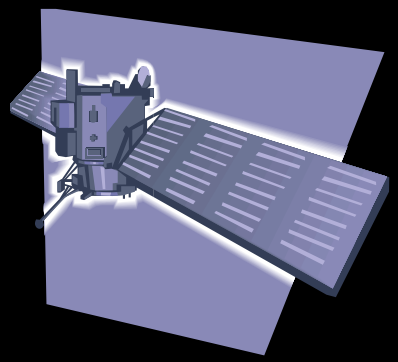


*ribs Space Consultancy & Insurance*

# RISK MANAGEMENT IN SPACE ACTIVITIES

# Risk Management in Space Activities

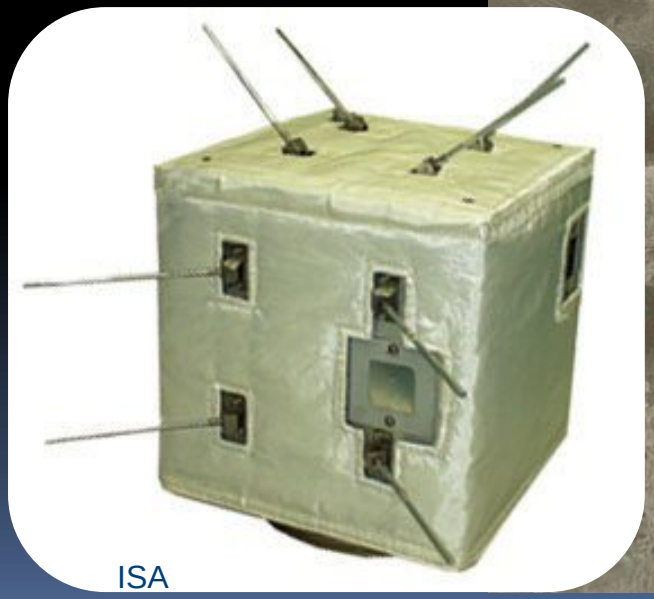
## Implementation, Execution and Evaluation of Risk Management

Henk H.F. Smid

Senior Space Consultant
*ribs Space Consultancy & Insurance*
http://www.ribs-sci.nl

The 9th Iranian Aerospace Society Conference
Feb. 8-10/2010, Islamic Azad University, Science and Research Branch

# 2 February 2009:
# Iran launches home made satellite with indigenous developed launch vehicle from its Semnan launch site.



Conclusion 1

Iran conducts space activities;
it builds satellites and launch vehicles

Conclusion 2

Iran has to implement *Risk Management* in its space activities

# Risk Management in Space Activities

## Implementation, Execution and Evaluation of Risk Management

## Introduction

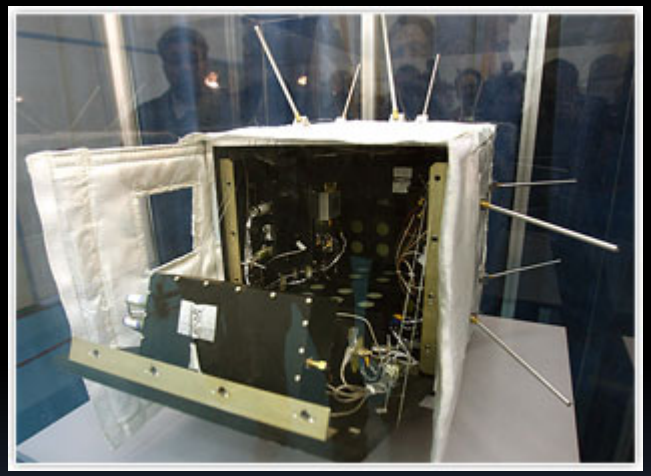
- Risk Management &
- Risk Control Measures

