



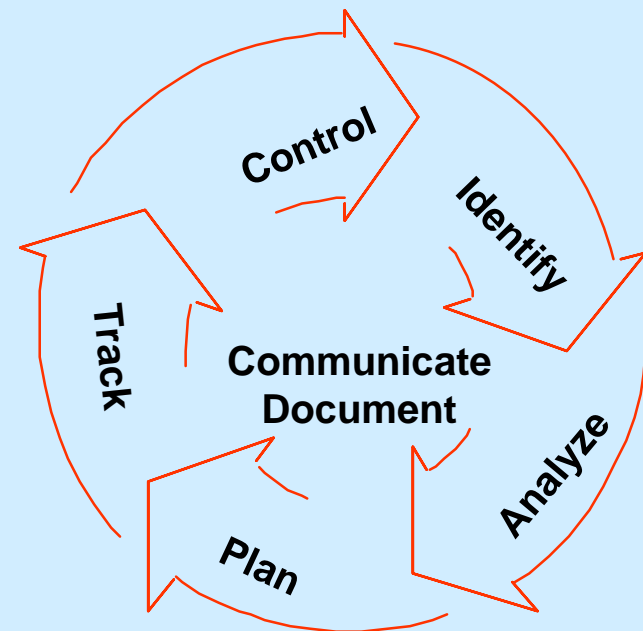
Continuous Risk Management at NASA

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Overview

Background

Why do Risk Management

NASA's Approach

NASA's Continuous Risk Management Course

Introduction

Risk Management Functions

Course Evaluations

Conclusions

Background





NASA Risk Management Guidance

- NPG 7120.5A, “NASA Program and Project Management Processes and Requirements,” April 3, 1998
 - RM is one of 7 major themes;
 - Section 4.2 establishes RM requirements;
 - Stresses RM as an integral part of program/project management.
- NPD 2820, “Software Policy”
- SMA independent assessments of programs and projects are RM-based.

NPG 7120.5A

Program Managers must:

Develop and implement a Risk Management Plan;

Implement a continuous RM process;

Know their primary risks* and seek governing program management council (GPMC) approval of decisions to “accept” them.

*Primary risks--those undesirable events having both high probability and high impact/severity

RM--Why now?

The current and future environment of:

Tighter budgets;

Fewer people;

Shorter schedules;

More complex systems;

”Better, Faster, Cheaper” spacecraft projects;

Limited facility dollars;

Performance based contracting;

Full-cost accounting....

With all of this we need informed decision-making to achieve first time success!



Continuous Risk Management (CRM) Course

Taught by Software Assurance Technology Center, Goddard
Space Flight Center

Course #NASA-FSFC-SATC-98-001

Text: Software Engineering Institute at Carnegie Mellon
University, *Continuos Risk Management Guidebook*, 1996.

NTIS#: AD-A319533KKG

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<http://arioch.gsfc.nasa.gov/302/Risk/PMPPage.htm>

