

Operation Observation

October 26, 2017

1. PURPOSE

The purpose of the observation is to observe the situation which must be simulated. This is done to make an assessment of what must be included in the design.

2. METHOD

To analyse and retrieve information in the matter the main method used is doing a contextual inquiry. This includes the different analysing models and interviews. A group of three was at Aalborg University Hospital to observe a robot assisted surgery performed on a person.

The observation team acquired both pictures, notes and some video from the operation. Which describes the tasks and teamwork necessary to perform such an operation. From this different models used in contextual inquiries are made. The models used are a physical model showing the layout of the room, a sequence model to clarify the work needed to be done and an artefact model showing what is used together with the robot.

3. RESULTS

The physical model shows the layout of the entire operation room and where the nurses move. This gives an overview of the operation room and how each nurse acts in the room. The figure includes doors and their movement as well as cabinets. The layout is shown in Figure 3.1.

This enables the development and design of the room when creating the simulation.

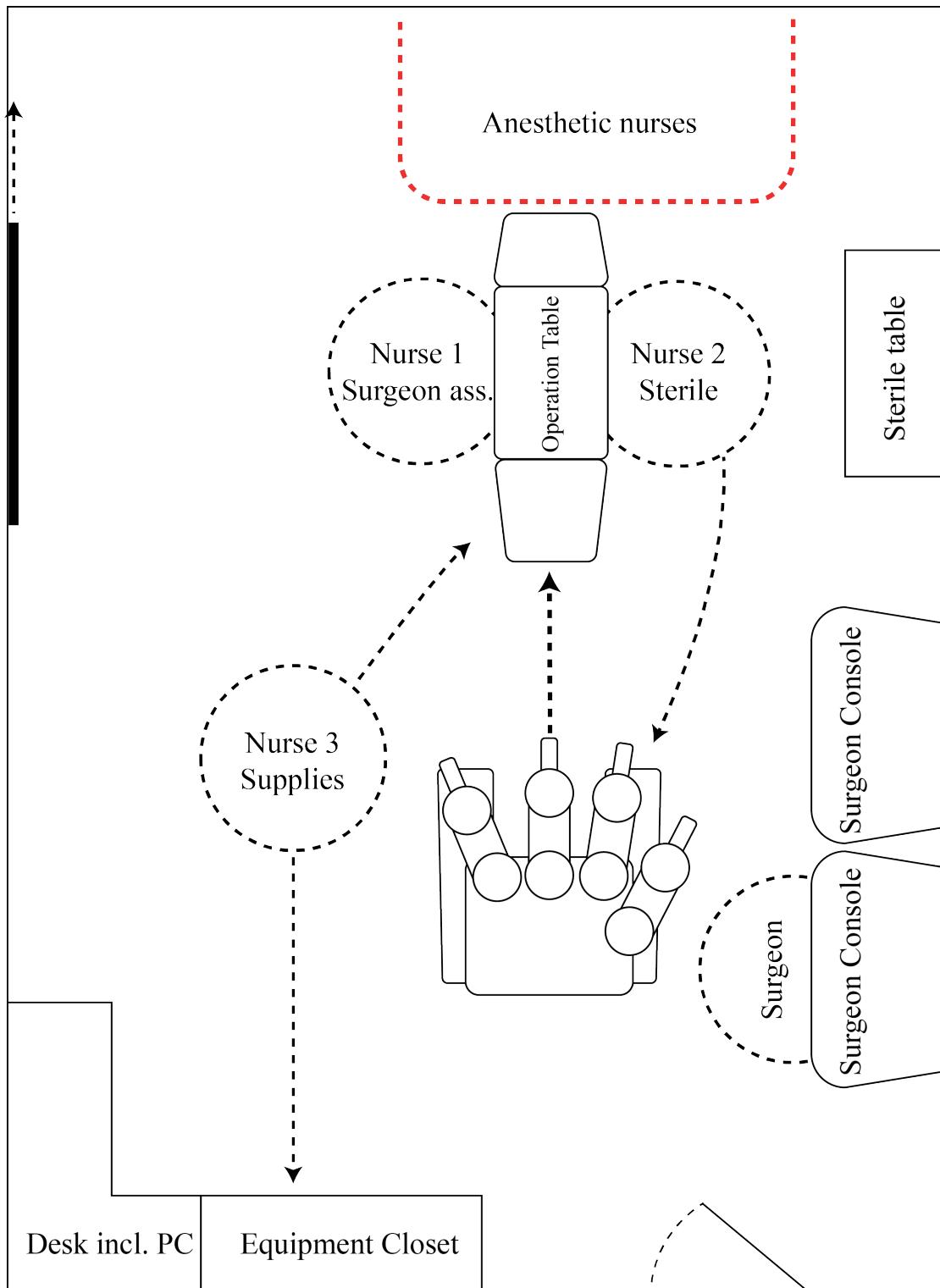


Figure 3.1: The physical model showing the layout of the operation room.

The sequence model is made from the handed out paper "Teoretisk og praktisk undervisning ved robotten som følgende". The sequence model is shown in Figure 3.2.

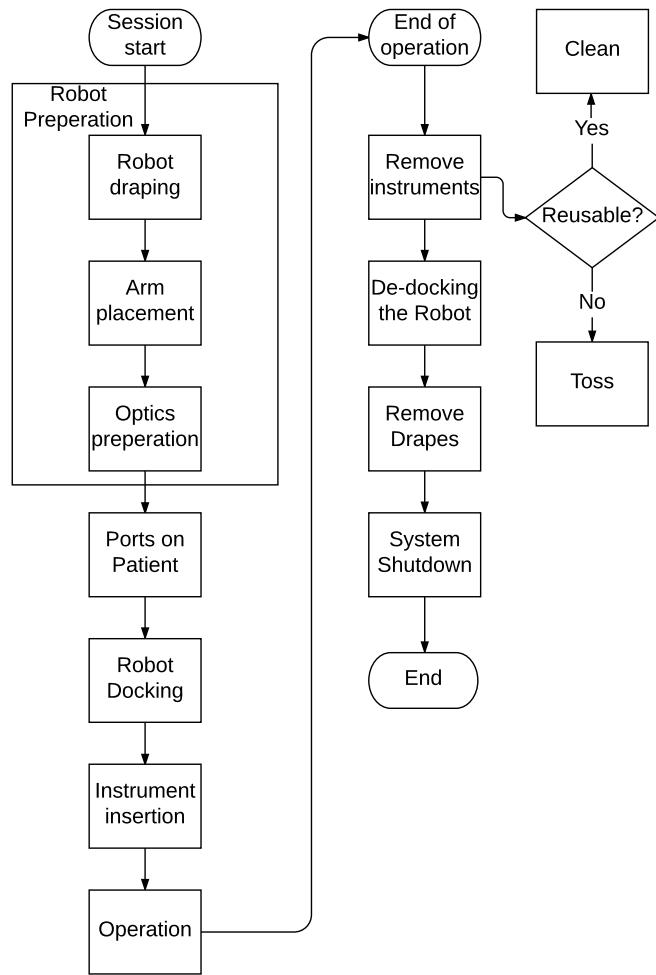
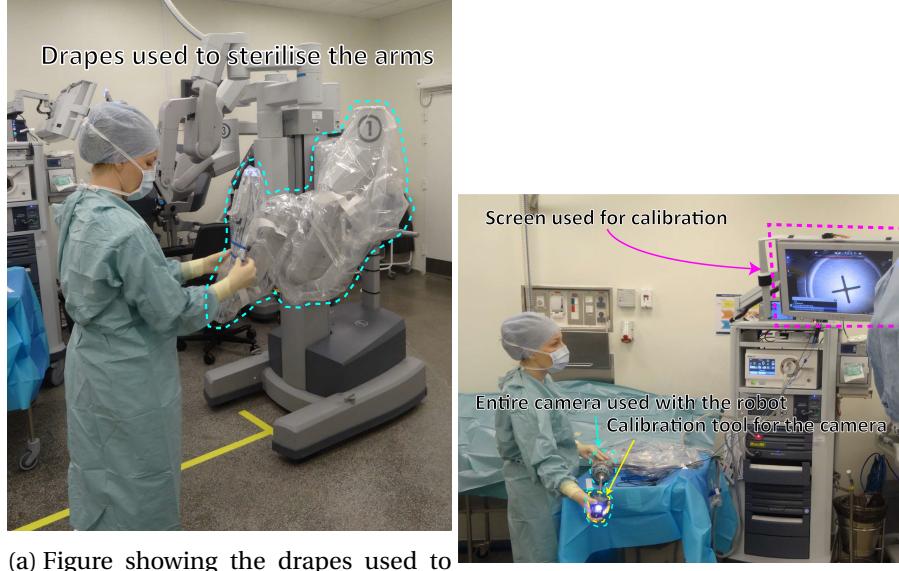


