ESS Procedure for Risk Management

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1. INTRODUTION

The purpose with the ESS Risk Management Procedure is to inform and instruct on how the work with Risk Management is carried out at ESS. Purpose, process steps and high level outcomes are described in the Risk Management Process [2].

2. PROCEDURE APPLICABILITY

The Risk Management Procedure is applicable on all activities within ESS. The steps in the procedure are to be iteratively carried out through the lifetime of ESS. When risk treatments have been carried out, the corresponding risk still needs to be monitored and re-assessed on regular basis.

The preferred approach for risk identification, risk analysis and planning of risk treatments is through workshops. Gatherings of co-workers enable communication of risks and uncertainties along with a better, common understanding of threats and opportunities.

2.1. Procedure map

The Risk Management Procedure is iterative and is schematically following the steps in Figure 1 below. Whenever a risk or a risk treatment has impact on the baseline, the Change Control Process [1] is to be applied.

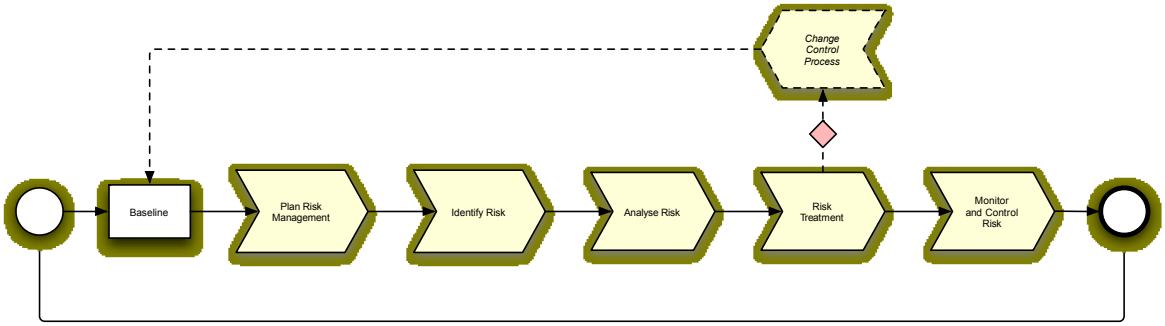


Figure 1. ***The universal ESS Risk Management procedure.***

The activities being part of the Risk Management workflow are broken down into detailed flowcharts, being presented in the following chapters.

2.2. Input

The Risk Management Process [2] triggers this procedure.

2.3. Baseline

The purpose of connecting the Risk Management Procedure to a baseline is to ensure that the information the risk relates to is valid, and that changes are properly assessed and managed. This is schematically carried out in accordance with Figure 2 below.

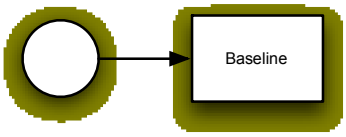
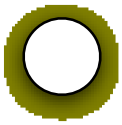


Figure 2. *Start of Risk Management Process and link to Baseline.*

2.3.1. Start	
All employees are responsible for communicating risk and uncertainties and subsequently initiating a Risk Management Procedure.	**Responsible:** All 
2.3.2. Baseline	
For successful traceability of changes, configurations, information, and decisions, risks shall when applicable relate to baseline [3].	**Responsible:** All

2.4. Plan Risk Management

The purpose of Risk Management planning is to, in a structured way, organize the risk related activities within the Directorates. Planning of Risk Management is schematically carried out in accordance with Figure 3 below.

Figure 3. *Plan Risk Management.*

2.4.1. Plan Risk Management	
The ESS Risk Management Plan [2] defines how Risk Management is incorporated at ESS, clarifying responsibilities, timeframes and alignment with the ESS Risk Management framework. Each Directorate shall develop, implement, and maintain Risk Management in alignment with the Risk Management framework. Customization and adaptation to the Directorate is essential for a successful incorporation in the daily work. This includes defining how Risk Management related tasks are delegated and carried out within the Directorate. Frequency of organized risk workshops needed for the Directorates to provide updated and relevant risk registers will naturally fluctuate in the organizations over time, which shall be considered while planning. Arranging for workshops is e.g. motivated prior to major events and transitions into new phases.	**Responsible:** Risk Management Function and Directors

2.5. Identify risks

The purpose of risk identification is to enable that all parts of ESS have a clear view of risks and uncertainties. Identification of risks is schematically carried out in accordance with Figure 4 below.