## Risk Control Measures

- Implementation
- Execution
- Evaluation

## Concluding remarks

- Conclusions
- Questions & Answers



Omid Satellite

# Risk Management in Space Activities

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Risk Control Measures

## Risk Control Measures

Implementation
Execution
Evaluation

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Questions & Answers

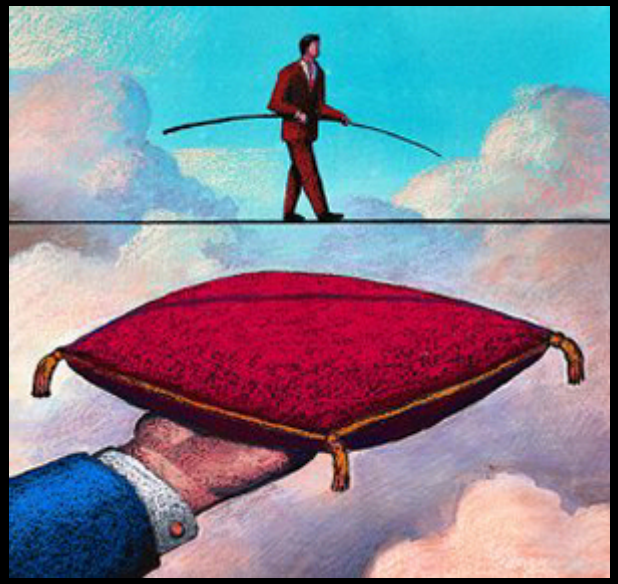
TT&C Vehicle

**Risk** is a measure of the inability to achieve overall programme objectives within defined cost, schedule, and technical constraints and has two components:

(1) the probability of failing to achieve a particular outcome and

(2) the consequences of failing to achieve that outcome.

RISK =
LIKELIHOOD
X
CONSEQUENCE

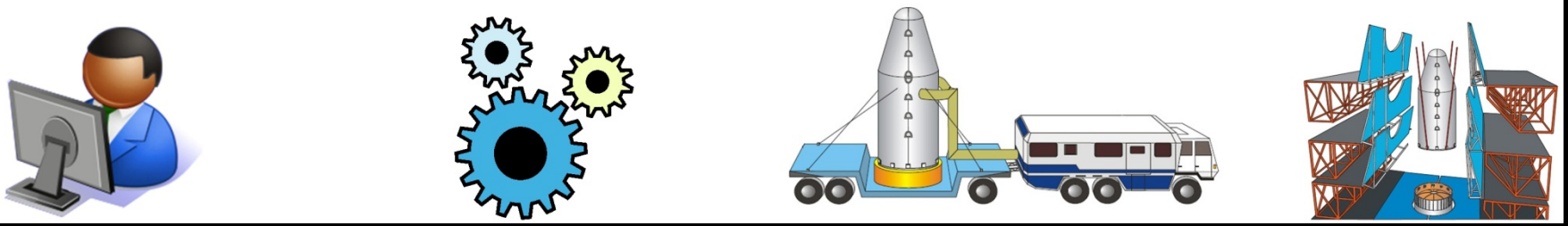


**Risk Management** is the act or practice of controlling risk.

It includes: risk planning,
assessing risk areas,
developing risk-handling options,
monitoring risks to determine how risks have changed,
documenting the overall risk management programme.