Figure 3.2: Flowchart of the sequence model showing how the operation preparation and de-brief is carried out.

The sequence model describes the actions necessary to both start the operation and to end it. This enables the design of the tasks which should be included in the simulation and their order of appearance to the user. The model shown is for an operation without any complications which could lead to de-docking of the robot in an emergency.

The Artefact models are shown in Figure 3.3. These are created from pictures taken at the observation of the operation. Figure 3.3a shows the drapes used to cover the arms of the robot sterilising the robot. Figure 3.3b shows the camera also known as the endoscope and calibration equipment.



(a) Figure showing the drapes used to cover the arms of the robot, sterilising them. (b) Figure showing the camera used with the robot and a calibration tool.

Figure 3.3: The figures show the artefacts used with the robot.

4. CONCLUSION

The physical model yields both information regarding the physical layout of the simulation which must be developed as well as limiting of the scenarios which can be implemented. The sequence model outlines the entire scenario in which the tasks must be implemented as well as yielding an overview of what is crucial to include in the simulation. The artefact model also shows which tools are important for the simulation to work as intended.

A. NOTES TAKEN DURING THE OBSERVATION

- If you are not sterile, you have to stand at least one meter from sterile objects.
- The tables covered in green paper blankets are sterile.
- When preparing tools and unpacking, two nurses work together. One non-sterile nurse unpacks while the other, sterile, nurse grabs and places the tools on the sterile table.
- The sterile nurse sterilises the robot.
- When the patient enters the room he is firstly laid down on the operating table and then prepared for surgery.
- The stereoscopic camera is wrapped separately from the robot and other tools.
- When all sterile tools are placed, the sterile table is covered.
- The camera is calibrated by the sterile nurse. This is done using different kinds of end pieces and rotating them around scopes.
- The arms of the robot must be placed in a specific order. This is to avoid any kind of collision of the arms. Furthermore, the placement of the arms is as important as the order. This is done before the robot is docked.
- Before the robot is docked, the nurses taking part in the operation are sterilising.
- When the robot is docked the arms are once again placed, this time around the ports inserted on the patient.
- A time out is taken before any cutting securing everyone and everything is ready and in place.
- The first cut done on the patient is to expand his stomach using air, easing the operation as this will yield more space.
- Before docking the camera on the robot it is used hand held to insert the other instruments and afterwards docked on the dedicated robot arm.
- When the camera is docked the robot arms are placed as far apart as possible. This is done to avoid collision.
- Each arm has three buttons enabling arm movement in two different ways.
- Cleaning of the optics is done several times during the operation. It may even be changed for another if it is too dirty.
- Communication during operation is somewhat an issue as the original speaker system made for this kind of surgery is broken. Instead, a small speaker and bad microphone is used.