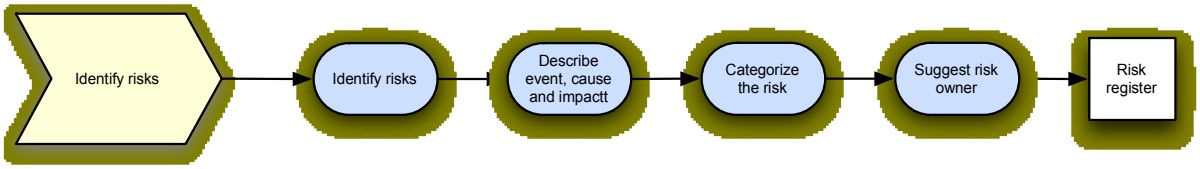


Figure 4. Identify risks.

2.5.1. Identify risks

Risk identification is an iterative process.

Gatherings of co-workers in workshops enable communication of risks and uncertainties, also providing good possibilities to understand threats and opportunities.

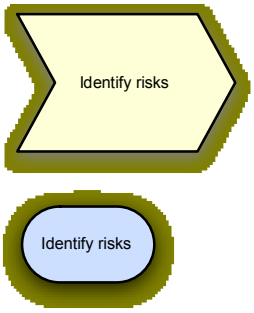
When risk identification workshops are organized, the objectives, scope, and limitations of the session shall be determined and communicated prior the workshop. Stakeholder analysis summary, goal statements, project plans, and requirements are examples of relevant input.

A trigger to risk identification can also be circumstances arising from day-to-day work, e.g. preparing critical agreements or prior to certain events.

Risks identified in day-to-day work shall follow procedures just as if the risk where identified in a workshop. It is important to communicate the risk with relevant parties concerned. When deemed necessary, the risk shall be escalated to managers in the line organization.

Before adding a new risk to the risk register, check whether there are existing risks that should be related to, or complemented with additional info instead of creating a new risk.

Responsible:
All employees



2.5.2. Describe event, cause and impact

When describing a risk, the phrasing shall consist of three main components:

Event: Describe an occurrence, a case or a happening. The event can sometimes be referred to as incident or accident.
Example: The dog runs away from its owner.

Cause: Describe the cause of the event. The same event can have several causes.
Examples: The dog is not leashed. The dog owner is not paying attention.

Impact: Describe what the event leads to.
Example: The family will loose their pet.

Event, cause and impact are described as free text.

Responsible:
Risk identifier

2.5.3. Categorize the risk	
The risks need to be categorized in order to understand how/when ESS is affected, if a risk is realized. It also provides better possibilities to filter the information in the risk registers. As a part of the categorization, the risk can be connected to a part of the organization and/or an activity. This structure needs to be configured in corporation with the Risk Management function.	**Responsible:** Risk identifier
2.5.4. Suggest risk owner	
Risks are to be handled on the most suitable level and expertise, which shall be considered when suggesting risk owner. Risks are thereby treated most efficient and duplication of work can be avoided. CEO, Directors and Project Managers have a formal ownership of risks and risk treatments, but delegation of ownerships are preferred, since it enables efficient handling. It furthermore increases the risk awareness within ESS and enables risk communication on several levels. All employees may suggest risk owner. Distribution of roles and responsibilities as regards risk is defined in the ESS Risk Management Plan defines [2]. It is the risk identifiers responsibility to ensure that the suggested risk owner understands and agrees how the risk is defined. The risk registration is not formally complete until the suggested risk owner has approved the risk ownership.	**Responsible:** Risk identifier
2.5.5. Risk register	
If the steps above are followed, all the necessary information describing the identified risk is in place. It is always possible to go back and add, change or withdraw information. It is not allowed to delete risks in the risk register. Risks not being relevant for the project any more shall be excluded from the risk register by marking the risk as not relevant. Note that risks that are removed might not be able to restore.	**Responsible:** Risk owner

2.6. Analysing and evaluating risks

The purpose of analysing risks is to obtain insight and explore the nature of the risks, describing i.e. consequences and likelihoods in order to treat the risk as efficient as possible. Structured analysis according to ESS' criteria enables comparisons, simplifies communication of risks, and is furthermore essential in order to understand whether the risk is acceptable or not. The risk analysis is schematically carried out in accordance with Figure 5 below.

