SEMP - Company B

Date of hand-in: 2020-02-19
Nr. of character: 10712

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Date	Author	Version	Change Description
12-02-2020	RØ	0.0	Created the document and added the different parts from SEMP as headlines
12-02-2020	MM	0.1	Added Risk management
13-02-2020	MG	0.2	Added the change log, the table of context, numbers to each chapter, and made the chapter headers into headings
13-02-2020	MG	0.3	Changes our version number to start at 0 instead of 1
13-02-2020	MA	0.4	Corrected dates from Jan, to Feb
13-02-2020	MA, AK	0.5	Added Information management
14-02-2020	MA	0.6	Added Quality management
14-02-2020	RØ	0.7	Added Assessment and Control
15-02-2020	ND,OR	0.8	Added Decision Management, Added Basic DM facts
15-02-2020	AM, CI	0.9	Added Planning
16-02-2020	MA	0.10	Rewrote some of Quality management
17-02-2020	SS, SL	0.11	Added Configuration Management
17-02-2020	MG	0.12	Added numbers and changes the font-size for the figures
19-02-2020	Company B	1.0	Baseline version 1
14-03-2020	MM, ND	1.1	Made changes based on Beidis feedback. (could you please explain the acronyms used in Fig.2? also, it is a good idea to "ground" different concepts to your own project, i.e. what are the risk factors related to each of your tasks, etc.) Made examples for the various points.

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1 Planning

An extension to the baggage handling system is wanted by an airport client. The extension wanted contains a baggage transportation loop, where all baggage sent into the loop is screened for security reasons. Baggage should only enter the loop if it hasn't already been screened. The solution for this request will deal with designing, testing, and integration with the system already in place.
The scope of this project is centered around the addition of two extra screening stations in the baggage handling system. The technical aspect of this requires two additional screening machines to be delivered, along with their software interfaces. The screening machines have to be fitted in, with the rest of the CrisBag elements[1], according to the provided overview of the entry points, exit points and so forth.

Deadlines

- The system must be ready for public use at January 1st 2021
- The operational trial period starts 4 month before public use (September 1st 2020)
- Development time for this project is 7.5 months.

Timeplan

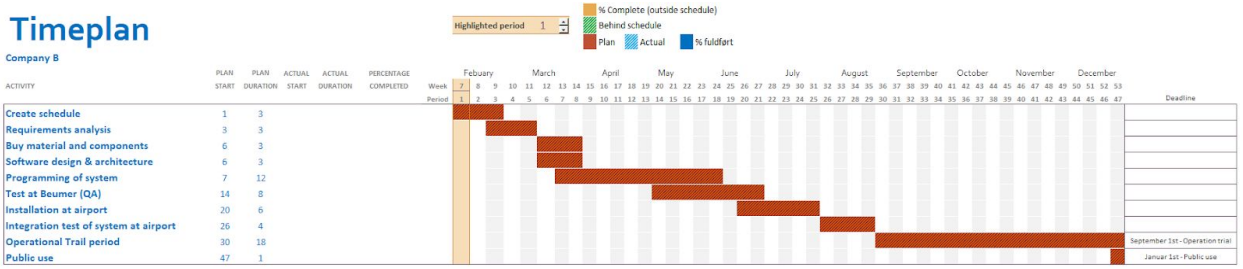

Figure 1 - Example of a timeplan using a gantt-chart[2]

As seen in Figure 1, the planning can be visualized by using a gantt-chart. The chart shows the estimated time allocated to the different phases of the project, according to the groups earliest estimations.

1
https://blackboard.au.dk/bbcswebdav/pid-2533986-dt-content-rid-8111535_1/courses/BB-Cou-UUVA-88921/Beumer%20Group_Case%20Description.pdf
2 https://drive.google.com/file/d/1u4aAi2L57PvRSnziTi6b3-nfSojYN-uc/view?usp=sharing

Cost

According to the case description the available budget for raw material os around €437.500. The additional cost for developers is €75/hour. When working at the client additional 50% is added to the hourly wage.

2 Assessment and Control

The purpose of assessment and control is to clarify the technical progress and potential threats regarding it. This is done to prevent threats such as declining performance, and establishing efficient countermeasures against it. Effective assessment and control is achieved through reviews and strict monitoring of performance, which should reveal and identify potential threats to the system. The threats are mitigated using action plans, which describe what action to take.

A central part of assessment and control is defining and implementing action plans. The main objective of such plans is to define the best approach for handling threats, that are discovered during the life cycle of the project. These plans help to ensure that the project is finished on time and within budget.

In this project the assessment and control is achieved through authorization, monitoring of performance and threats, and technical reviewing. Furthermore if a severe threat is discovered it is possible to seek project fundings to mitigate the threat according to the action plan.

