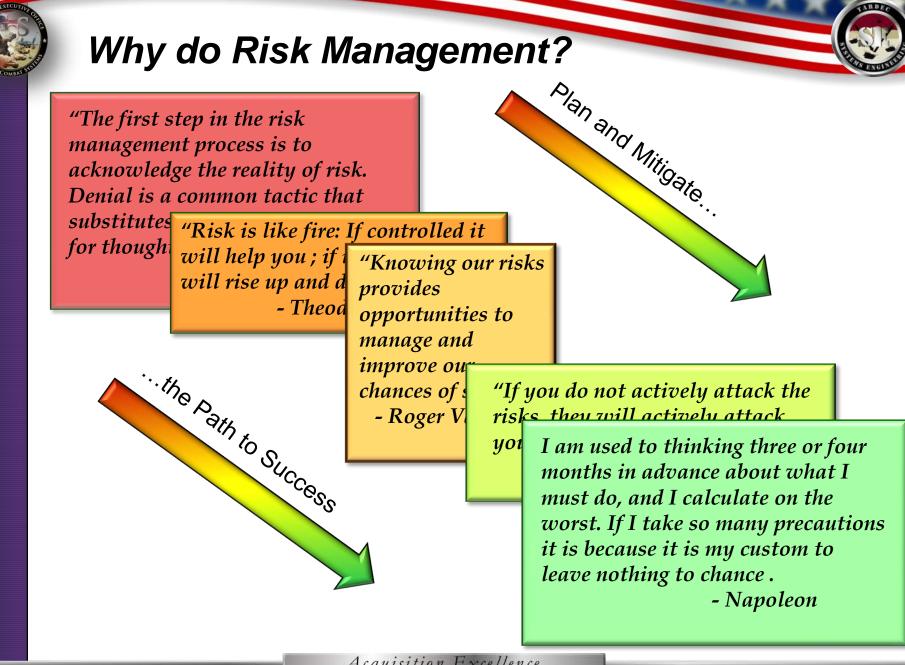
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chances of success. - Roger Vanscoy

Why do Risk M	lanagemen	t?	
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Risk Affects Everyone...



Even on a beautiful day, though the likelihood is low, there is still the risk of loss of power from a thunderstorm. Lightning has the *potential* to hit your house or a power tower during a storm. *If* the lightning strike hits your house or a power tower *then* power to the house *may* be lost, and the consequence could be that your alarm clock may not go off, making you late for work.

Risk Defined

Risk is the potential of *future* uncertainties in achieving program performance goals and objectives within established baselines of cost, performance and schedule constraints.

If the item being described has already occurred in real time, it is an ISSUE and not a RISK.

The words IF, THEN and MAY in a problem statement indicates that something has not yet occurred, but has the potential to occur in the future, hence it is a risk.

Risk Mitigation

In the previous example of loss of power during a thunderstorm, the risk is the loss of power, the consequence is that you might be late to work, but what can be done to mitigate this risk from becoming an issue?

The goal of risk management is to mitigate risks to prevent them from becoming issues. In this case, mitigation steps and action plans could include:

- Installing a back-up generator in your home's electrical system
- Burying power lines underground to reduce the risk of downed power lines due to high winds.
- Adding lightning rods to the top of your house to ground the lightning strike.

Each of these plans can help mitigate the risk, though each has a different impact to the risk consequence and likelihood. Some plans are more successful and easier to achieve than others.



Issue Defined

- An issue is something that has already occurred.
 - Issues includes:
 - A past or current problem
 - A future certainty (probability of occurrence = 1).

<u>TIP</u>:

If a root cause is described in the past tense, *the root cause has already occurred*, and therefore, it is an issue that needs to be corrected, not a risk to be prevented.

