M+BECS

D5.5 – Information Exchange Concepts

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Deliverable 5.5	Executive Summary
This document describes concepts for the exchange of messages between the devices.	

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1 Introduction

The exchange of messages between MOBECS devices among each other as well as the routes of the messages are defined in this task. It also defines which information is gathered on what device. Received or sent messages belong also to that.

The result of this tasks defines the requirements and performance characteristics of the protocols to be developed in the following task.

2 Description of the work package

BEW
Partner BEW will provide informal assistance provided in localization and navigation. Information from AP2 is thereby considered as well as practical advice and information about hardware requirements and appropriate software standards for the definition of interfaces.

FHG
In this part of work package methods for robust information and data exchange between the mobile device and MOBECS service platform are examined to ensure the highest level of QoS. Partner FHG develops in collaboration with IPC and BEW a data exchange format and defines interfaces that are refined over the course of the project, depending on the used end devices. Of special importance is the outsourcing of computing operations to computationally more powerful components in the MOBECS system. This is to be investigated in detail depending on the application scenario.

IPC
In this part of work package methods for robust information and data exchange between the mobile device and service platform MOBECS are examined to ensure the highest level of QoS. This includes the study of existing methods for the various end devices and the various communication channels and the selection of appropriate methods which meet the requirements of the MOBECS platform.

3   MOBECS Devices

This package analyzes the message flow between the MOBECS devices. The MOBECS devices are:

- The MOBECS central, always referred to as "central" in the following

- The MOBECS base station, always referred to as "base station" in the following

- The MOBECS emergency call transmitter, always referred to as "emergency call transmitter" in the following

- A smartphone which is integrated into the MOBECS system by means of specific applications (Apps) and is always referred to as MOBECS smartphone in the following.

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4   MOBECS Network Topology

The devices are arranged in a hierarchical topology. There are directly associated connections as well as alternative connections. The latter come to bear when the direct links do not work any longer.
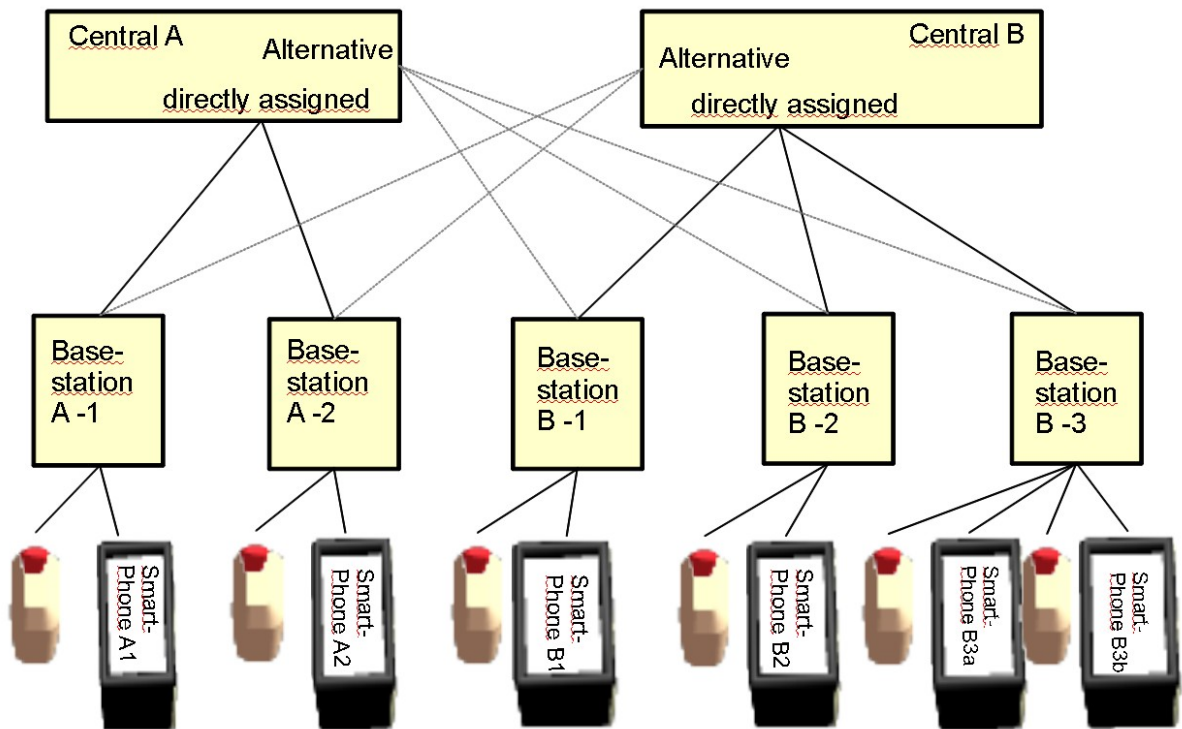

Fig1. Network topology

5   Messages

Messages can transport the following contents:

- Events such as Alarm signaling or the occurrence of faults

- People-related data

- Installation-related data

- Device-specific data

5.1   Manual triggered messages

Who can trigger a message (signal) in what way:

5.1.1   Emergency call transmitter

- Alarmbutton pushed

5.1.2   Basestation

- Callbutton pushed

- Servicebutton pushed

5.1.3   Smartphone

- Emergency call triggered via MOBECS App

- Access to the webserver of the basestation

5.1.4   Central

- Access to the webserver of the basestation

5.2   Automatic triggered message

5.2.1   Emergency call transmitter

- Reports once a day operational readiness. Here also the battery level is transmitted. Moreover, the internal clock is synchronized.