## Satellite

Design → Manufacturing → Transport to launch site → Pre-launch activities

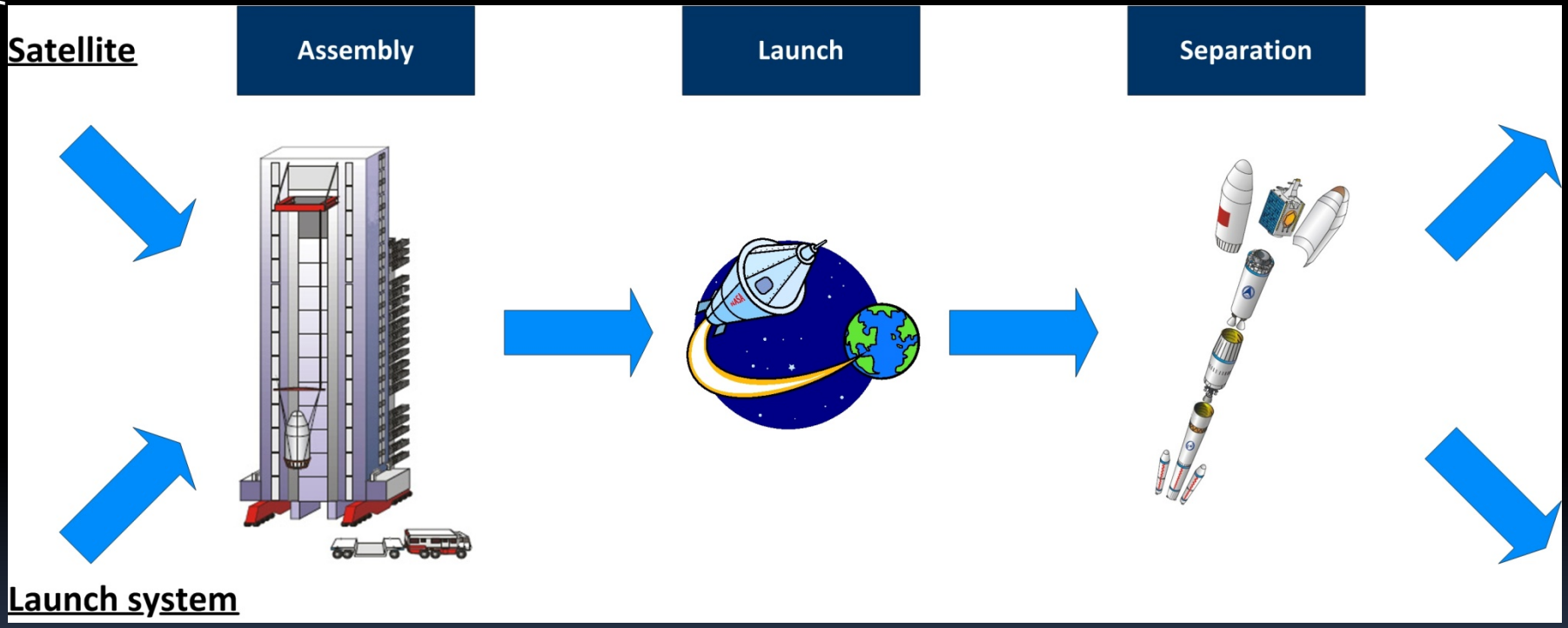


The process of launching and maintaining a satellite in orbit

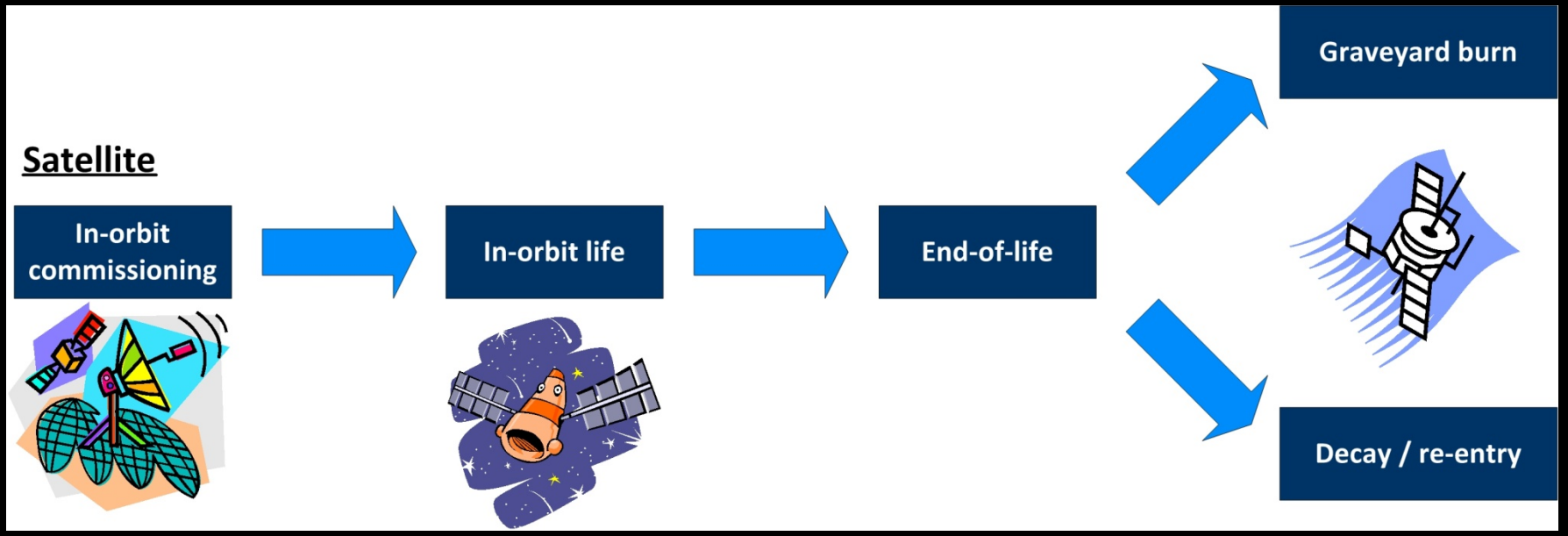
## Launch system

Design → Manufacturing → Transport to launch site → Pre-launch activities

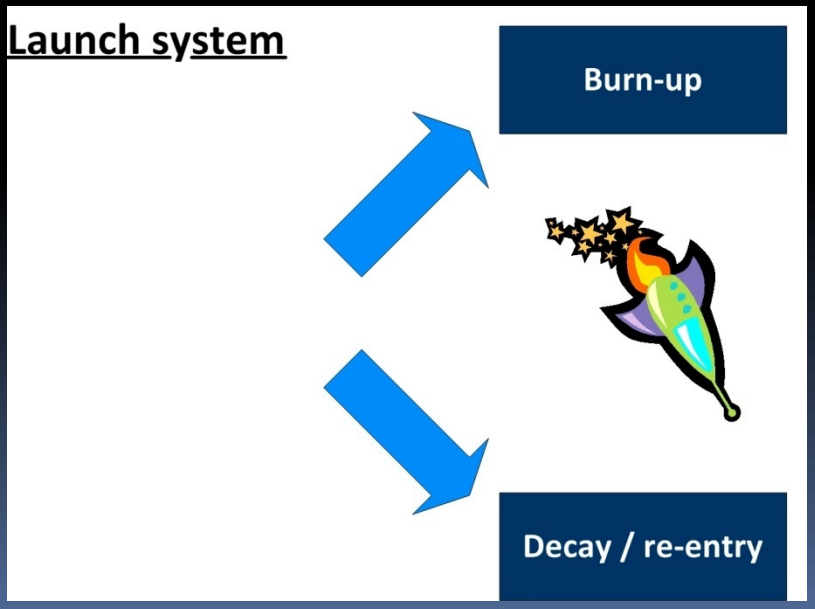
RISK


Satellite
Assembly
Launch
Separation
Launch system

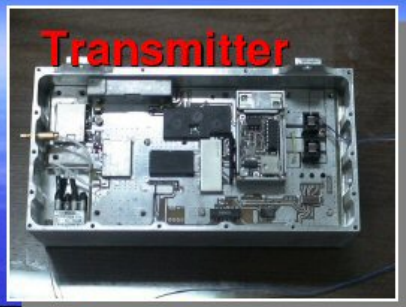
## Satellite

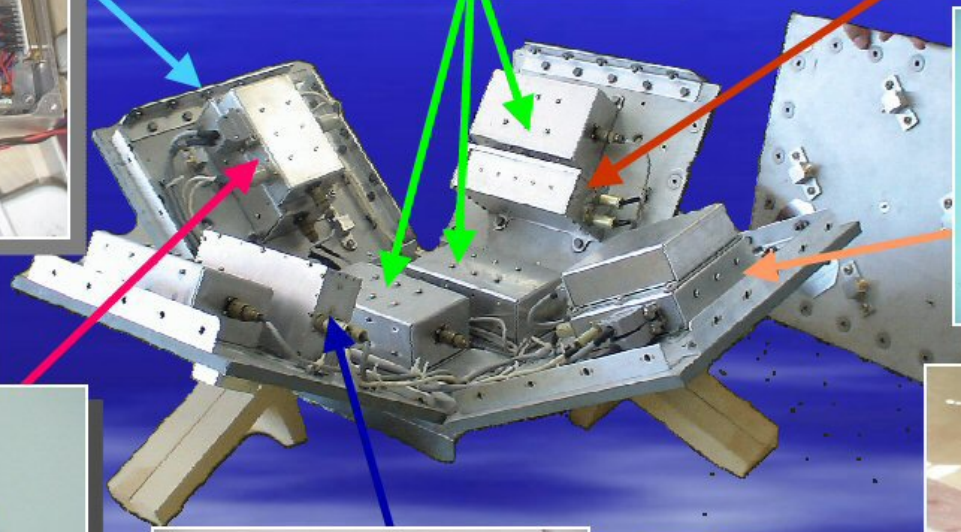


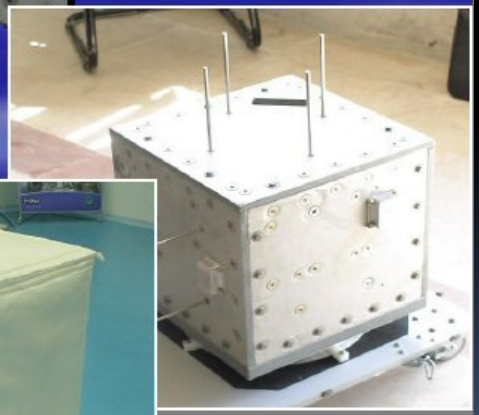

## Launch system



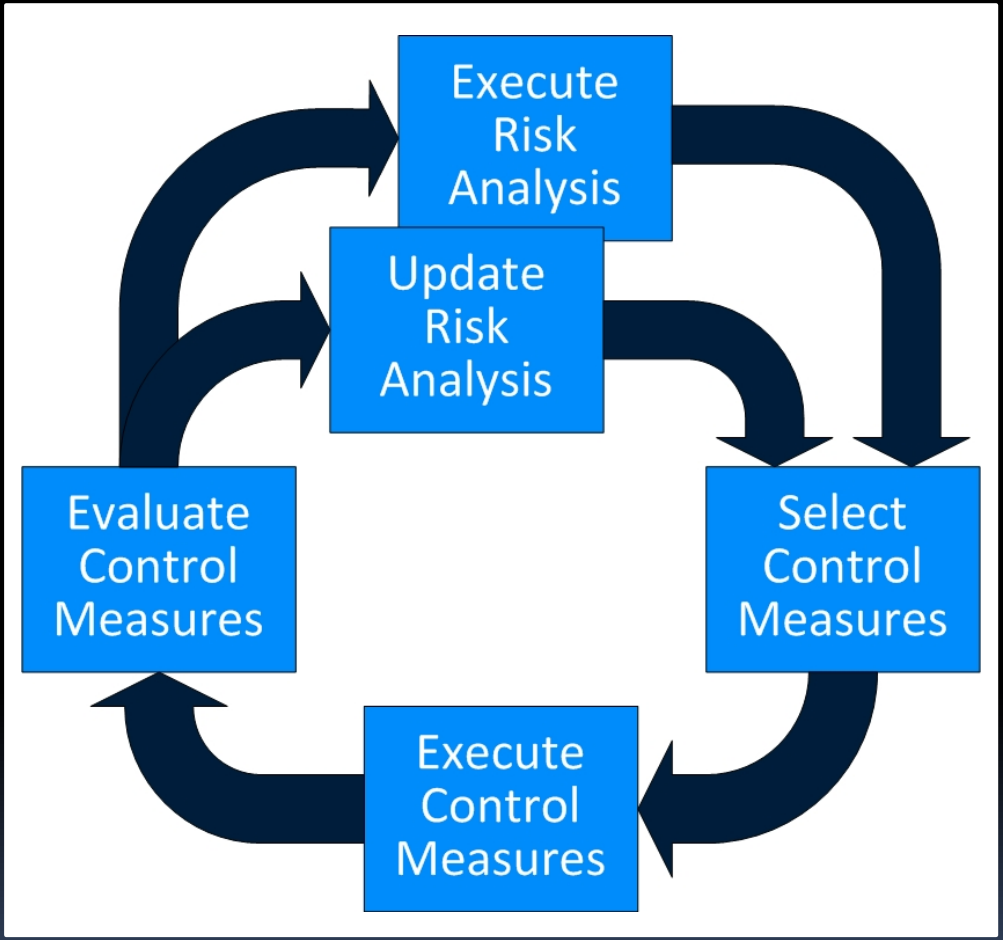
# OMID-Sat Subsystems





Risk Analysis → Risk Management