Risk vs. Issue

- A risk can be <u>mitigated</u>; an issue must be <u>corrected</u>.
- If risk mitigation is unsuccessful, a risk may become an issue after an event has occurred, such as:
 - Testing The future root cause "if testing fails" has become an issue when "testing has failed".
 - Schedule Slip a date where mitigation was required by has been exceeded causing further schedule slips
 - Etc.

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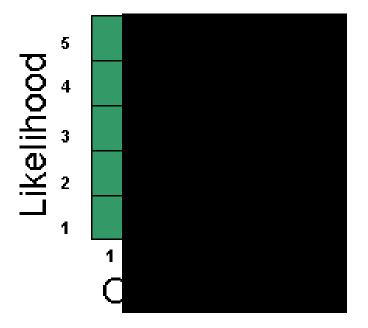
Key Components of Risk

A Risk is composed of three key components:

- **1. Future root cause** (yet to happen), which, if mitigated, eliminated or corrected, would prevent or minimize a potential consequence from occurring
- 2. Likelihood, or probability, of the future root cause event occurring
- **3. Consequences**, or impact to the project, of the future event occurring.

Risk Matrix

The likelihood and consequences are tracked in a risk matrix (see *below*). Their combined values form a risk rating or assessment of high, medium or low.



Risk Rating = Likelihood X Consequence

- •Likelihood describes the probability of the event occurring.
- •Consequence denotes the magnitude of loss.

Rankir	ng of Ri	sk Ra	tings										
B	Near Certainty 5						Ъ	Near Certainty 5	9	16	20	23	25
Likelihood	Highly Likely 4			X			Likelihood	Highly Likely 4	6	13	18	28	24
	Moderate 3				Х		C.	Moderate 3	4	10	15	19	21
	Low 2							Low 2	2	7	11	14	17
	Not Likely 1							Not Likely 1	1	3	5	8	12
		Negligible 1	Marginal 2	Moderate 3	Critical 4	Catastrophic 5			Negligible 1	Marginal 2	Moderate 3	Critical 4	Catastr 5
			(Consequ	lence	1					Consequ	lence	I

A "4,3" and "3,4" – Which Rates Higher?



One thing that is important to note is that the consequence rating is typically weighted higher than the equivalent likelihood number.

For instance – a "4,3" where the consequence is the "4" is weighed higher than a "3,4" where the likelihood is a 4. This is because the consequence is viewed as of slightly higher importance than the likelihood.

This is also used as they way risks are organized in a hierarchy for risk reports – those equivalent risk numbers (example "3,5" or "5,3") are ranked with the higher consequence number first.



Consequence Guidance

(Available in Risk Recon under "Help" and "Tip Sheet")

Rating / Description	Performance	Cost	Schedule
5 (Catastrophic) Jeopardizes an exit criterion of current acquisition phase.	Unacceptable; No viable alternatives exist.	Program budget impact by 10% or more; Program success jeopardized.	Key events or milestones delayed by more than one month.
4 (Critical) Potentially fails Key performance parameter (KPP).	Unacceptable; Significant changes required.	Program budget impact by 5% – 10%; Significant portion of program management reserves must be used to implement workarounds.	Critical path activities 2 weeks late; Workarounds would not meet milestones; Program success in doubt.
3 (Moderate) Shorts a critical mission need but expect no breech of KPP threshold requirements.	Below goal; Moderate changes required; Alternatives would provide acceptable system performance; limited impact on program success.	Budget impacted by 1% - 5%; Limited impact on program success; Does not required significant use of program cost and or schedule reserves.	Non-critical path activities one month late; Workarounds would avoid impact on critical path; Limited impact on program success.
2 (Marginal) Requires the commitment of a minor portion of the program cost, schedule or performance reserve.	Below goal but within acceptable limits; No changes required; Acceptable alternatives exist; Minor impact on program success.	Budget impacted by 1% or less; Minor impact on program success; Minor commitment of program management reserves (schedule, cost) used for workarounds.	Non-critical path activities late; Workarounds would avoid impact on key and non-key milestones; Minor impact on program success; Development schedule goals exceeded by 1% - 5 %.
1 (Negligible) Remedy will require minor cost, schedule and/or performance trades.	Requires minor performance trades within the threshold – objective range; No impact on program success.	Budget not dependent on the issue; No impact on program success. Cost increase can be managed with program plan.	Schedule not dependent on issue; No impact on program success; Schedule adjustments managed within program plan.

