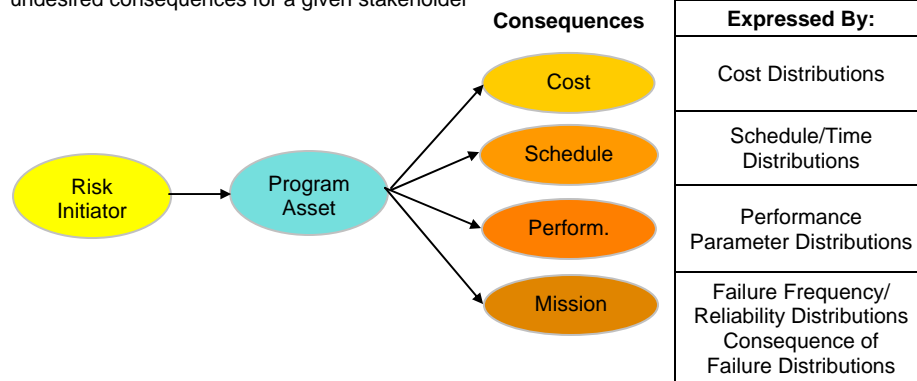


Risk Management Quick Reference Card

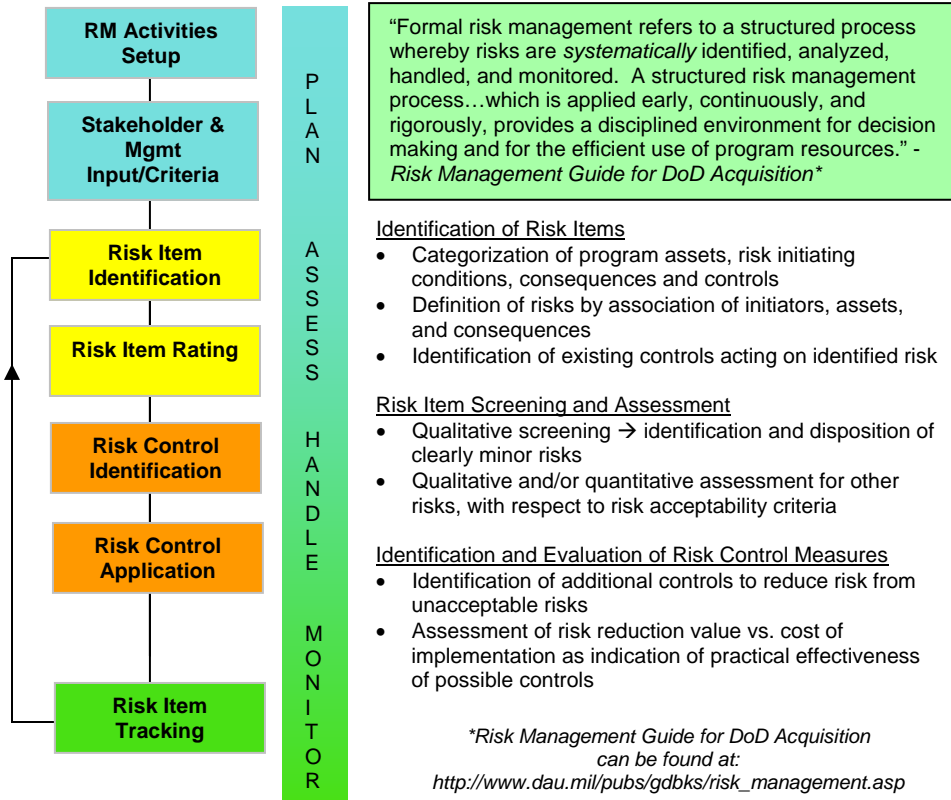
DEFINITION OF RISK

"Risk is characterized by the combination of the probability that a program will experience an undesired event and the consequences, impact, or severity of the undesired event were it to occur." – from NASA Risk Management Procedures and Guidelines, NPG 8000.4, 25 April 2002

Risk Item: A specific set of interdependent conditions or events, and the resulting set of undesired consequences for a given stakeholder



THE CONTINUOUS RISK MANAGEMENT PROCESS



POTENTIAL RISK INITIATOR CATEGORIES

| Programmatic | Potential Failures |
|---------------------------------------|-----------------------|
| Budget and schedule allocation issues | System performance |
| Teaming, staffing issues | Component performance |
| Facilities and equipment | Safety assurance |
| Customer – supplier chains | Security assurance |
| Requirements, design and test issues | Information assurance |

RISK HANDLING STRATEGIES

- **Avoid:** use alternate design/ process
- **Control:** use mechanisms to reduce risk
- **Transfer:** allocate responsibilities to more competent entity
- **Accept/Monitor:** evaluate if probability and/or consequence changes require other strategies

SAMPLE QUALITATIVE RISK MATRIX

Likelihood

A = Very Low, 1/1000 per mission
 B = Low, 1/100 per mission
 C = Medium, 1/10 per mission
 D = High, 1/3 per mission
 E = Very High, 2/3 per mission

| Likelihood | E | Low | Medium | High | High | Very High |
|------------|----------|-----------------|----------|----------|--------|-----------|
| | D | Low | Medium | Medium | High | High |
| C | Very Low | Low | Medium | Medium | High | |
| B | Very Low | Very Low | Low | Low | Medium | |
| A | Very Low | Very Low | Very Low | Very Low | Low | |
| | | 1 | 2 | 3 | 4 | 5 |
| | | Severity | | | | |

Consequence

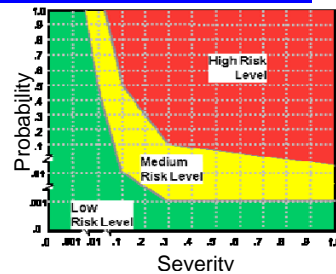
| | | |
|---------------|-------------------|---|
| 1 = Very Low | 3% utility loss | Minor deviation from required performance/schedule |
| 2 = Low | 10% utility loss | Significant, but non-impairing to primary mission or impairing to secondary mission |
| 3 = Medium | 30% utility loss | Impairing to primary mission or severely-impairing to secondary mission |
| 4 = High | 60% utility loss | Severely-impairing to primary or failure of secondary |
| 5 = Very High | 100% utility loss | Failure of primary mission |

USEFUL EQUATIONS (QUANTITATIVE RISK AND CONTROL ANALYSIS)

1. Basic Risk Calculations – Expectation Model

P = Probability (Likelihood)
 C = Consequence (as a fraction between 0 and 1)
 R = Risk (Expected Consequence)

$$R_{base} = P \cdot C_{Total}$$



2. Control Effects

Preventive Control (p): A control that, if successful, will prevent the risk initiator from impacting the program; reduces likelihood of the risk. F = Probability of Control Failure

$$R_{Ctrl} = R_{base} \cdot F_p$$

Mitigative Control (m): A control that, if successful, will reduce the consequences of the risk (by some fraction, μ), or transfer the consequences to a different dimension

$$R_{Ctrl} = R_{base} \cdot (\mu(1 - F_m) + F_m)$$

3. Control Benefit

Change in Risk ($R_{base} - R_{Ctrl}$) compared to cost of control

© 2003. The Aerospace Corporation.
 All Rights Reserved.