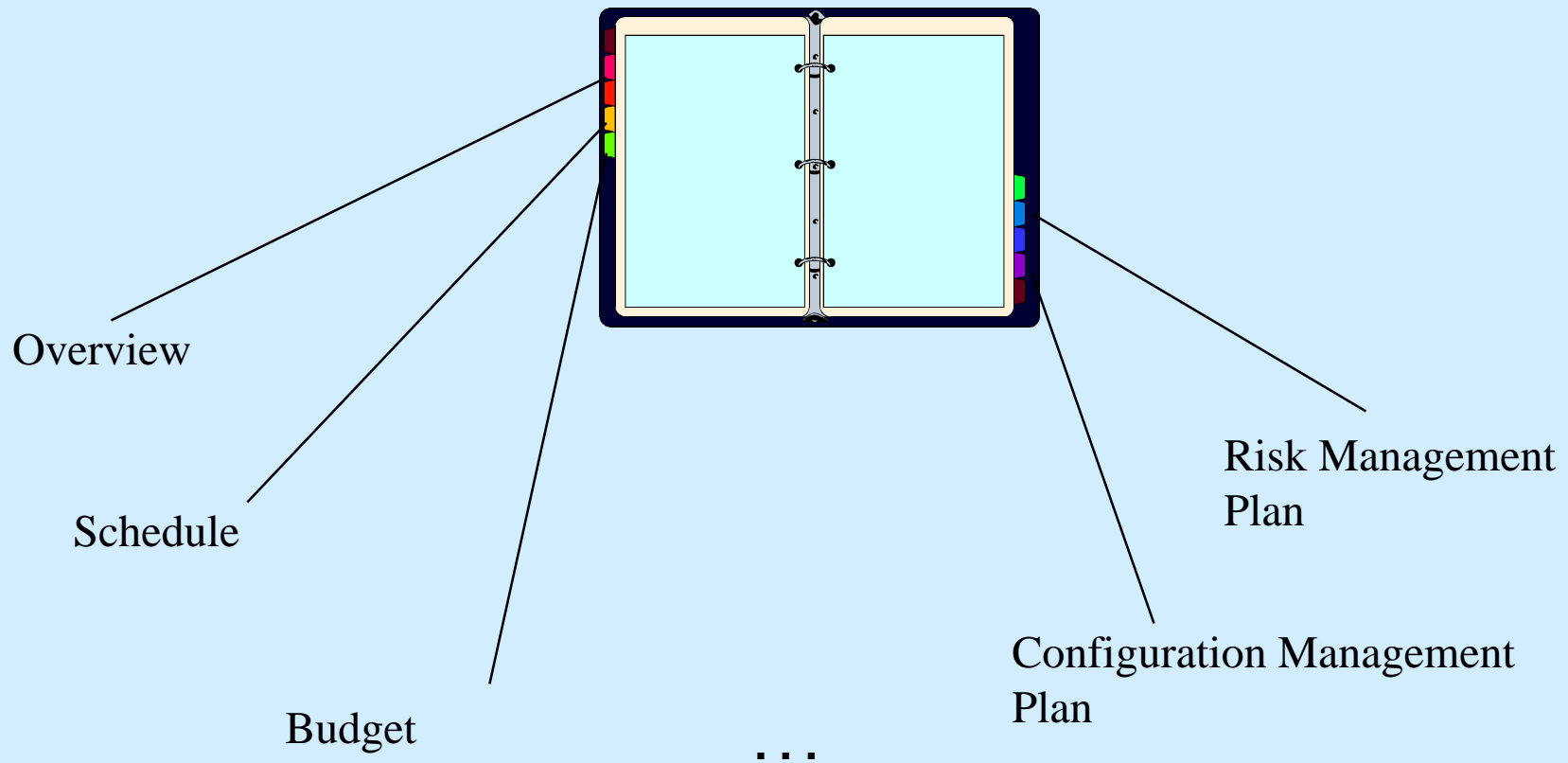


NASA Risk Management Course

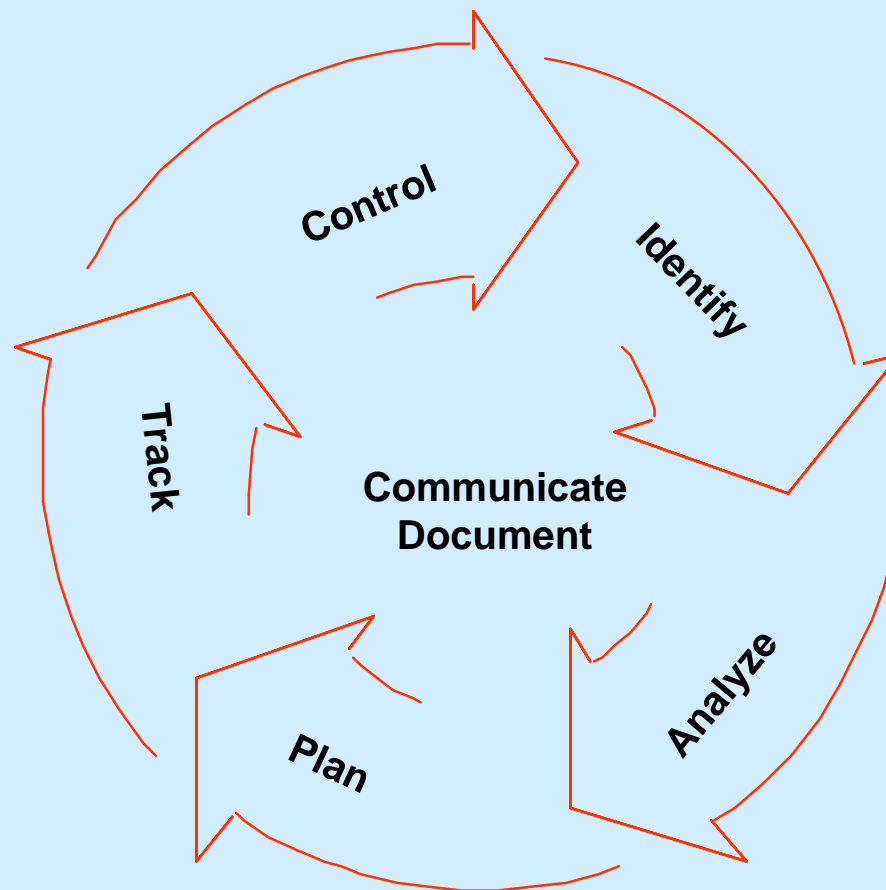
Objectives

- ⇒ Understand the concepts and principles of Continuous Risk Management and how to apply them
- ⇒ Develop basic risk management skills for each function of Continuous Risk Management
- ⇒ Be able to use key methods and tools
- ⇒ Be able to tailor Continuous Risk Management to a project or organization

Project Management Plan



Continuous Risk Management Course



CRM Course Outline

- 1 Introduction
- 2 Continuous Risk Management Paradigm
 - 2-1 Overview
 - 2-2 Identify
 - 2-3 Analyze
 - 2-4 Plan
 - 2-5 Track
 - 2-6 Control
 - 2-7 Communicate and Document
- 3 Risk Management Example Implementation
- 4 Getting Started in Continuous Risk Management
- 5 Risk Management Workshop



CRM Workshop Outline

- Objectives:
- 1 - Partial completion of risk management plan
