

Documenting Risk Stories to Extract Best Practices

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Topics

- Background and Goals
- Approach
- Overview of templates
- Discussion of templates
 - As is
 - Modify
 - Replace
 - Delete
 - Add
- Contributions to the stories solicited



Background and Goals

- Risk management is increasing in importance based on limitations in budgets and schedules
- Need to build a compelling case for risk management
 - Practitioner's Workshop at prior Risk Management Conference
 - JPL/Aerospace Risk Management Collaboration
- What is important in the practice of risk management and what isn't??



One Approach- Compilation of Risk Stories for Further Analysis

- Decision to compile two kinds of stories
 - Risk management
 - Specific risks
- Develop and populate the first draft templates for comment and evaluation
- Revise templates
- Solicit wider input of the templates
- Solicit stories to incorporate into the template



General Information for Both Templates

- Project
- Customer
- Performing Contractor/Agency
- Time frame (approximate year)

Story Template (Risk Management)	Story 1
Project:	MER
Customer:	NASA
Performing Contractor/Agency:	JPL
Year	2003

Sections in Risk Management Template

- Enterprise level questions
- Program/project level questions
- Participants' history with risk management
- Implementation of traditional risk management steps
- Contributions to decision making processes and project success



Risk Management Template Questions

- Enterprise level

Enterprise Level	NER
Were there guidance documents for risk management? What were they?	yes, NPG 7129.A
If available, are the documents helpful? Was there anything else that was more helpful in getting started?	yes, prior risk management plans
Is there a support function in the enterprise to assist implementation?	yes, Risk Management Process Owner
Was it useful? What was needed to be more useful?	

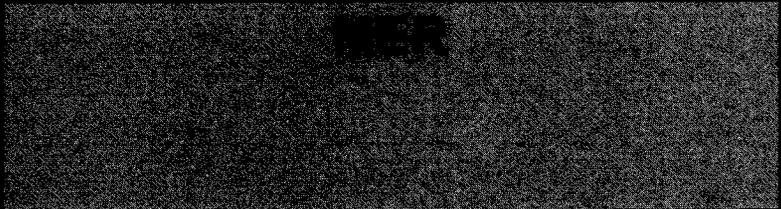
Risk Management Template Questions

- Project/program level

Who initiated risk management?	Project System Engineer
Who had responsibility for the risk	System Engineer
Who had responsibility for the day to day implementation?	Risk Data Manager
When, relative to conventional program/project milestones, was risk management initiated?	After the beginning of Phase B??
What were the critical program/project challenges?	schedule (from the beginning), technical (when the realization of how much less could be used from Pathfinder), a successful EDL
What was the prior experience of participants with risk management?	
Program Manager	believer from prior program
Systems Engineer(s)	a class, no experience

Risk Management Template Questions

- Participants' history with risk management

What was the prior experience of participants with risk management?			
	Program Manager	believer from prior program	
	Systems Engineer(s)	a class, no experience	
	Mission Assurance Manager		
	Subsystem engineers	nothing formal, most open minded	
	Supporting engineers/functions	nothing formal, most open minded	
	Was there a formal risk management plan? (attach)	yes	

Risk Management Template Questions

- Implementation of traditional risk management steps

Risk Management Steps		
	Risk Identification- How was this implemented?	by interviewing all of the lead engineers and system managers on a regular basis
	Risk Assessment- How was this implemented?	very ad hoc and incompletely
	Risk Decision/Mitigation Process(es)- How was this implemented?	ad hoc by the system managers, business as usual
	Risk Handling- How was this implemented?	ad hoc and via business as usual methods
	Risk Tracking- How was this implemented?	regular interviews with lead engineers and system managers

Need to add a question about the scales for probability and consequences used.

Risk Management Template Questions

- Contributions to decision making processes and ultimate project success

	Risk Tool(s) Used	Excel Spreadsheet, Custom Filemaker Pro database
	Was it value-added to the program/project?	Required people to think ahead as to what they might encounter (the local culture encouraged people to take action)
	How was the value added measured?	it wasn't formally,
	What other factors contributed to the effective execution of the project?	
	Success of project (implementation)	Successfully launched in 2003
	Success of project (mission)	TBD in 2004

For the Risk Management Template...