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Likelihood Guidance

(Available in Risk Recon under "Help" and "Tip Sheet")

Level	Likelihood	Probability of Occurrence
1	Not Likely	Occurrence is possible but very unlikely (<10%) Approach and processes are well understood and documented.
2	Low Likelihood	Occurrence possible but less than likely (10% to 40%) Current approach and processes understood and documented; most technology has been validated.
3	Moderate (Likely)	Significant chance of occurrence (>40% to 65%) Approach and processes are partially documented; Un-validated technology has been shown to be feasible by analogy, test or analysis.
4	Highly Likely	Very high chance of occurrence (>65% to 90%) Approach and processes not well documented; Technology available but not validated.
5	Near Certainty	Assume and anticipate occurrence (>90%) Approach and processes cannot mitigate risk; Immature technology; System very complex.

Risk Recon – Risk Management Tool Benefits

• *Ease of Use* - The software is easy to use – training of personnel takes approximately 1 hour.

• Uniform Method for Capturing and Reporting Data – Captures data in a centrally accessible, secure location.

• *Imbedded Reporting* – Risk Recon has several built-in reporting options including an Executive Summary and export to an Excel spread sheet. Future upgrades include metrics for monitoring mitigation plans, pie charts for historical comparisons, the ability to "e-mail update" notices to team members, etc.

• **Integrated Process Flow** – Risk Recon has an integrated work process flow in the software as well as a notification system for when new risks are created.

• *Attachments* – Risk Recon has an attachment function so that the team can attach briefs, data, etc to the risk – saves time on updating the risk status and eliminates duplication of effort.

• **No Cost** – Since Risk Recon is owned by the US Army, there is no program cost for using this database.

Risk Recon – Risk Management Tool Benefits

• *Traceability* - There is 100% traceability for risk history – nothing is ever permanently deleted.

• Accessibility - It is a database that everyone can access – unlike an excel spreadsheet that can only be accessed by one person at a time and lacks traceability. The software can be accessed by all DoD locations and off-site with a user name and password. Access can be limited down to the product level.

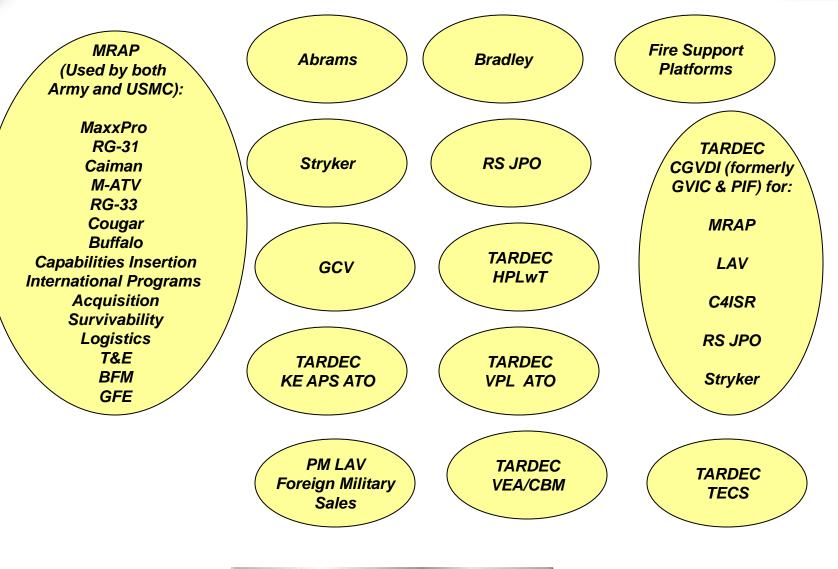
• Server Based Application - The software runs from a server – "unlimited" users at one time.

