# Requirement Specification

INCOSE describes a system life cycle for processes and activities. In the Emergency call button system, we have chosen to describe some of the activities in the life cycle model management process, which is a part of the organizational project enabling processes. The activities and scope for this project is illustrated below.

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| --- |
|  |

System Life cycle Processes Overview[[1]](#footnote-1)

## Requirement Analysis Process

### Concept of Operation

This section will contain a storytelling from where many use cases stakeholdes can be derived.

### Storytelling

An old lady has fallen and knocked her-self in the bedroom. The old lady presses emergency call button and gets redirected to a service assistant at the help care center. At the help care center, they quickly realize that the old lady needs help, and immediately sends a car off to get her.  
  
An old man tried to reach the coffee on top shelf, but cannot reach it. He then presses the emergency call and gets redirected to a service assistant at the help care center. The service assistant quickly realizes that it is not seriously and urgent help is not needed.

### Use case diagram



Figure 1 - Use case diagram

In Figure 1 all communication goes through the Emergency call base, yet where the communication is merely relayed to another actor the Emergency call base is not shown as part of the communication.

## Stakeholders

Commune

Help care center

The older

System administrators

# Requirement Analysis Process

The activities in the requirement analysis process (RAP) is about transforming the stakeholders requirement driven view, of desired functionality into a technical view of the required product. The result of this process is a measurable system requirement, that meet the stakeholders demand. Because our customer already is a system engineer, the need for deriving stakeholders need is already done, and the product to work futher on is a detailed requirement specification. To keep track of oure requirement we have developed a requirement verification tracability matrix (RVTM)[[2]](#footnote-2), though we have shipped the “v” verification because it is beyond the scope for this project.

The table below illustrates all system requirement together with is corresponding use case, and an indication whether it is a functional requirement or non.

### Initial Requirement Traceability Matrix

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **ID** | **Stakeholder Requirement** | **System Requirement** | **Requirement type** | **Component** | **Requirement ref.** | **UC Ref.** | **Test Case Ref.** | **Comment** |
| **1** | **SR1** | It shall be possible to activate the emergency call button | Functional | Handheld device | N/A | **UC1** | N/A | N/A |
| **2** | **SR2** | Is shall be possible to recharge the battery on the emergency call system | Functional | Handheld device | N/A | **UC2** | N/A | N/A |
| **3** | **SR3** | The system shall automatically adjust the RF transmission power according to the environment, to minimize power consumption | Functional | Handheld device | N/A | **UC3** | N/A | N/A |
| **4** | **SR4** | The system shall notify the user if the batty is below 20 % of max capacity | Functional | Handheld device | N/A | **UC4** | N/A | N/A |
| **5** | **SR5** | The system base shall notify a technician if is doesn’t receive signal for a period of 30 minutes | Functional | Base | N/A | **UC5** | N/A | N/A |
| **6** | **SR6** | It shall be possible to install a new emergency call button | Functional | Handheld device | N/A | **UC6** | N/A | N/A |
| **7** | **SR7** | It shall be possible to update the firmware on the emergency call button | Functional | Handheld device | N/A | **UC7** | N/A | N/A |
| **8** | **SR8** | The emergency call button itself shall not weigh more than 125g | Design | Handheld device | N/A | **N/A** | N/A | N/A |
| **9** | **SR9** | The emergency call button shall not be larger than 40x60x15mm | Design | Handheld device | N/A | **N/A** | N/A | N/A |
| **10** | **SR10** | The button on the emergency call button must be at least 20x30mm or have a circumference of at least 75mm | Design | Handheld device | N/A | **N/A** | N/A | N/A |
| **11** | **SR11** | The ISM band used shall be the EU allocated frequency for social alarms (EN 300 220) at 869.2 – 869.25MHz | Design | Handheld device | N/A | **N/A** | N/A | N/A |
| **12** | **SR12** | All requirements set down by the EU and Denmark regarding EMC, transmission strength and frequency hopping must be met, as well as other legal obligations pertinent to the product/project. | Design | Handheld device | N/A | **N/A** | N/A | N/A |
| **13** | **SR13** | The devices battery life shall be sufficient for at least 24 hours of stand-by (with heart beats) and a 5 minutes conversation | Performance |  | N/A | **UC4** | N/A | \* |
| **14** | **SR14** | The emergency call button shall transmit a button-push to the emergency call base within 500ms of the button being pushed | Performance |  | N/A | **UC1** | N/A | \*\* |
| **15** | **SR15** | An emergency button failure must be reported by the emergency button base no later than 2 hours after the actual time of failure. | Performance |  | N/A | **UC5** | N/A | N/A |
| **16** | **SR16** | A firmware update shall take no more than 30 minutes to complete | Performance |  | N/A | **UC7** | N/A | N/A |
| **17** | **SR17** | The emergency call button shall be able to charge from empty to fully charged in no more than 6 hours | Performance |  | N/A | **UC2** | N/A | \*\*\* |
| **17** |  |  |  |  |  |  |  |  |
| **18** |  |  |  |  |  |  |  |  |
| **19** |  |  |  |  |  |  |  |  |
| **20** |  |  |  |  |  |  |  |  |

\* A graph showing the dimensions/weight vs. battery life shall be shown starting at the smallest battery supporting the above time constraint and continuing until the size and/or weight constraint is reached.

\*\* The caregiver must be at the home of the user no more than 30 minutes from the activation of the emergency call. From this a requirement of a maximum delay from emergency call button is pressed until the alarm is received by central office of 10 seconds is created, and as the possible delay on the GSM network covers most of the 10 seconds allotted, the ISM delay of 500ms is determined.

\*\*\* If the user is to charge the emergency button themselves they must be able to do so while they sleep.

# Risk Management

This process is about identy, analyze, treat and monitor the risk continuously. Since the emergency call system, has great prospective it’s important to analyze which factor that could risk the product value on the marked.

The risk of failure for the emergency call system can be devied into diffent types of risk:

1. Development (*Technical risk* )
2. Maintenance (*Technical risk* )
3. Operation of system ( *Technical risk* )
4. Price (*Cost risk*)
5. Time to market ( *Schedule risk* )

Risk is dealing with uncertainty that is present throughout the entire system life cycle. The goal is to archive a proper balance between risk and opportunity.

### Risk calculation

As for all risk, the risk possibility is the same. The risk calsulation is illustrated below.

Risk = Probability of failure (Pf) \* Consequence of failure (Cf)

RISK CALCULATION CHOOSING AN UNKNOWN PLATFORM COMPARED TO THE WELL KNOW.

## Technical risk

This risk is worth taking serious, because at technical failure could be devastating for emergency call system. The technical risk is the possibility that a technical requirement for emergency call system may not be archived in the system life cycle. Normally large technology companies have expirenced from priveous project, and know were the risk of failure is most likely, but for emergency call system which is a newly establish company, there are many technology barriers, which have to be confronted.

## Cost risk

## Schedule risk

1. INCOSE Figure 1-1 System life-cycle Process Overview per ISO/IEC 15288:2008 [↑](#footnote-ref-1)
2. INCOSE p. 57 [↑](#footnote-ref-2)