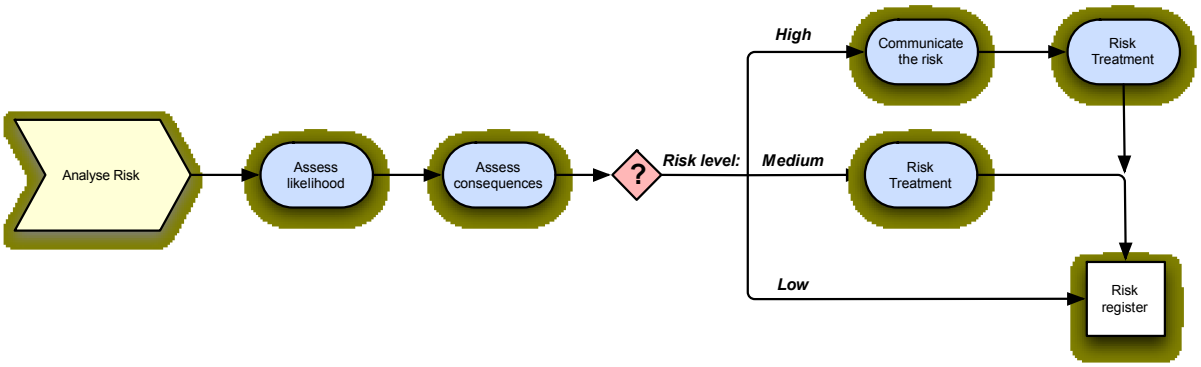


Figure 5. Analyse risks.

2.6.1. Assess likelihood	
The likelihood criterion is based on a five-degree scale. The likelihood criterion is defined in chapter 4.	**Responsible:** Risk owner Assess likelihood
2.6.2. Assess consequences	
As with likelihood, the consequence shall be assessed based on a five-degree scale, where 1 is defined as *minor* and 5 is defined as *catastrophic*. There are in total seven categories of consequences, described in chapter 4. Only those consequences categories being relevant for the risk shall be used. *Example:* 'A risk of cost increases due to raw material price fluctuations' is not likely to cause personal injuries, why the 'Personal injury' category shall be set as 'not applicable' in the risk register. Risks that are considered to cause cost overrun on project budget shall be assessed using three point estimates. Input shall be reasonable costs caused by the risk, if its realized, based on three cases:	**Responsible:** Risk owner Assess consequences

• Minimum, • Maximum, and • Probable. The estimates shall be based on best available knowledge at the time being. The input is used to calculate the expected risk cost distribution for the time span the risk is valid for. If there are no cost consequences, no input shall is required. The output from the three point estimates represent bottom up calculation of costs for identified risks, e.g. providing one important input to the understanding of the need of contingency. This quantitative risk information can be used when discussing contingency and cost risk exposure e.g. in annual budget and planning processes, Project Reviews, and in Change control work in CCB.	
2.6.3. Risk level	
The combinations of likelihood and consequence correspond to a risk level; *high, medium* or *low*. The risk acceptance criteria in chapter 4 describe what level of risk ESS is willing to accept. It furthermore clarifies when risk treatments are required, giving guidance for decision-making. This enables a controlled balance between innovation and caution.	**Responsible:** -
2.6.4. Communicate the risk	
All high level risks identified shall be communicated with concerned parties.	**Responsible:** Risk owner
2.6.5. Risk Treatment	
High-level risks are unacceptable and can never be accepted without treatment. *Medium-level* risks normally require risk treatments, but can be accepted without treatment if evaluation shows that the action efforts are not proportional to improvements gained. *Low-level* risks are acceptable without risk treatment. These risks shall be monitored and usual precautions shall be taken and maintained.	**Responsible:** Risk owner

2.6.6. Risk register	
Following the steps above, the input to the risk register at this stage shall include: 1. The scope of the risk, including description of the event, its causes and impact. 2. Suggested Risk owner 3. Categorization and area of concern 4. Connection to WBS/activity 5. Links to documents in CHESS, if any. 6. Connection to schedule and time span when the risk is valid. 7. Assessment of likelihood and applicable consequences, including three-point cost consequence estimate. 8. Evaluation whether the risk is acceptable or not. It is always possible in corporation with the risk owner, to go back and add, change or withdraw information.	**Responsible:** Risk owner

2.7. Risk Treatment

The purpose of planning risk treatments is to, in a controlled way, modify the risks as efficient as possible to an acceptable level. The process of planning risk treatment, including sub-activities, is schematically carried out in accordance with Figure 6 below.