 - 2 - Initial risk identification and mitigation

Steps:

Organizational chart

Roles and responsibilities

Meeting schedule

Tools and methods

Attribute definitions

timeframe, probability, impact

Risk identification

Writing risk statements

Mitigation strategies

Tracking data

Definitions of Risk

Risk involves the likelihood that an undesired event will occur.

Risk involves the severity of consequence of the event should it occur

Qualitative or
Quantitative



Qualitative or
Quantitative

$$\mathbf{Risk = Likelihood * Severity}$$

Why Do Risk Management?

- Early identification of potential problems
- Enable more efficient use of resources
- Promote teamwork by involving personnel at all levels of the project
- Information for tradeoffs based on priorities and quantified assessment
- Increase chances of project success

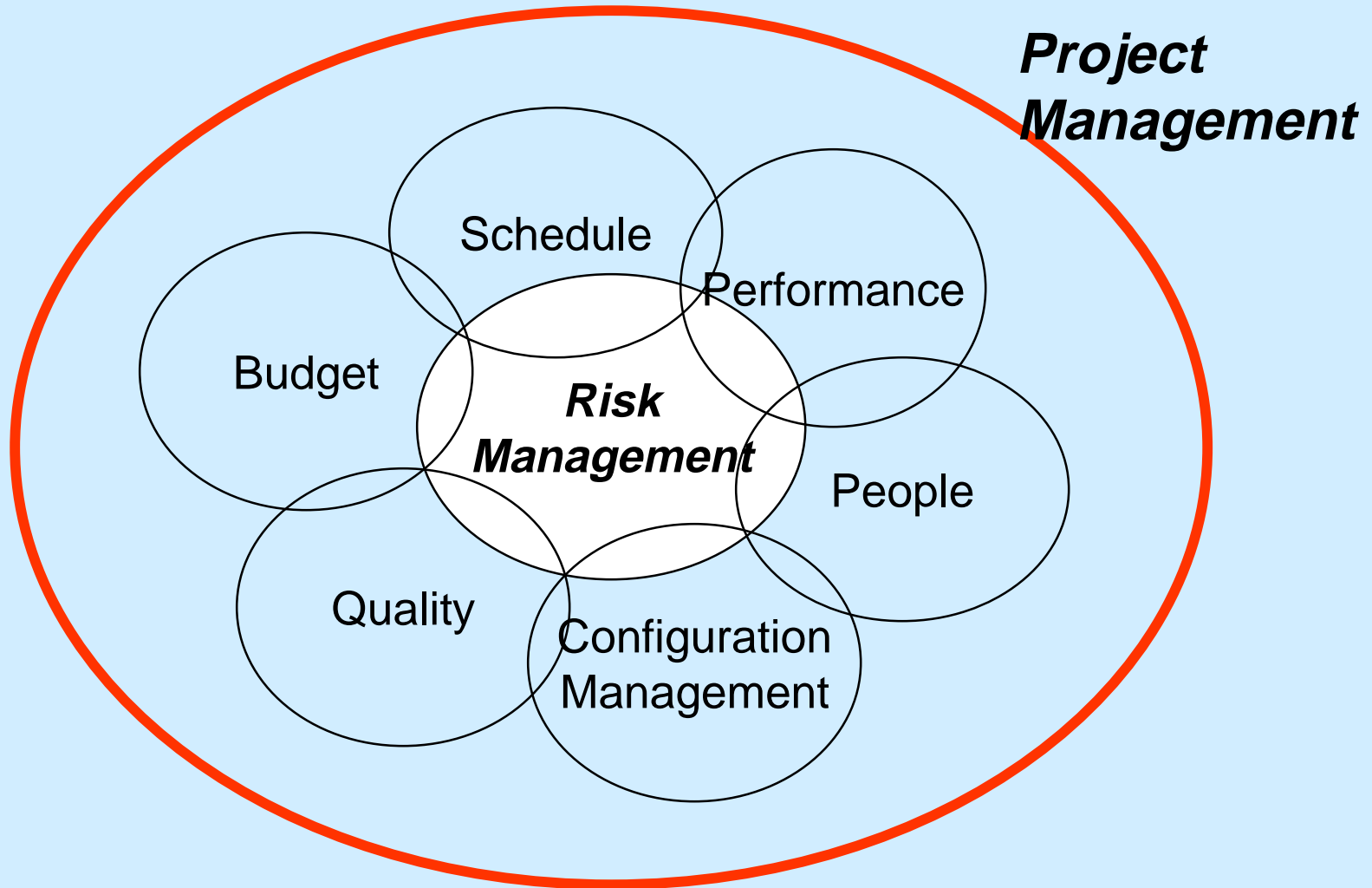
What is Continuous Risk Management?

