

# TERMS OF REFERENCE

## UNIFIED SYSTEM FOR MONITORING AND PROVISION OF TELEASSISTANCE/TELECARE SERVICE

### 1. INTRODUCTION

#### 1.1. Purpose of the document

The purpose of this document is to describe the requirements for the implementation of a public procurement procedure with a subject – delivery of a “**Unified System for Monitoring and Provision of Teleassistance/Telecare Service**”. The Assignee shall ensure the delivery of software and equipment, installation, deployment and training of staff within 7 months after the conclusion of a performance contract, as well as data transmission for the entire period until 17 May 2023 including warranty support.

These Terms of Reference also describe the documentation and reporting requirements towards the Assignee.

#### 1.2. About the Project

The “Innovative Community Care Models in Favour of People with Chronic Diseases and Permanent Disabilities” Project No. BGLD-1.001-0001 is implemented by the Bulgarian Red Cross with the support of the Financial Mechanism of the European Economic Area 2014-2021 under the “Local Development, Poverty Reduction and Improved Inclusion of Vulnerable Groups” Programme.

The main goal of the Project is to build an innovative model for remote monitoring of chronic diseases – teleassistance/telecare – in the regions of Vratsa, Vidin and Montana, using modern information and communication technology (ICT).

The goal is to ensure continuous contact with and support to elderly and vulnerable people in the community living alone, by implementing a set of technological solutions, including features such as monitoring the general condition of users, keeping track of physiological indicators, ensuring compliance with treatment prescribed, etc., as well as providing an adequate response depending on the users’ condition and needs. The teleassistance/telecare service will be provided in

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coordination with integrated health and social services by the teams of 7 Home Care Centres (HCC) on the territory of the municipalities of Vratsa, Oryahovo, Krivodol, Byala Slatina, Vidin, Montana and Belogradchik, including in the villages in these municipalities. The technological solutions will be integrated into the daily lives of users, while at the same time being reliable and easy to use.

The signal, transmitted by the personal devices in the home of the users, will be directed to a team in a dedicated Control and Communication Centre (CCC) established specifically for the purpose on the territory of the municipality of Vratsa. The CCC team will carry out 24/7 monitoring and maintain constant contact with all Home Care Centres. Depending on the specific situation in the homes of users, CCC operators will be able to contact other health and social service providers such as emergency medical services, medical Centres, general practitioners and relatives.

### **1.3. Regulatory framework**

The present public procurement procedure has been organized on the grounds of Art. 11, Para. 1 in conjunction with Art. 7, Item 1 and Art. 8, Para. 1, Item 2 of Council of Ministers Decree No. 118 of 20.05.2014 on the terms and procedure for the selection of an assignee on the part of grant beneficiaries under the EEA Financial Mechanism, the Norwegian Financial Mechanism, the Asylum, Migration and Integration Fund and the Internal Security Fund (Prom. State Gazette, Issue 44 of 27 May 2014, amended by State Gazette, Issue 76 of 12 September 2014, amended by State Gazette, Issue 101 of 9 December 2014, amended and supplemented by State Gazette, Issue 50 of 3 July 2015, amended by State Gazette, Issue 52 of 8 July 2016, amended by State Gazette, Issue 30 of 11 April 2017, amended by State Gazette, Issue 68 of 22 August 2017, amended by State Gazette, Issue 107 of 28 December 2018).

## **2. GOAL, SCOPE AND EXPECTED RESULTS FROM THE IMPLEMENTATION OF THE PROCEDURE**

### **2.1. Goal**

The goal of the current procedure is to build an information solution, which would ensure continuous contact with and support for elderly and vulnerable people in the community by helping them stay independent for as long as possible in their homes and to avoid or delay the necessity of more complex interventions and measures.

The main goal is to implement a “Unified Monitoring and Teleassistance/Telecare System”, for the operation of the “Teleassistance/Telecare” Service, as an addition to and/or independently from of the services provided by the Home Care Centres, to 500 users.

## 2.2. Scope

The main goal described in item 2.1. will be achieved through the implementation of the following main activities and stages forming the scope of the contract:

2.2.1. Delivery and implementation of software and personal devices;

2.2.2. Testing;

2.2.3. Training of BRC employees, respectively employees in the National Council of the Bulgarian Red Cross, Sofia, employees of the CCC, Vratsa, as well as in the Home Care Centres in the towns of Vratsa, Byala Slatina, Oryahovo, Krivodol, Vidin, Belogradchik and Montana.

Support for the operation of the system, including:

2.2.4. Warranty support;

2.2.5. Ensuring connectivity with the terminal devices in the Unified System – selection and maintenance of the transmission medium.