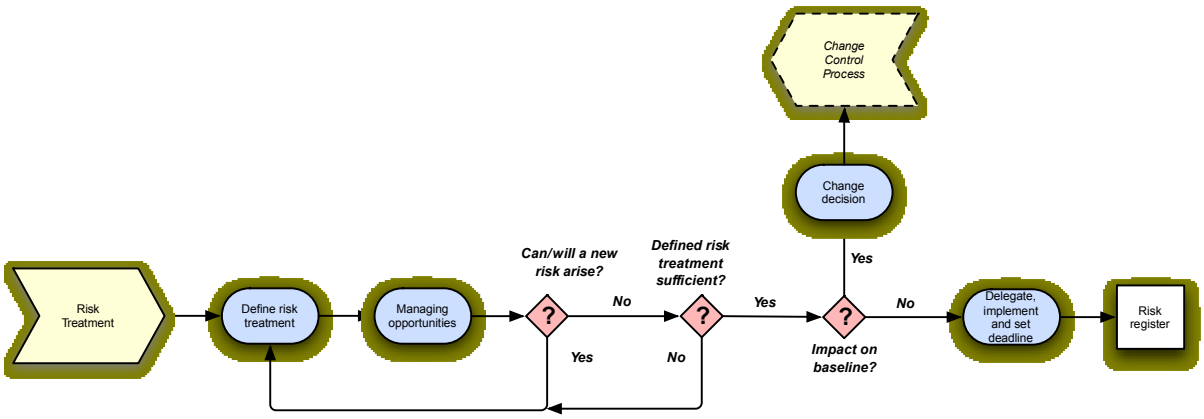
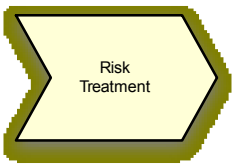


Figure 6. Risk Treatment.

2.7.1. Plan risk treatments	
Risk treatment is the process and the measures being taken in order to treat the risk to an acceptable level. The risk treatments shall be planned by the risk owner in collaboration with required expertise in order to treat the risk on	**Responsible:** Risk owner

the most efficient level, within given mandate.



2.7.2. Define risk treatment

Based on the outcome of the risk analysis and corresponding risk level treatments shall be defined. Treatments are to be defined to such extent that it is assessed that the risk residual is acceptable.

Choice of treatment technique should be taken considering e.g. risk level, the effects on deliverables or scheduled events, relationship to critical path, and level of urgency.

Eliminate: Removing the risk source, avoiding the risk, deleting or changing requirements, modifying schedule, funding level or profile with the aim to eliminate the risk.

Mitigate: Minimizing the consequence and/or the likelihood. Mitigating treatments can be risk preventive and/or risk reducing.

Observe: The risk owner shall monitor low level risks and if/when changes occur, re-assess the risk and if necessary plan for treatments. Ignoring a risk is never an option.

Transfer: In most situations it is not possible to transfer the entity if a risk, only parts of the consequences. For this reason transfer, insurances included, is most often not a complete stand-alone solution to reach acceptance. Transfer of risk shall be used only in combination of thorough communication and/or contractual agreements with the party that is expected to take over the risk.

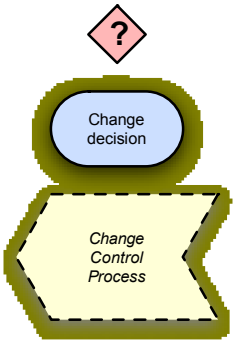
Responsible:
Risk owner and
Risk treatment owner

2.7.3. Managing opportunities

Assessing risks and defining risk treatments entail ideas and alternatives that are potential opportunities.

Opportunities shall always be documented with the explicit aim and purpose to further investigate the opportunity in terms of costs and benefits. If the opportunity entails a change of requirements or solutions, the Change Control Process [1] shall be applied. If not, it is

Responsible:
Risk owner

enough to prepare a decision basis to be presented to the appropriate forum following the delegation of authority. It is crucial that the decision basis includes an analysis off new risks that might be imposed due to implementing the opportunity.	
2.7.4. Can/will a new risk arise?	
When risk treatments have been defined, these shall be evaluated in order to understand if the treatment can give rise to new risks. This includes communicating risk treatments to all relevant parties being concerned of the action(s). If a risk treatment introduces a new risk, a new Risk Management workflow shall be initiated, starting with risk identification described in chapter 2.5 'Identify risks' above.	**Responsible:** Risk owner
2.7.5. Defined risk treatment sufficient?	
Before risk treatments are implemented, the residual risk needs to be estimated and whether the treatments are deemed to be sufficient or not. Treatments deemed to be sufficient are ready for implementation. If deemed inadequate or insufficient, more treatments should be defined until the residual risk is assessed to be acceptable. As an option, the original treatment can be broken down in to several actions.	**Responsible:** Risk owner
2.7.6. Change Control Process	
Whenever a risk or a risk treatment impacts on a released configuration or baseline, the Change Control Process [1] shall be applied. The baseline and the risk id shall be trace linked.	**Responsible:** Risk owner and Risk treatment owner 
2.7.7. Delegate, implement and set deadline	
Risk treatment owners shall be appointed, and given sufficient time, mandate and resources necessary for the task.	**Responsible:** Risk owner