An engineering management practice with processes, methods, and tools for managing risks in a project.

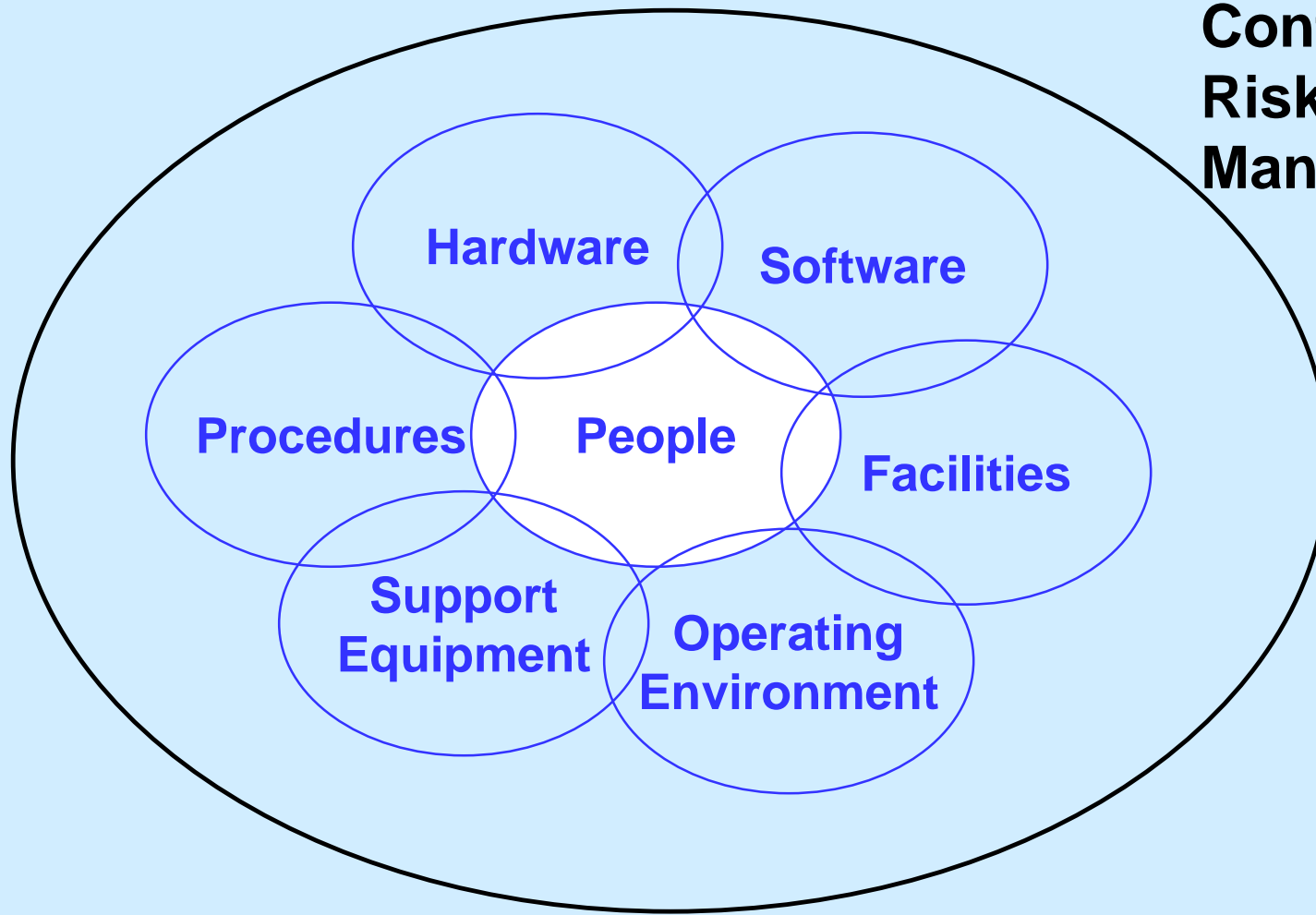
It provides a disciplined environment for proactive decision making to:

- assess continually what could go wrong (risks)
- determine which risks are important to deal with
- implement strategies to deal with those risks
- assure, measure effectiveness of the implemented strategies

Risk Management & Project Management

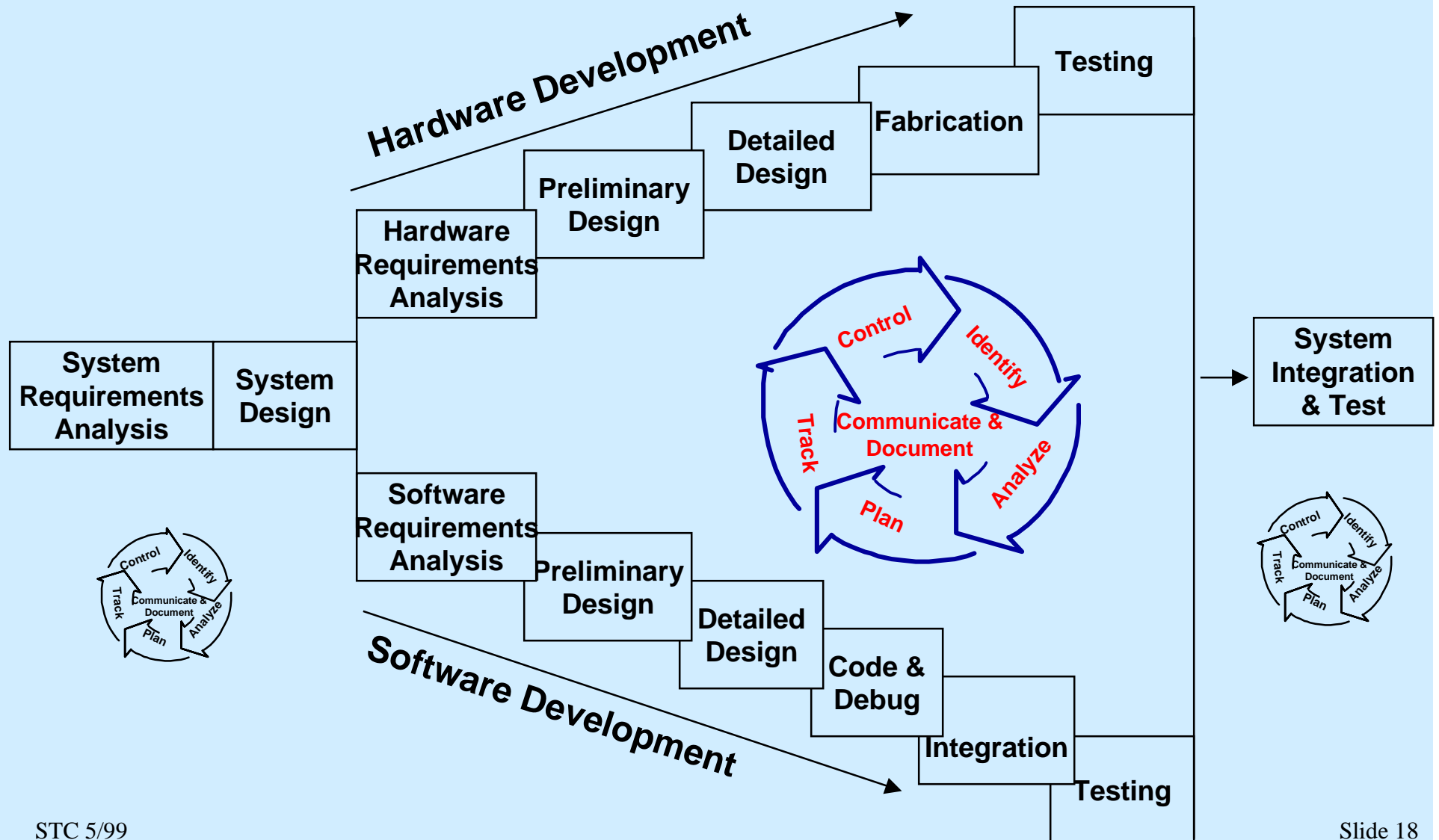


Where is Continuous Risk Management Applied?



**Continuous
Risk
Management**

When Should Continuous Risk Management be Done?

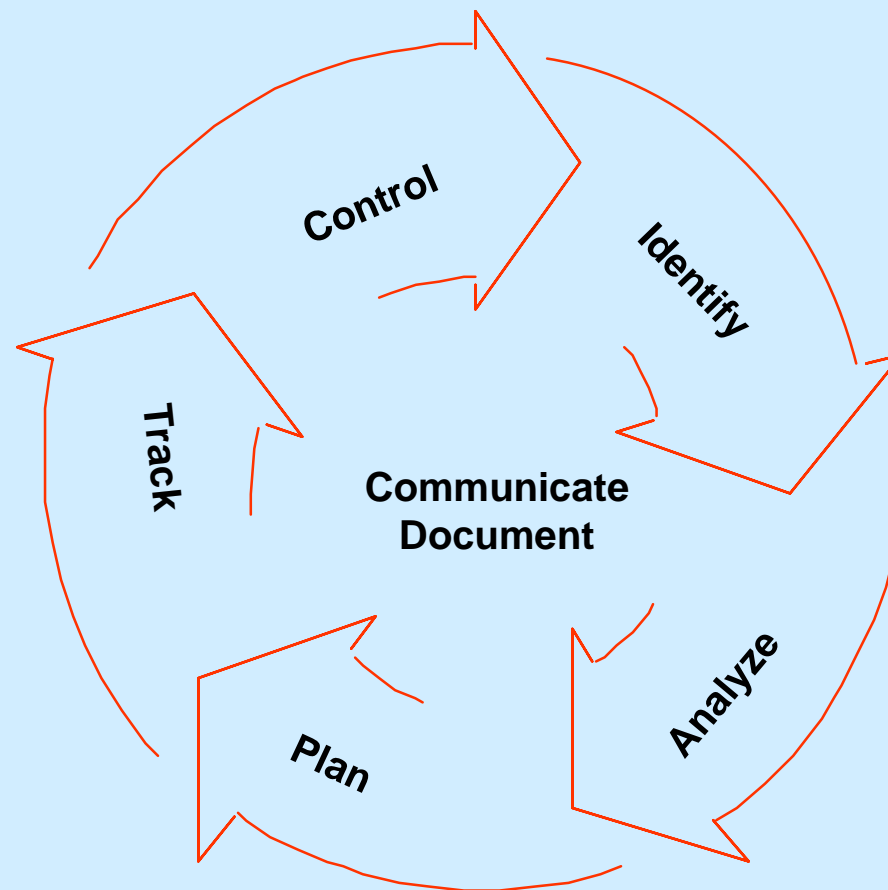


Who Does Continuous Risk Management?



Learning Continuous Risk Management is similar to incorporating any new habit into your daily life.

Continuous Risk Management Functions



1 - Identify

Purpose

Search for and locate risks before they become problems

Description

The process of transforming uncertainties and issues about a project into distinct (tangible) risks that can be described and measured

Risk Statement & Context

Condition → Consequence
Risk Statement

A good risk statement:

- Contains at least one condition
- Contains at least one consequence
- Is clear and concise

Good context:

- Provides additional information not in the risk statement
- Ensures that the original intent of the risk can be understood, particularly after time has passed

2 - Analyze

Purpose

Convert risk data into decision-making information

Description

The process of examining the risks in detail to determine the extent of the risks, how they relate to each other, and which ones are the most important

Analysis Activities

Evaluate:

- impact (I)
- probability (P)
- timeframe (T)

Classify:

- identify duplicates
- consolidate risks to sets

Prioritize:

- identify Pareto top N
- rank top N

Risk	I	P	T
Risk a	M	M	F
Risk b	M	L	N
Risk c	L	H	N
...			