# Risk Management in Space Activities

## Implementation, Execution and Evaluation of Risk Management

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Ground-based communication antennae

# The implementation of Risk Control Measures

Success Factors:

- Clear goals

- Harmonization of management style and organization

- Recognition of the culture of the project organisation

- The place of the risk management in the project organization

- Adequate capacity, knowledge and experience

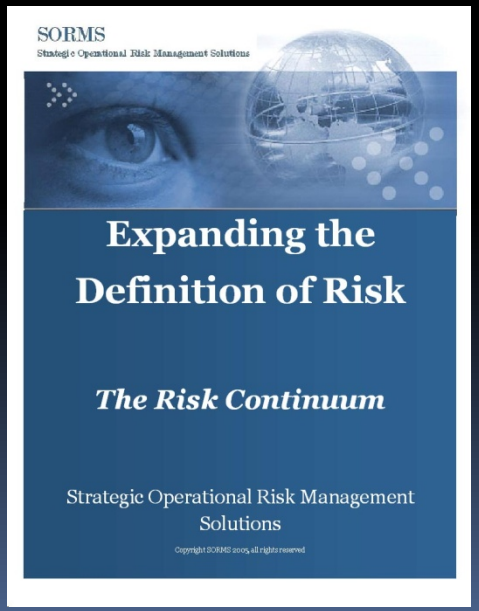
- External motives

# The implementation of Risk Control Measures

| Phase | Description |
|---|---|
| **Initiation** | Determine goals (necessary/useful) |
| | Determine results (when/what) |
| | Set project boundaries |

# The implementation of Risk Control Measures

| Phase | Description |
|---|---|
| **Definition** | Determine requirements the risk management must meet |
| | Determine whether these demands are achievable and non-conflicting |



# The implementation of Risk Control Measures

| Phase | Description |
|---|---|
| **Design** | Risk Management versus Project Management |
| | Design the necessary tools |

# The implementation of Risk Control Measures

| Phase | Description |
|---|---|
| **Preparation** | Scenario of implementation |
| | Train risk management assistants |