• **Data Storage** - There is virtually unlimited storage for risks – memory limitation is not a concern.

• **Security** - It is secure for information including FOUO – Classified information is not permitted, though classified teams do use the database with "code" language.

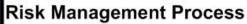
• *Customization* – The tool is owned by PEO GCS but overseen by the Risk Recon IPT represented by all user groups. This allows all users to have input in requesting upgraded features for future versions of Risk Recon.

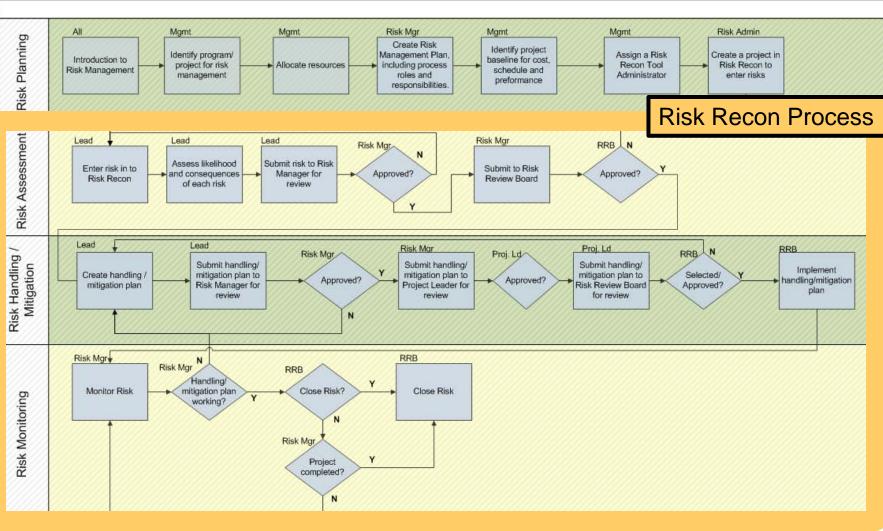
Current Risk Recon LCMC Customers ~750 users registered:





Risk Management Process Workflow





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ARDE



risk

Creating a Risk In Risk Recon

Watch Risk

Risk Lifecycle

Close Risk

Related Projects

Back to the Home	Page	View Histo	ry		
Save Cancel	Submit	To Clos	e, select Risk St	atus 👻	
Risk Info Sheet	Docume	nts F	Risk Info Team	Mitigation Plan(s)	

Changes must be Saved first before navigating off this web page • Filling out the risk information is Risk Analysis (Click bar to expand/contract) **Risk ID:** 821 easy. **User Defined Risk ID:** Initial risk input takes < 5 **Risk Title:** Risk of Loss of Power In Thunderstorms Status Candidate minutes. Urgent: Additional time required for Check to alert Risk Manager of time sensitive mitigation steps. **Open Date:** 4/1/2010 * Last Saved On Date: 5/9/2011 10:09:06 AM WBS #: - Create a Risk Title. IMP/IMS #: **Functional Groups:** Functional Groups.. -- Confirm Open Date. \leftarrow + * **Risk Lead:** Graf, Lisa - Enter WBS #, IMP # if * required field applicable. **Risk Assessment**

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Likelihood 3					0
2					
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Crea	ting a Risk In Risk Recon	
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Original Consequence (O):	(5) Catastrophic 🔹 *	
Original Likelihood (O):	(3) Moderate *	
Current Consequence (C):	(4) Critical *	
Current Likelihood (C):	(2) Low Likelihood 🔹	
Residual Consequence (R):	(2) Marginal 👻	
Residual Likelihood (R):	(1) Not Likely	
Risk Impacts		Select Risk Impacts:
Cost:		Cost
Schedule:	<	Schedule
Performance:		Performance
Other:		Other Oritical Dath
Affects the Critical Path:		Critical Path