Consolidate risks

Risk	I	P	T
Risk set A	H	M	F

Risk b	M	L	N
Risk c	L	H	N
...			

Sort by evaluation results

Risk	I	P	T
Risk n	H	H	N
Risk s	H	M	N
Risk set A	H	M	F

Risk c	L	H	N

Pareto top N

Rank order the Pareto top N

Top N
1.
2.
3.
...

3 - Plan

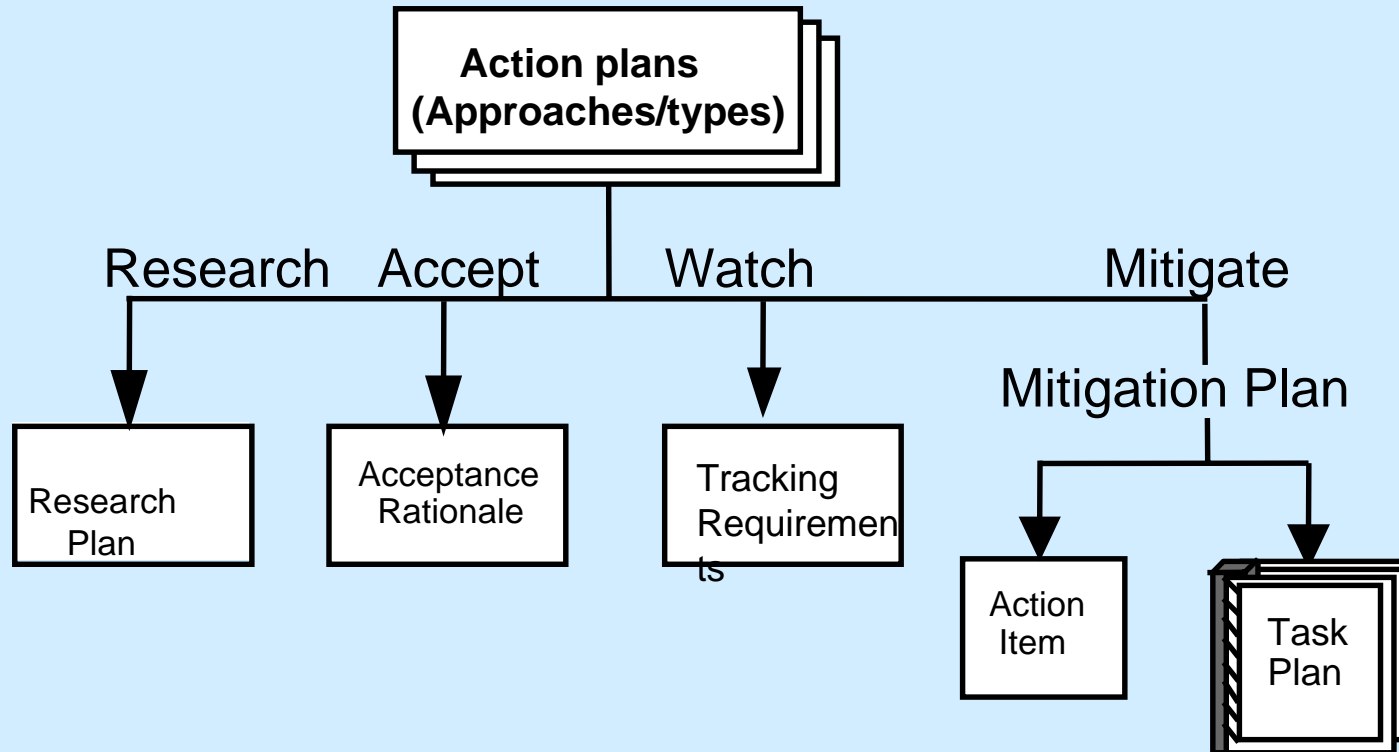
Purpose

Translate risk information into decisions and mitigating actions (both present and future), and implement those actions

Description

The process of deciding what, if anything, should be done about a risk or set of related risks

Action Plan Approaches



4 - Track

Purpose

Monitor risk indicators and mitigation actions

Is the plan followed?

Is the risk reduced?