# The implementation of Risk Control Measures

| Phase | Description |
|---|---|
| **Realization** | Implement/bring into use the Risk Management |
| | Put the tools into use |
| | Create aftercare plan |

# The implementation of Risk Control Measures

| Phase | Description |
|---|---|
| **Aftercare** | Use/execute risk management |
| | Adapt risk management when necessary |
| | Record and report 'lessons learnt' |

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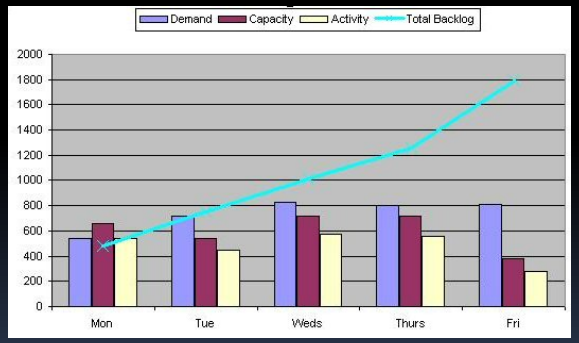
Mesbah Satellite

# Execution of Risk Management

*The execution of risk management deals with a number of factors that need to be clear to everyone involved.*

These factors are:

- time/capacity



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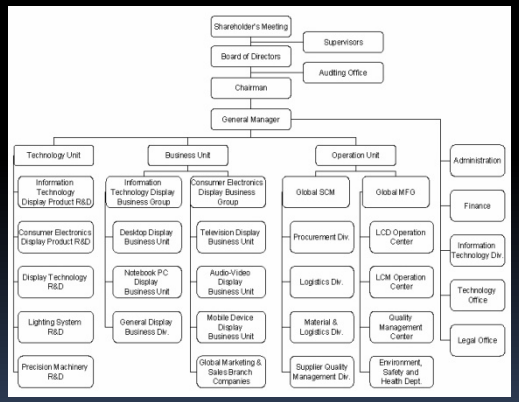
- money
- quality
- information

# Execution of Risk Management

*The execution of risk management deals with a number of factors that need to be clear to everyone involved.*

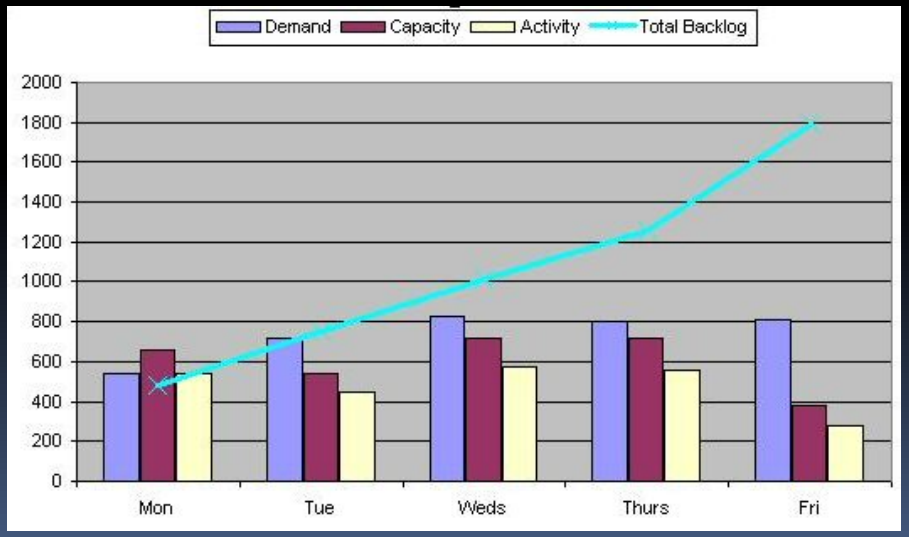
These factors are:

- time/capacity
- money
- quality
- information
- organization



# Execution of Risk Management

| Factors | Explanation |
|---|---|
| Time/capacity | Determine the necessary/available capacity to execute RM |
| | Decide at what moment risks and control measures are discussed |



# Execution of Risk Management

| Factors | Explanation |
|---|---|
| **Money** | Determine costs and revenues of RM |
| | Do the balanced costs/revenues fit into the budget? |