## 2.3. Target groups

The groups targeted by the Project include:

- 500 users aged 50+ with chronic diseases and permanent disabilities on the territory of the municipalities of Vratsa, Oryahovo, Krivodol, Byala Slatina, Vidin, Belogradchik and Montana, as well as users from small and remote localities within these 7 municipalities;
- Bulgarian Red Cross employees.

## 2.4. Expected results

The result expected is to have a Unified System (with a capacity of 500 people) implemented, which will serve all the necessary functions for the operation of the CCC, supporting the Teleassistance/Telecare Service for constant monitoring of the health and psychosocial status of people in need of regular monitoring of physiological indicators and support in the home environment in order to ensure an independent way of life, including for people living in small and remote localities within the seven municipalities described above. The system should also provide a permanent connection between the CCC and the Home Care Centres, the mobile units and all stakeholders such as: social services, the fire department, the police, medical facilities, i.e. the system should also ensure an adequate response to emergencies with opportunities for inter-institutional connectivity.

## 2.5. Term of implementation

The term of implementation of the contract is up to 7 months as of the date of its conclusion.

The Assignee shall keep in mind that the implementation of the activity under Item 2.2.5. Ensuring connectivity with the terminal devices in the Unified System – selection and maintenance of the transmission medium, shall be guaranteed until 17.05.2023.

### **3. PERFORMANCE REQUIREMENTS**

When implementing the delivery, the Assignee shall strictly adhere to the terms of these Terms of Reference, his offer and the clauses set out in the draft contract, being an integral part of the documentation for participation in the procedure.

The Assignee shall present a complete solution, forecast and bear all costs related to the implementation of the procedure, as well as ensure the connectivity with the terminal devices in the Unified System – selection and maintenance of the transmission medium, which shall be guaranteed until 17.05.2023, which also includes the costs for data transfer (Internet subscription fees and/or other costs according to the proposed solution by the Assignee) for the entire period after concluding a contract until 17.05.2023 for all 500 users which simultaneously arise at the expense of the Assignee.

In case mobile or stationary devices (Raspberry PC, smart phones or others) are required for this purpose, they shall be provided by the Assignee at its expense.

The structures and modules delivered shall be installed at the Assignor's own or leased infrastructure (server or cloud space).

#### **3.1. Reporting and documentation**

The respective technical documentation for the system should be prepared in accordance with the Terms of Reference, subject to the following requirements:

- The entire documentation and all technical descriptions, manuals for operation, administration and maintenance of the System, including its components, shall be available in Bulgarian;
- All documents shall be submitted by the Assignee in electronic format (ODF/Office Open XML/MS Word DOC/RTF/ PDF/HTML, etc.), allowing full-text search/keyword search and copying parts of the content of the original documents to external documents, for Assignor's internal use;
- Wherever charts or graphs are included in the documentation, they shall be embedded in the documents in their original vector format;
- The documentation provided by the Assignee to the Assignor shall be:

- ✓ In Bulgarian;
- ✓ In hard copy and in electronic format; copying and editing the documents provided shall be readily available.

The minimum required documentation shall include the following documents:

- **Technical documentation:** All products to be supplied – software and personal devices – shall be accompanied with specific installation and/or technical documentation, including:
  - Administrator's Guide, including all necessary installation, configuration, backup, recovery and other procedures and scripts necessary for the system administration;
  - End User Documents: The Assignee shall provide the main User Guides for the software and the personal devices. They must describe the overall functionality of the application software and the personal devices, respectively how they can be used by the end users;
  - Detailed description of the database;
  - Description of the software modules;
  - Declaration of Conformity: CE marking certification (if applicable) proving that the specific product (personal device) meets the requirements of Council Directive 93/42/EEC of 14 June 1993 on medical devices;
  - Warranty Statement, Technical Documentation and other documents at the discretion of the Assignee.
  - If the documents are issued in a foreign language, they shall be accompanied by a translation into Bulgarian.
  - The technical documentation shall mention the version of the document in order to keep track of any changes to the document with each version.

### 3.2. ORGANIZATION AND MANAGEMENT REQUIREMENTS

In the process of implementation of the subject of the procedure, the Assignee shall comply with all regulatory requirements regarding the activities of the Bulgarian Red Cross and the laws of the Republic of Bulgaria.

#### 3.2.1. Management

The management activities shall include, as a minimum, the management of the implementation of all activities specified in this procurement and the achievement of the expected results, as well as the allocation of the proposed participants in the procurement management team by roles, including a schedule of activities.