All risk treatment shall be given deadlines, and it is the risk owner's responsibility to monitor how the treatment progresses. This shall be documented in the risk register.	

2.8. Monitor and control risks

The purpose of monitoring and controlling risks is to create continuity in the endeavour of decreasing the risk exposure at ESS, and to ensure focus and attention to risks at all times. The activities of monitoring and controlling risk are schematically carried out in accordance with Figure 7 below.

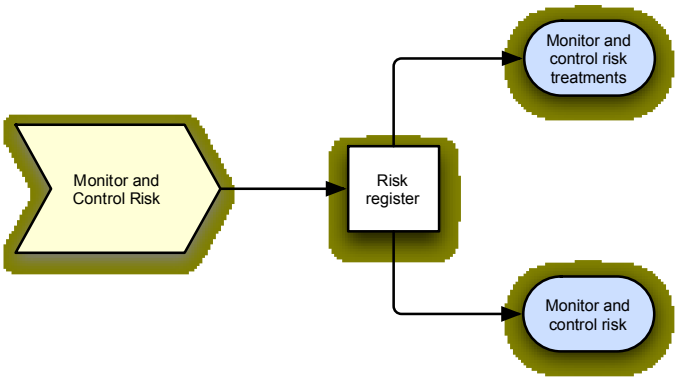
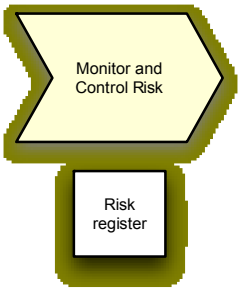


Figure 7. Monitor and control risks.

2.8.1. Monitor and control risk	
How risks and risk treatments are to be monitored and controlled shall be considered as a part of the Risk Management Plan [2]. Updated risk registers enables an overview of all registered risks. These data shall be used for monitoring and controlling risks and treatments. Each Project needs to establish routines for reviewing the risk registers with the purpose to remind risk and risk treatment owners when/if due dates have passed. The Risk Management function will schematically monitor the risk register, to ensure that it is updated and that the work with risks and risk treatments is proceeding.	**Responsible:** Risk owner 

2.8.2. Monitor and control risk treatments	
Risk treatments shall be monitored continuously. The follow-up assessment shall be done in accordance with chapter 0 ' Analysing and evaluating risks'. If the residual risk (after treatment and re-assessment) still is high or medium, additional treatments are required.	**Responsible:** Risk owner
2.8.3. Monitor and control risk	
Risks are to be monitored and controlled continuously, in accordance with the Risk Management Plan [2].	**Responsible:** Risk owner

3. OUTPUT

When this procedure has been accomplished, a complete risk register has been finalized.

4. ESS RISK CRITERIA

4.1. Definitions

Consequence categories	Description
Personal injuries	Impact on health and safety for persons involved with ESS as well as to third person.
Quality and function	Impact on requirements, potentially degrading technical structures, systems and components.
Surroundings	Impact on environment and/or third party property, also considering impact on the physical surroundings of the ESS site.
Goodwill	Impact on partner's and other stakeholders' opinion, understanding and viewpoint of ESS and how the general public experiences the organization.
Cost overrun on Construction budget	Economic impact in terms of cost overrun on project's budget.
Schedule delays during Construction	Schedule impact for the exposed process or activity in terms of delay according to project plan.
Cost overrun on annual Operation costs	Impact of annual operation cost in terms of e.g. service, energy consumption, business interruption, insurance premium and/or loss of property. Might be due to a one-off event as well as to increased current expenses.

4.2. Consequence criteria

Below, criteria for consequences (C) are presented for different consequence categories.