# Execution of Risk Management

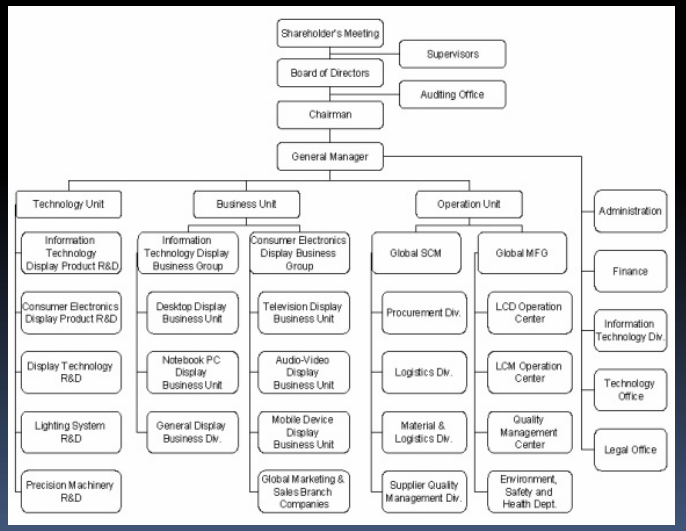
| Factors | Explanation |
|---|---|
| Quality | Lay down the mandatory quality of RM |
| | Ascertain how this quality can be guaranteed |

# Execution of Risk Management

| Factors | Explanation |
|---|---|
| Information | Prescribe the way how risks are recorded/reported |
| | Stipulate who gets what kind of information |

# Execution of Risk Management

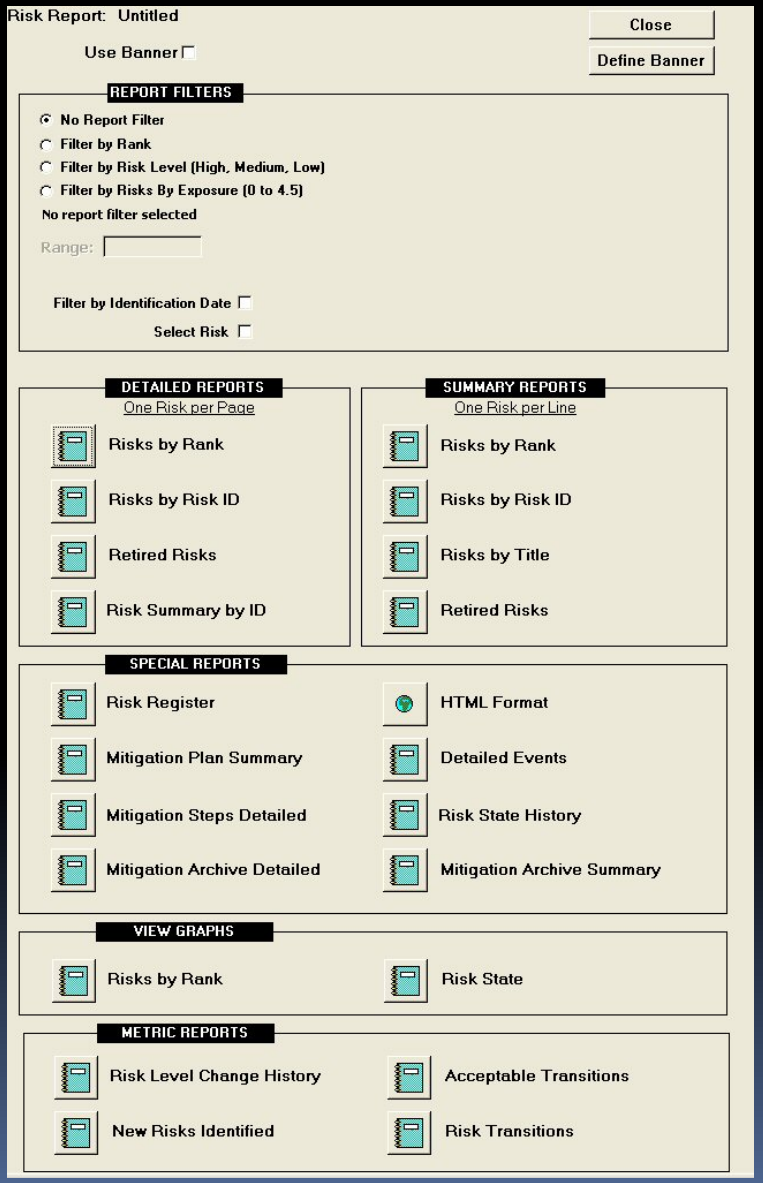
| Factors | Explanation |
|---|---|
| Organization | Define the necessary organization to execute RM |