5.2.2   Basestation

- The absence of vital detection over a long period of time triggers a vital call emergency signaling.

- The noise detector rates a noise as an emergency and triggers an emergency signaling.

- The basestation detects an internal malfunction and triggers a fault signaling.

6   Message flow

The media for message exchange is essentially mobile Internet (GPRS / EDGE / UMTS), and mobile phone network. Additionally to this there is Bluetooth 4.0 (BLE) and 868 MHz radio used by the emergency transmitter.
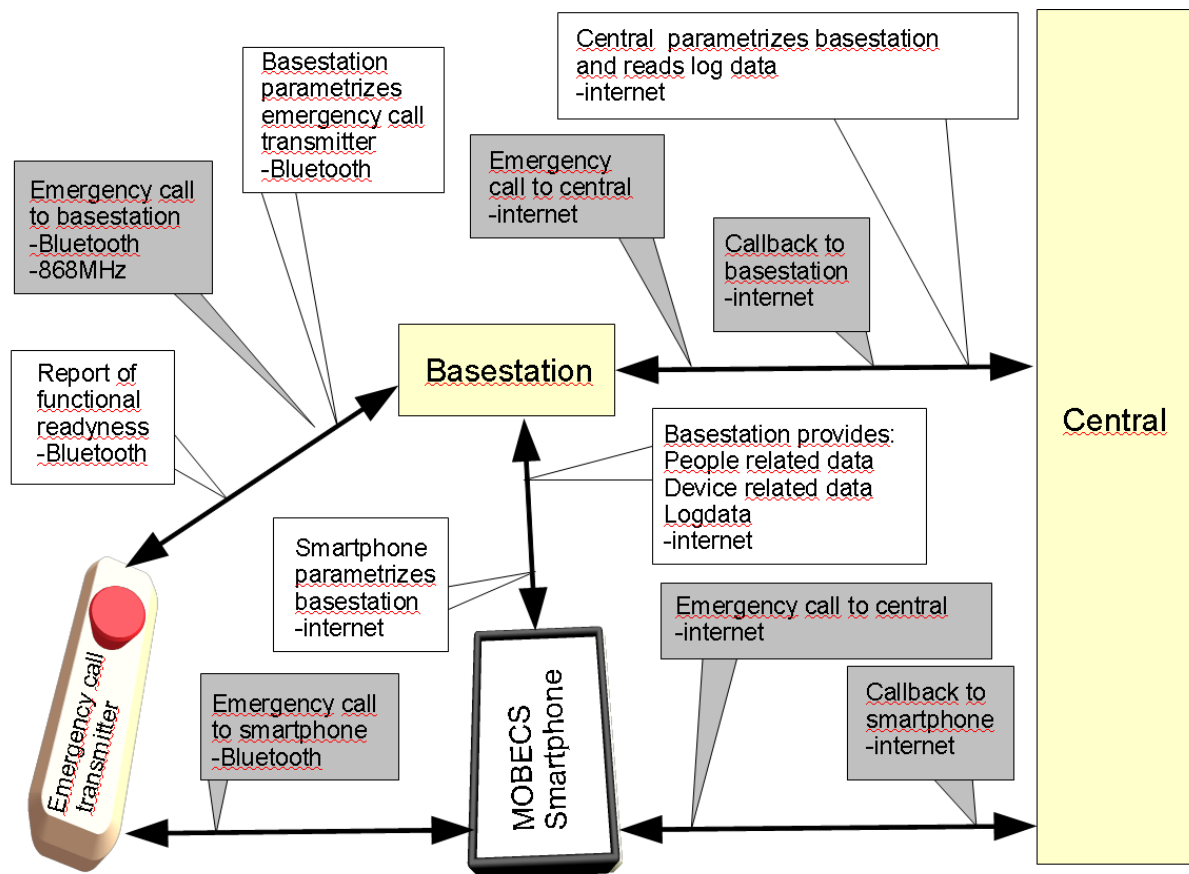

Fig. 2 Message flow

6.1   Message Contents Central

The central is connected to its known basestations as well as its assigned MOBECS smartphones. The following messages could be exchanged:

6.1.1   Basestations incoming and outgoing messages

The central receives messages from the basestations without any request:

- Service- and alarmsignaling which are directly triggered at the basestation by pressing a pushbutton or alarms from emergency call transmitters forwarded by the basestation.

- Emergency signaling triggered by the noise detector

- Failure messages.

The central can make a request to the basestation:

- People-related data, i.e. name of the resident, names and phone numbers of the nearest relatives.