Your Input is Solicited Now, at any future time

- Additions- are there data and information that we have NOT asked for in the template that should be requested?
- Deletions- any items that are probably not value added and why
- Modifications - clarification??
- Accept- Looks good so far
- Replace- Wrong question, what's the alternative question



Template for Risk Stories

- Risk description
- Context of specific risk
- How and when did it become a risk
- What options were identified, when and what decision was made on the course of action to pursue
- What happened, what might have happened without risk management

For the Specific Risk Stories

- Risk Description Questions

Story Template (Individual Risks)	Story 1
Project:	Mars Reconnaissance Orbiter
Customer:	NASA
Performing Contractor/Agency:	JPL
Describe the parameters of the risk management system. (Summary of Risk Management Story)	MRO initiated the development of risk management a few months before PMSR. Used support with experience on MER, non JPL.
What was the risk?	original descriptions from Science, Mission Navigation, Payloads had circularly referenced risks related to uncertainties in the orbit around Mars

For the Specific Risk Stories

- Context of specific risk

Project:	Mars Reconnaissance Orbiter
What if ... (this bad thing happens)	we are unable to support a 200x 400 km orbit?
Due to ...due to ... due to ... (identify the cause that is uncertain and/or out of your planned control)	the uncertainty in the ability to guarantee planetary protection with this periapsis, in the drag at periapsis impacting amount of propellant needed for maintaining the orbit and in the orbits necessary to meet science requirements(payloads were selected
Then ... (what requirement(s) are affected)	Additional budget required for additional mission design (more iterations than planned, lower quality of science than planned, the ability to meet planetary protection requirements

For the Specific Risk Stories

- How and when did it become a risk

Project:	Space Reconnaissance Orbiter
How was the risk identified	By discussion with the system managers, Mission Navigation, Science and Project Systems Engineer
Who identified the risk	Risk data managers compiled to the single risk
Why was it considered a risk	because it had the potential for significant impacts to multiple organizations late in the game
When in the effort was it identified	just before PMSR

For the Specific Risk Stories

- Development mitigation actions and associated decisions

Project:	Mars Reconnaissance Orbiter
What options for prevention or mitigation were identified?	carry margin in the propellant allotment, get and analyze Odyssey data when available and use to refine models, perform an early evaluation of alternative orbits, work to an early resolution of how to meet the planetary protection requirements (with NASA)
When was the decision to mitigate, prevent or accept made?	well before PDR, in fact a modified orbit that still met all the requirements was established by PDR.
What was decided	a modified orbit, 255 x 320 km??
What was the rationale for the decision	a better balance for meeting requirements
Did the decision lead to a determinate or indeterminate status	indeterminate until a particular balance dropped into place

For the Specific Risk Stories

Project:	Risk Recognition Order
What actually happened?	monitoring status- is orbit going to change before or after CDR??
What would have happened without formal risk management?	
What resources were spent? (estimates in \$, schedule, manpower or any other measure of resource is ok, quantitative is better, but qualitative is ok)	A few hours to gather and refine the risk, send it back to the system managers for clarification and feed back, some additional in scope planning, and (maybe??) another 100 man hours out of scope effort for extra analyses. Additional in scope effort with
What resources would have been required if realized?	Depending on how late potential mismatch of requirements was, it could have meant redesign of the propulsion system (or relaxing the mission lifetime requirement), the mission design (and redocumenting the design), and design modifications for the payload

For the Risk Management Template...

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Rules of Engagement for Submissions

- You provide stories and you get the next revision with all stories compiled to date
- Stories you provide must be able to be released to others
- Continuing submissions results in continuing updates
- The Aerospace/JPL Collaboration Team will perform the compilation



Submission of Stories

- Use template on CD
- Provide POC information in case we need to follow up and to provide up-to-date list
- Email to: mona.m.witkowski@jpl.nasa.gov
AND susan.c.ruth@aero.org
- Updates nominally biannually, more frequently if warranted