This project seeks to keep the assessment and control process independent from the customer and focuses on providing assessments based on experience and analysis. Furthermore it is important to accept and communicate uncertainty, as uncertainties are part of requirements and designs when developing a complicated system. Generally the communication should be clear and transparent, so every project member has access to important documents, and every stakeholder is aware of potential threats.

The assessment and control process is closely related to other topics in SEMP, such as planning and risk management. This enables concurrent work on multiple topics, but also requires frequent updates to keep all processes aligned.

3 Risk Management

Risk management will be implemented by first identifying different parts of the project that can increase the cost, time spent on the project, or will make the project fail.

After the risks have been identified, they will be categorized and prioritized. So each risk will get a number from 1-5 of the probability that the risk will occur and of the consequence if risk will happen. Those two numbers will be multiplied and give a number that describes the overall rating of the risk. If the number is under 8 then it’s a low risk, if it’s between 8-19 it’s a medium risk and if it’s over 19 it’s high risk.

For the medium and high risk there must be made a plan to reduce risk through the project and a plan for handling the consequence if the risk occurs.

Through the project the risks will be monitored and updated if any development has been made that influences the risk. There can be added new risks that need to be monitored, as they are discovered through the project. In figure 3 is there an example of risk management.

Risk management						
Date: 14-03-2020						
Revision: 0.1						
Risk	Description	Probability 1-5	Consequence 1-5	Overall 1-25	Risk mitigation plan	Risk Management Plan
1	Change to the project from the Owner /Beumer	4	4	16	Continuous communication with the Owner/Beumer	Reevaluate the cost, resources and design to match the new projekt.
2	Supplier ccan't deliver the materials on time	2	4	8	Continuous communication with the supplier. Order the critical materials in advance.	Reevaluate the supplier. Calculate the new delay for the projekt. Inform the Owner /Beumer
3						

Figure 3 - Risk management

4 Decision Management

To ensure the best possible decisions to be made in the team, it is necessary to implement a good decision process. In this project it will be done by following the INCOSE DAWG 2013[3] model. To ensure the team fully understands the decisions, descriptions of the following terms are made:

- The system
- Life cycle stages
- Decision makers
- Stakeholders
- Available resources

A series of objectives and measures to evaluate possible solutions is established by interviewing experts on the matter along with the stakeholders[4]. After the objectives and the associated measures have been established, creative alternative solutions are developed and tested. When that is done the solutions are assessed based on operational data, test data, simulations, models, and expert knowledge[5]. When the solutions have been assessed the solutions are put into a value table[6], so the solutions can be evaluated based on the ideal solution and how important each measure is. The uncertainties of the solutions can now be identified, along with doing a risk analysis and sensitivity analysis on those uncertainties. Then there will be some possible improvements to the alternative solutions in order to claim any untapped value or reduce risks[7]. Based on all that a decision on a solution will be made. To conclude, decisions are made throughout the life cycle of the system whenever alternative courses of action exist. Milestones and decision gates mark the most formal decisions. Less formal decisions require less structure. Decision-making Process activities include:

[3] https://www.sebokwiki.org/wiki/File:Decision_Mgt_Process_DM.png
[4] https://www.sebokwiki.org/wiki/File:Fund_Obj_Hierarchy_DM.png
[5] https://www.sebokwiki.org/wiki/File:Descript_of_Alt_DM.png
[6] https://www.sebokwiki.org/wiki/File:Value_Scorecard_w_Heat_Map_DM.png
[7] https://www.sebokwiki.org/wiki/File:Uncertainty_on_Perf_Value_from_Monte_DM.png

- Identifying the need for a decision and the strategy for making the decision, including desired outcomes and measurable success criteria.
- Identifying all personnel with knowledge and experience relevant to the decision.
- Evaluating the consequences of alternative choices using the selected strategy and optimize the decision.
- Recording the decision made with the relevant data and supporting documentation.
- Communicating new directions from the decision.

5 Configuration Management

The purpose of configuration management is to maintain the integrity of the project, process outputs, and make them available to interested parties. Unmanaged changes to the system, i.e. changes to plans, requirements, design and so forth, can lead to problems that exist throughout the system life cycle. Configuration management is implemented to avoid these problems.

Every element of the system will be classified as a configuration item (CI). A CI can be any hardware (HWCI), software (CSCI) or combination of both that satisfies an end use function. Instances of the same CI must be “Form, Fit and Function” compatible[8]. A standard part must be back- and forward compatible with each revision. All CIs will be placed in a hierarchical structure as shown below, called a product structure, where product is a synonym for CI.