Consequence / Category	*1= Minor*	*2 = Substantial*	*3 = Serious*	*4 = Very Serious*	*5 = Catastrophic*
Personal injuries	Minor injuries or discomfort	Injuries requiring professional treatment	Injuries leading to more than three days absence	Permanent injuries	Fatal outcome
Quality and Function	Impact on the design but no impact on the requirements.	Impact on one low-level requirement	Impact on several requirements	Impact on one top level requirement	Impact on several top level requirements
Surroundings	Temporary effects	Temporary effects requiring corrective actions	Temporary effects requiring professional corrective actions	Long-term effects despite professional corrective actions	Permanent effects despite professional corrective actions
Goodwill	Negative impact regionally	Negative impact in Sweden	Long-term negative impact regionally	Long-term negative impact in Sweden, or negative impact in Europe	Long-term negative impact in Europe
Cost overrun on Construction budget:	0.5% or less	1% or less but more than 0.5%	2% or less but more than 1%	Less than 5% but more than 2%	5% or more
Schedule delays during Construction	0 – 3 months delay	4 – 6 months delay	7 – 9 months delay	10 – 18 months delay	> 18 months delay
Cost overrun on annual Operations costs:	0.75 MEUR or less	1.5 MEUR or less but more than 0.75 MEuro	3 MEUR or less but more than 1.5 MEuro	Less than 7.5 MEUR but more than 3 MEUR	7.5 MEUR or more

4.3. Risk matrix

			Consequence				
	Phase		1	2	3	4	5
	Construction	*Operation*	Minor	Substantial	Serious	Very serious	Catastrophic
5	Most likely to occur during construction	More frequent than once per 5 years of operation	5x1	5x2	5x3	5x4	5x5
4	Likely to occur during construction	Less frequent than once per 5 years of operation	4x1	4x2	4x3	4x4	4x5
3	May occur during construction	Less frequent than once per 10 years of operation	3x1	3x2	3x3	3x4	3x5
2	Unlikely to occur during construction	Less frequents than once per 25 years of operation	2x1	2x2	2x3	2x4	2x5
1	Most unlikely to occur during construction	Less frequent than once per 100 years of operation	1x1	1x2	1x3	1x4	1x5

Likelihood

4.4. Acceptance criteria; risk levels and descriptions

Table 1 Risk levels, acceptance criteria, and descriptions.

Risk level	Criteria (LxC)	Description
High – Unacceptable	5x3, 5x4, 5x5 4x3, 4x4, 4x5, 3x4, 3x5 2x5	*Can never be accepted – treatments are required.*
Medium – Tolerable	5x1, 5x2 4x2 3x2, 3x3 2x3, 2x4 1x4, 1x5	*Treatments are required but risks can be accepted without treatment if the actions are not proportional to gained improvements.*
Low - Acceptable	4x1 3x1 2x1, 2x2 1x1, 1x2, 1x3	*Treatments are not necessary. Usual precautions taken and maintained. Should be monitored.*

5. REFERENCES

1. Change Control Process, ESS-0001879

2. ESS Risk Management Process, ESS-0000263.

LIST OF TERMS AND DEFINITIONS

Term	Definition
Baseline	A configuration of software, hardware, or a process that is established and documented as a point of reference. It can also be the base of a programme/project plan where any changes need to be handled by the Change Control Board (CCB).
Configuration	Set of interrelated characteristics of a system defined in product configuration information.
Risk	Risk is effect of uncertainty on objectives, expressed in terms of a combination of the consequences of an event and the associated likelihood of occurrence.
Risk Management	Coordinated activities to direct and control an organization with regard to risk.
Uncertainty	Limitation of knowledge, understanding and/or lack of information of a state or an event, its likelihood or consequence.
Risk treatment	Measures being taken in order to treat the risk to an acceptable level.
Risk register	The record containing relevant and updated information about risks and risk treatments.
Risk level	Magnitude of a risk or combination of risks. Depending on assessed combinations of likelihood and consequence, the risk level can be described as *high, medium* or *low*.
Risk criteria	Defined scales for likelihood and consequence used to assess risks in a uniform way.
Acceptance criteria	Clarifies what risk level that is acceptable, and when risk treatments are required for a specific risk.
Risk matrix	Graphical presentation of risk levels and acceptance criteria. Risks can be plotted in a matrix in order to visualize the assessed risk level.
Risk owner	Person/role with the responsibility, accountability and authority to manage a risk.
Risk	Risk is effect of uncertainty on objectives, expressed in terms of a combination of the consequences of an event and the associated likelihood of occurrence.

DOCUMENT REVISION HISTORY

Version	Reason for revision	Date
1.0	New Document	2014-11-18