- Data related to the location of the installation, i.e. city, street, house number, floor, hall, room number.

- Device-related data such as the TCP port number, the list of associated relay servers or the internal clock of the base station.

- Event-related data such as loglists

The central transmits to the basestations:

- Updated people-related data, i.e. name of the resident, names and phone numbers of the nearest relatives

- Updated device-related data, i.e. a new list of associated relay servers or an alternative central will be assigned directly.

- In case of alarm signaling the central establishes a call back hands-free connection.

6.1.2   MOBECS Smartphones incoming and outgoing messages

The central receives messages from the smartphones without any request:

- Alarmsignaling, triggered directly at the MOBECS Smartphone or alarms from emergency call transmitters forwarded by the MOBECS Smartphone.

The central can make a request to the MOBECS Smartphones:

- GPS Data for localization of a signaling MOBECS Smartphone.

6.2   Message Contents Basestation

The basestation can connect to one or multiple centrals. There is always one central assigned as fixed. The basestation tries to connect to an alternate central if the fixed central is not available.

As a mobile extension a MOBECS smartphone is assigned to the basestation. If there is more than one resident in the assisted living unit, more MOBECS smartphones can be assigned. In addition, an emergency transmitter is assigned for each resident.

6.2.1   Central incoming and outgoing messages

The basestation receives messages from the central without any request:

- Updated people-related data, i.e. name of the resident, names and phone numbers of the nearest relatives
- Updated device-related data i.e. a new list of associated relay servers or an alternative central will be assigned directly.
- In case of alarm signaling the central establishes a call back hands-free connection.

6.2.2   MOBECS Smartphone incoming and outgoing messages

The basestation receives messages from the MOBECS Smartphone without any request:

- People-related data, i.e. name of the resident, names and phone numbers of the nearest relatives.
- Data related to the location of the installation, i.e. city, street, house number, floor, hall, room number.

The basestation transmits to the assigned MOBECS Smartphone on request:

- Device-related data such as the TCP port number, the list of associated relay servers or the internal clock of the base station.

- Event-related data such as loglists.

6.2.3   *Emergency call transmitter incoming and outgoing messages*

The basestation receives from the assigned emergency call transmitter without any request:

- Emergency call signaling

- Notification of readiness for operation at specified time(s).

6.3   **Message Contents MOBECS Smartphone**

The MOBECS smartphone can connect to one or more centrals. It is always one central assigned as fixed. The MOBECS smartphone tries to connect to an alternate central if the fixed central is not available. Exactly one basestation and one emergency call transmitter is assigned to each MOBECS smartphone.

6.3.1   *Emergency call transmitter incoming*

The MOBECS smartphone receives from the assigned emergency call transmitter without any request:

- Emergency call signaling

6.3.2   *Central incoming, outgoing*

The MOBECS smartphone receives from the assigned central without any request:

- An alternative central will be assigned directly.

- Request of GPS-localization data

The MOBECS smartphone transmits to the assigned central without any request:

- Signaling of emergency call

The assigned central receives from the MOBECS smartphone on request:

- GPS-localization data

6.3.3   Basestation incoming, outgoing

The MOBECS smartphone receives from the assigned basestation without any request:

- Failure messages

The MOBECS smartphone transmits to the assigned basestation without any request:

- Signaling of emergency call which was received from the assigned emergency call transmitter.

Every MOBECS smartphone can connect to the web interface of every known basestation to transmit or request for content:

(This function is secured and can only be used by a service engineer or similar authorized personnel)

- People-related data, i.e. name of the resident, names and phone numbers of the nearest relatives.

- Data related to the location of the installation, i.e. city, street, house number, floor, hall, room number.

- Device-related data such as the TCP port number, the list of associated relay servers or the internal clock of the base station.

- Event-related data such as loglists

6.4   Message Contents Emergency call transmitter

The emergency call transmitter can only connect to its assigned basestation and to its assigned MOBECS smartphone.

6.4.1   Basestation incoming, outgoing

The emergency call transmitter receives from the assigned basestation without any request:

- Parameter settings such as the interval or time when functional readiness shall be reported.

The emergency call transmitter transmits to the assigned basestation without any request:

- Emergency call signaling.

- Report of functional readiness.

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6.4.2   MOBECS Smartphone, outgoing

The emergency call transmitter transmits to the assigned MOBECS Smartphone without any request:

- Emergency call signaling

7   Event logging

Every event, whether triggered manually or automatically is first recorded in the log memory of the basestation. The memory is protected against unauthorized access and cannot be read or manipulated by the residents or third parties. In addition, all voice recordings are recorded encrypted. The memory depth for the log data has not been set yet. The default setting is set to 14 days.

7.1   Following events are stored:

- All kind of emergency call signaling (emergency call transmitter, Vital-call, alarm of noise detector)

- Failure message

- Report of functional readiness of the emergency call transmitter.

- Access to the basestation from the internet.

- The audio data accumulated by a call back of the central are stored compressed and encrypted.

7.2   Following events are not stored:

- Emergency call signaling which is triggered by the MOBECS smartphone or forwarded by the MOBECS smartphone.