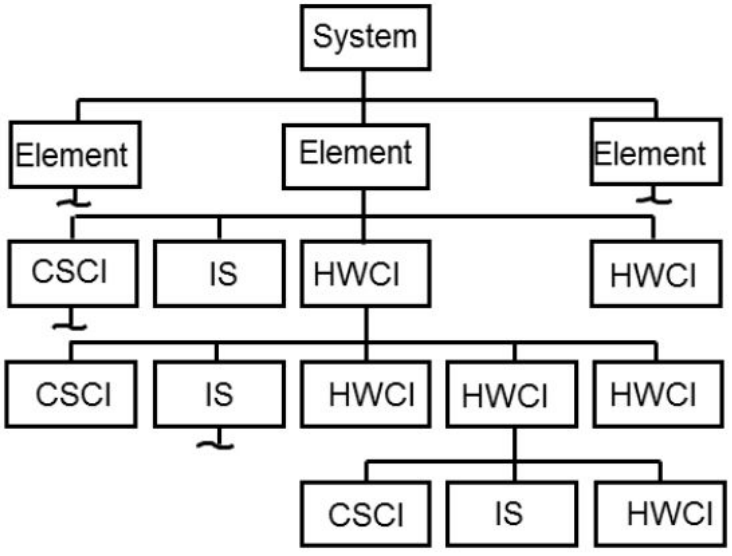

Figure 2 - Product structure of configuration items[9]

Configuration management is split into two primary processes: Identification and change management.

[8] TISYE_L2_Concept_Stage.pdf - Slide 90
[9] TISYE_L2_Concept_Stage.pdf - Slide 89

- **Identification**: Identify every element rigorously. Every product (CI) with a part or document number. Every instance of a CI gets a serial number. Identifiers for namespaces and revisions. They can be machine or human readable. Identifying revisions are crucial to describe the life-cycle of a CI and to make CIs interchangeable with other implementations.
- **Change management**: Keeping track of changes to the requirements the CIs need to satisfy, and keeping track of the capabilities of each CI.

To define the life-cycle of each CI the items can be in one of the following states:

1. **Draft/preliminary/under construction:** In this state each increment to the CI will result in a new version number.
2. **Released for use:** After the release of the CI, the configuration is frozen.
3. **Approved change:** A change to the CI has been approved.
4. **Revised change:** A change to the CI has been revised.
5. **Obsolete:** In this state the CI is not for sale or for use in any version of the system.

To document the Configuration Management, each CI will get a document identifying the product and revision and describing the capabilities and requirements for the CI. Changes to the CI must be meticulously controlled and every CI revision should be coupled to a baseline document. A baseline document contains a product structure of the CIs in a certain revision.

6 Information Management

This project only uses text and diagram based information (i.e. documents). Documents shall be stored on an external server, for this project Google Drive is used. Since documents are stored on an external server, longevity of the documents should exceed the project lifetime. There is a concern regarding the documents during the system use. Documents should still be accessible for when the system needs repairs, replacement, and shutdown.
Only members of company B have access to write and read all documents from the Google Drive. If stakeholders from outside company B need access to documents, a copy of the document is sent via mail.
An “Information Control Document” is made, to keep track of which versions of documents are sent to stakeholders.
All text documentation uses the Google Docs format.
Every Google Docs and Google Sheets will have a version history at the top of the document, where date of change, author, version number and comments will be written in a table.
To keep terms clear, a dictionary is created, and updated as new terms are needed[10]. To keep information organized, it is split up into different categories, and placed in folders. Folders can have multiple subfolders. In figure 3 is there an example of the Information control document.

[10] https://docs.google.com/spreadsheets/d/199dg75kodylmzzs4mdwuEQaW6pVgmbkRtUIMSCkkjuU/edit#gid=0

Directory	Name	Information Type	Rights to Recieve	Rights to Transmit	Rights to Change	Version
Information control document						
Hand-ins	SEMP	Text dokument	BEUMER, Company C	Internal	Internal	1.0
Hand-ins	ConOps	Text dokument	BEUMER, Company C	Internal	Internal	1.0

Figure 4 - Information control document

7 Quality Management

Quality attributes should be identified to uphold the quality that a stakeholder expects. To make sure the right quality attributes are prioritized in the system, in regards to the stakeholders, a trade-off analysis should be made, as quality attributes may have a relationship and thus affect each other.
Quality attributes can either be for the product, or for services, where the services can be split into primary and secondary services.
Quality attributes for products can be characteristics related to how the product functions, or its aesthetics. For primary services they could be security, safety etc., where secondary services are typically services that provide help to the customer.
The chosen quality attributes should be measurable, so they can be monitored and improved upon.