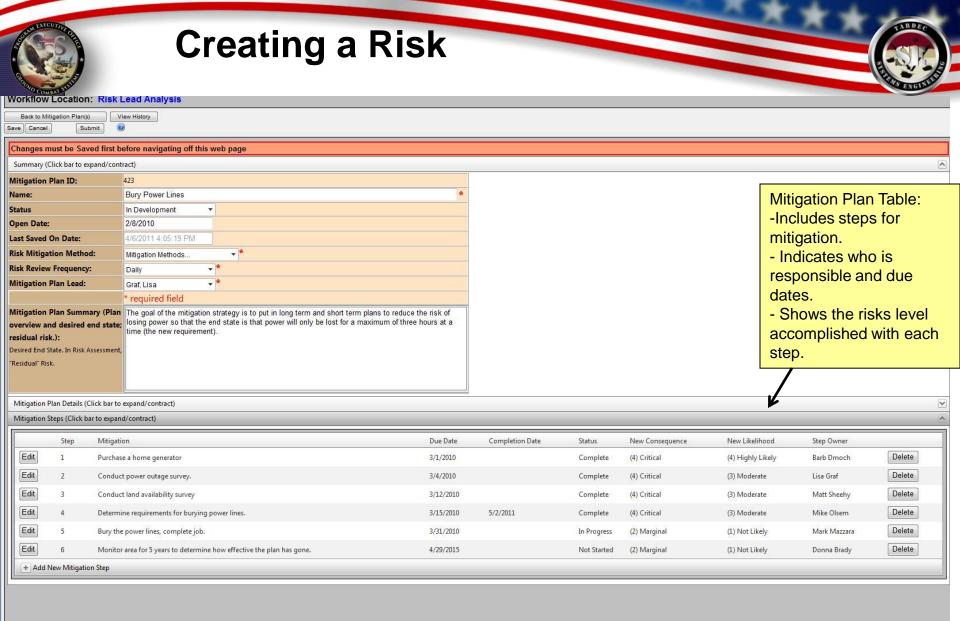
Creat	ing a Risk In Risk Recon	
Description of Risk Condition: Clear and concise - cite only one Risk condition.	If there is a thunderstorm with high winds and lightning strikes occur, then loss of power to homes may occur and people may be without power.	Description of Risk – One sentence – an "IF/THEN/MAY" statement.
Context: What how, why, where of the risk condition.	If a thunderstorm occurs and high winds in excess of 60 mph occur (WHAT), then power lines may come down due to high winds (HOW) and loss of power may occur (WHAT). If lightning strikes occur (WHAT), then transformers may be hit and damaged (HOW) and loss power may occur (WHAT). This may occur because power lines are exposed to the environm (WHY) and subject to wind damage and lightning strikes. This can affect home and people (WHO) subdivision wide or any building in the area that the power system supplies power to (WHERE).	
Consequence if realized: In terms of cost schedule, performance and other.	If power is lost in a storm then homes will not have power. This can lead to loss of food in the refrigerator (COST), alarm clocks that don't work and people may be late to their jobs (SCHEDULE) and worrying about failed systems such as sump pump systems (PERFORMANCE) may cause performance issues at work to those affected.	Consequence – The "So What if it Happens?"
Mitigation Plan Summary (Plan overview and desired end state; residual risk.): You may enter your basic mitigation plan details here or you can click on the Mitigation Plan(s) tab to enter a more detailed plan.	The goal of the mitigation strategy is to put in long term and short term plans to reduce the ris losing power so that the end state is that power will only be lost for a maximum of three hours a time (the new requirement).	