Description

The process in which risk status data are acquired, compiled, and reported

Risk Metrics

Measure attributes of a risk

- impact, probability, and timeframe

- other risk-specific attributes

Assess the impact or success of a mitigation plan

Chosen during planning

Provide meaningful information to enable more informed control decisions

Triggers

- provide early warning of an impending critical event

- indicate the need to implement a contingency plan to preempt a problem

5 - Control

Purpose

To make informed, timely, and effective decisions regarding risks and their mitigation plans

Description

The process that takes the tracking status reports for the project risks and decides what to do with the risks based on the reported data

6 - Communicate & Document

Purpose

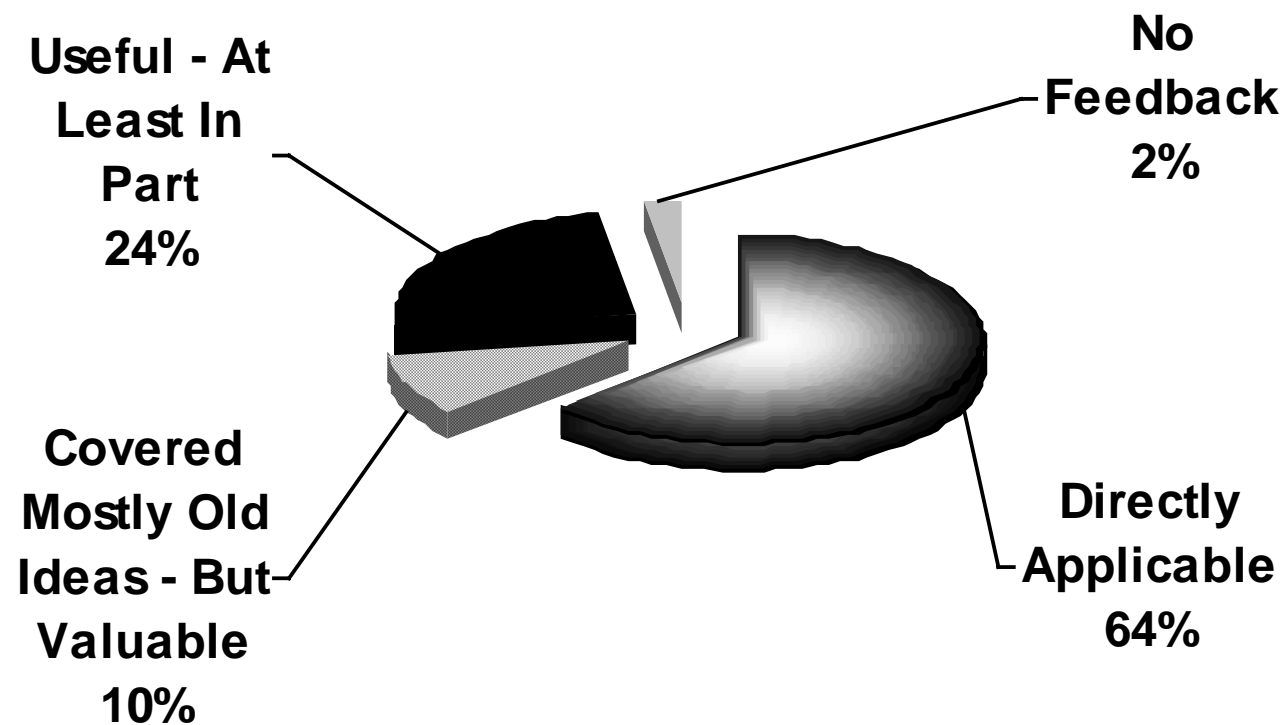
Provide information and feedback to the project on the risk activities, current risks, and emerging risks

Description

A process in which risk information is conveyed between all levels of a project team

Course Evaluations

Applicability to Work



RM--Costs vs. Benefits

Costs

Formalized process
Formalized documentation
Additional analysis
Additional mitigation actions
Training

Benefits

Reduced “forest fires”
Fewer surprises
Clearly specified contingency plans and triggers
More effective use of resources
Fewer schedule and cost overruns
Greater probability of mission success

Can you really afford NOT to?

Summary

The time is right for RM;

Successfully managing “Better, Faster, Cheaper” projects requires up-front, knowledge-based RM;

Good RM is good PM;

A structured RM approach is critical to successful projects in the current environment;

RM is required (NPG 7120.5A & NPD 2820) and expected;

RMP, CRM, primary risks, PMC reviews, Independent Assessments

The NASA specific RM training is ready and available;

The SATC at GSFC is responsible for the course.

Over 30 courses have already been taught since 1/1/98 at all NASA centers.

RM concepts are being applied by projects trained in CRM.

References

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