# Execution of Risk Management

## Reporting

| Issue | Applicable (Yes/No) | Comments |
|---|---|---|
| Identify any existing requirements in the baseline that conflict with the proposed change. | | |
| Identify any other pending requirement changes that conflict with the proposed change. | | |
| What are the consequences of not making the change? | | |
| What are possible adverse side effects or other risks of making the proposed change? | | |
| Will the proposed change adversely affect performance requirements or other quality attributes? | | |
| Will the change affect any system component that affects critical properties such as safety and security, or involve a product change that triggers recertification of any kind? | | |
| Is the proposed change feasible within known technical constraints and current staff skills? | | |
| Will the proposed change place unacceptable demands on any computer resources required for the development, test, or operating environments? | | |
| Must any tools be acquired to implement and test the change? | | |
| How will the proposed change affect the sequence, dependencies, effort, or duration of any tasks currently in the project plan? | | |
| Will prototyping or other user input be required to verify the proposed change? | | |
| How much effort that has already been invested in the project will be lost if this change is accepted? | | |
| Will the proposed change cause an increase in product unit cost, such as by increasing third-party product licensing fees? | | |
| Will the change affect any marketing, manufacturing, training, or customer support plans? | | |
| Identify any existing requirements in the baseline that conflict with the proposed change. | | |



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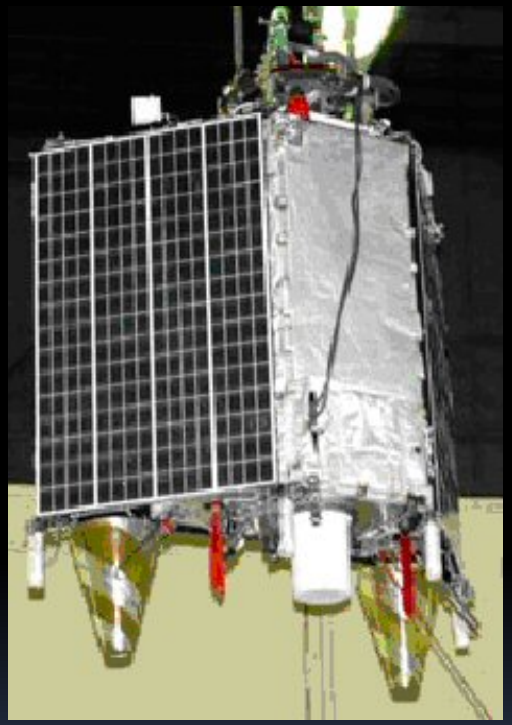

Sina-1 Satellite

# Evaluation of Risk Control Measures

In an evaluation process the following questions should be asked:

What is the probable cause if desired effects have not been achieved?

Is the frequency of consultation to satisfaction?

Is it necessary to adapt the current information and reporting facilities?

Has the information needed been communicated?

Have the responsibilities and authorities been assigned correctly?

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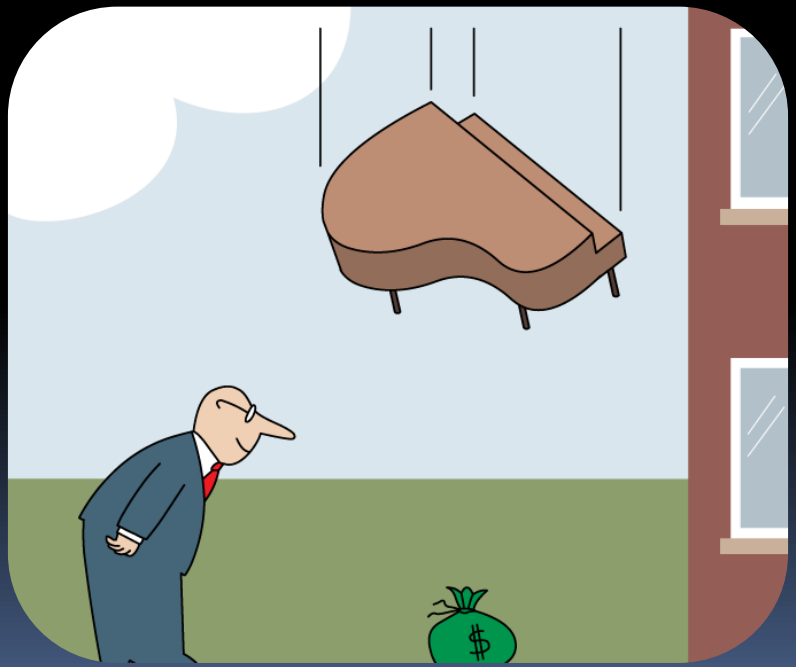
Safir Omid IRSLV

# Conclusions

- Risk management is more than just the execution of a risk analysis.
- Risk management needs follow-up by implementing it into the regular project planning.

By correct implementation, execution and evaluation of risk management and its accompanying control measures, the total cycle of good risk management in the project guarantees better results.

# Q&A