Creating a Risk In Risk Recon

Consequence if realized: In terms of cost, schedule, performance and other.	If power is lost in a storm then homes will not have power. This can lead to loss of food in the refrigerator (COST), alarm clocks that don't work and people may be late to their jobs (SCHEDULE) and worrying about failed systems such as sump pump systems (PERFORMANCE) may cause performance issues at work to those affected.	
Mitigation Plan Summary (Plan overview and desired end state; residual risk.): You may enter your basic mitigation plan details here or you can click on the Mitigation Plan(s) tab to enter a more detailed plan.	The goal of the mitigation strategy is to put in long term and short term plans to reduce the risk losing power so that the end state is that power will only be lost for a maximum of three hours a time (the new requirement).	
Close out rationale: New problem/issue with ID number, overtaken by events, Mitigation plan successful Who approved this closure? Date of risk closure? Reason for risk closure?		Close Out Rationale – Include date of
Detailed Risk Analysis (Click bar to exp	and/contract)	meeting, who authorized closing the risks, for what reasons, and what is the residual risk.





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A	dditio	nal Fe	ature	es			
Additional Analysis is required by	available if						
Home Administration Rep	ports Actions New Users Help	Version: 6.1 - User: Dan Tor Project: HBC	res	T Training > HBCT Training > Training			
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Risk Analysis (Click bar to expa	ind/contract)						
Risk ID:	821						
User Defined Risk ID:							
Risk Title:	Risk of Loss of Power In Thunderstor	ms					
Status	Candidate 👻						
Urgent: Check to alert Risk Manager of time se risk.	nsitive						
Open Date:	4/1/2010 *						
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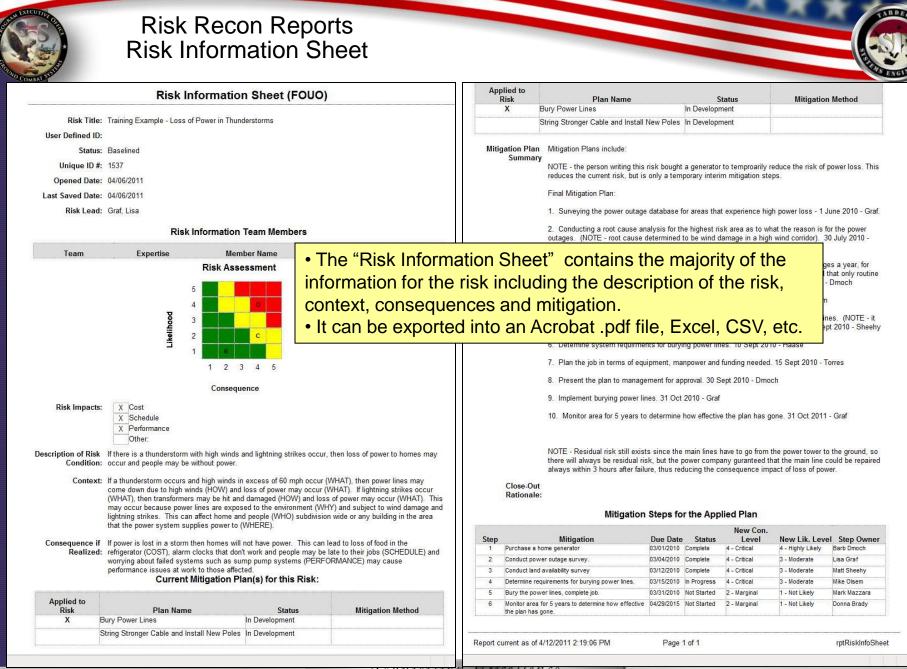
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Risk Recon Reports Detailed Risk Report – Excel

Risk Recon - Detailed Risk Report (FOUO)

HBCT Test Org / HBCT Test PMO / HBCT Training / HBCT Training / test three

Risk ID Status		Current Con/Lik	Impact	Risk Title	Description of Risk Condition	Context	Consequence if Realized	Mitigation - Rational for Choosing that Mitigation Plan			
587	Baselined	4/4	C/S/P	Loss of power in a thunderstorm	winds may also occur and power may	If a thunderstorm and high winds occur in excess of 60 mph, then power lines may be blown down due entaglement in trees, which may cause loss of power to homes in the neighborhood, and loss of power to home subsystems. The power company is responsible for this system.		12/27/09: Bury 3-Nov-10: too expensive to bury, buy generator instead			
625	Baselined	4/4	C/S/P/O	Hitting a deer	IF a driver hits a deer THEN their new car MAY be damaged.	The is a potential of hitting a deer.	Damage to a car.				
822	Baselined	4/3	C/S/P	Data Loss		learned on other operating operating systems We	Consequence of data files loss, and time loss of people fixing the issues. More time and possibly more resources needed to fix the issue.				

Risks can also be exported into an Excel spreadsheet.
This allows for easy sorting, searching and customization for reports.

AND COMMAND	Future Enha	ance	emo	ent	ts												CTUTING ST
Risk Recon Home Administration Repo Classified data must not be s User Help and Feedbact Back @ Area Noted: (Indicate the area or web page where you would like to ask a question or make a comment about.)			 Future Enhancements Include: Automatic Error Logging. Flag Identification for most recently updated fields. Enhanced Report Filtering. Revive option for mitigation plans on revived risks. 														
Satisfactory Rating: <i>(Optional)</i> Comments/Questions:	(0) - Choose a Satisfactory Rating 🔹	Version: 1: April 2011 Home Administration Reports Actions New Users Help User Dan Torns Project: Home Project: Home Her Dan Torns Project: Her Torn Torns Classified data must not be stored in this risk management tool Edit Risk: Risk of Loss of Power in Thunderstorms															
		Back to Risk Info Sheet Page Risk Info Sheet History Detail NOTE: The light green high Last Modified Modified By 5/9/2011 Dan Torres2	iled Risk Analysis Hist hlight indicates tha	ory at a field was more Lead Risk Status C	Re ^r OpenedDate	Last viewed WBS IM	P O Likelihood	0	C Likelihood	C Consequence L	R		mpactOnCost	ImpactOn Schedul	le ImpactOnPerformanc True	e ImpactOnOther I False	ImpactOnOtherTi
Submit Cancel		10:20:56 AM 5/9/2011 Dan.Torres2 AM 5/3/2011 lisa.graf 5/3/2011 lisa.graf 5/3/2011 lisa.graf	Power In Thunderstorms Risk of Loss of Grat Power In Thunderstorms Risk of Loss of Grat Power In Thunderstorms Risk of Loss of Grat	1 , Lisa Candidate 4 , Lisa In Manager 4 , Review 1 , Lisa Candidate 4	12:00:00 AM 10: AM 1/1/2010 5/9 12:00:00 AM 10: AM 1/1/2010 5/3 12:00:00 AM 3:2 PM 1/1/2010 5/3	20:56 /2011 09:06 /2011 4:29 /2011 /2011	Moderate Moderate	Catastrophic Catastrophic	Likelihood Highly Likely Highly Likely	Critical Critical		F	false False	False False False	False False	False False	
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Risk Management brings structure and order to the unknown.

Resources

 Risk Management Guide for DOD Acquisition, http://www.acq.osd.mil/sse/docs/2006RMGuide4Aug06finalversion.pdf

Risk Recon

- Link→ https://peoportalap.tacom.army.mil/riskmgmt/Default.aspx
 - User Guide (click help in Risk Recon)
 - Workflow (located in the User Guide)
 - Risk Management Plan (click help in Risk Recon)
 - Tip Sheet (click help in Risk Recon)
 - Standard Operating Procedure (PEO GCS Knowledge Center)
- Risk Admin for your Organization
 - Cynthia Crawford 586-282-0768 MRAP/TARDEC cynthia.crawford1@us.army.mil
- PEO GCS Point-of-Contact
 - George Wiklund george.wiklund@us.army.mil



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