The methodology should include a detailed description of the following:

3.2.1.1. Organization of implementation:

- ✓ Structure of the Assignee's team;
- ✓ Way of interaction among the members of the Assignor's team;
- ✓ Relation between the Assignee and their Subcontractor, if any;
- ✓ Interaction model with the Assignor's team.

3.2.1.2. Documentation with regard to the implementation of the procurement:

- ✓ Types of reports – one interim report in case of positive testing of the functioning of the entire system and the personal devices) and one final report, after the completion of the training;
- ✓ Technical and operational documentation;
- ✓ Submission time;
- ✓ Content of the documents.

3.2.1.3. Time schedule for implementation of the activities.

Participants shall propose a time schedule detailing the stages, activities and steps for their implementation, showing the logical connection among them.

This procedure's implementation team shall include at least two experts meeting the following minimum requirements:

- Expert 1. Education – higher education, Bachelor's degree or equivalent, in the field of Natural Sciences, Mathematics and Informatics. Professional field: Informatics and Computer Science or another specialty in: technical sciences with professional fields: Communication and Computer Equipment, Electrical Engineering, Electronics and Automation, according to Council of Ministers Decree No. 125 of 24.06.2002 on the approval of a *Classifier of the areas of higher education or equivalent education acquired abroad*.

Specific experience: Participation in at least one activity or contract in connection with the supply and/or development and/or implementation of software in the field of teleassistance/telecare/telemedicine or development or delivery of Monitoring and Teleassistance/Telecare Systems or an equivalent field.

- Expert 2. Education – higher education, Bachelor’s degree or equivalent, in the field of Natural Sciences, Mathematics and Informatics. Professional field: Informatics and computer science or another specialty in: technical sciences with professional fields: Communication and Computer Equipment, Electrical Engineering, Electronics and Automation, according to Council of Ministers Decree No. 125 of 24.06.2002 on the approval of a *Classifier of the areas of higher education or equivalent education acquired abroad*.

Specific experience: Participation in at least one activity or contract in connection with the supply and/or development and/or implementation and/or maintenance of software in the field of teleassistance/telecare/telemedicine or development or delivery of Monitoring Systems and provision of Teleassistance/Telecare Services or an equivalent field.

### **3.2.2. Communication and reports**

In the process of implementation the Assignee shall submit one interim report at the stage of positive testing of the functioning of the overall system and the personal devices. After the delivery is made and the training is given, the Assignee shall submit a final report. The final report shall contain a description of the implementation and the results.

The reporting process shall be performed in compliance with the following requirements:

- All reports shall be sent to the responsible employee of the Assignor. For this purpose, the Assignor shall determine the responsible employees in the contract;
- All reports shall be presented in Bulgarian in electronic and hard copy formats;
- Submission of the reports shall be accompanied by Acceptance Protocols, signed by representatives of the Assignee and the Assignor.

Approval of the respective report shall be certified by an Acceptance Protocol to be signed.

## **4. SOFTWARE FUNCTIONAL REQUIREMENTS**

### **4.1 Desktop, web application, or equivalent**

The unified system shall serve:

- The Control and Communication Centre (CCC);
- The Home Care Centres described above, including mobile units with each of them, equipped with a mobile client.

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The system should provide a rapid response to emergencies with opportunities for inter-institutional connectivity, including the following functionalities:

#### **4.1.1. RECORD KEEPING:**

The system shall keep records for each of the monitored objects, including:

- Collection and analysis of data with the possibility of individual personalization of the status of each patient (for no fewer than 500 users);
- Organization of regimes (tasks) for users and monitoring their implementation by the teams of the BRC;
- Maintenance of a journal and monitoring the general physical condition;
- Possibilities for maintaining information about the following parameters of each object:
  - Blood pressure (hypertension diary);
  - Blood sugar;
  - Temperature;
  - Saturation;
  - ECG;
  - Photoplethysmography (PPG);
  - Laboratory results;
  - Daily routine;
  - Diet;
  - Hereditary data;
  - Medical first aid kit;
  - Medical events;
  - Symptoms;
  - Images.

#### **4.1.2. INTEGRATION WITH PERSONAL DEVICES**

**The system shall provide integration with personal devices measuring, providing data and alerts in real time for the following vital parameters:**

- Heart rate monitoring;
- ECG;
- Blood pressure;
- Saturation;
- Body position;
- Sleep monitoring;
- Photoplethysmography;

- Emergencies (fall detection, data or lack of data sufficient to define a life-threatening situation – S.O.S.);
- Temperature;
- Active plan: journal with a possibility for reminder through notification (alarm) for:
  - Taking medication;
  - Medical examinations.

All the information necessary to manage the processes and deal with critical situations in a user's home shall be displayed on the computer screen at the CCC. This includes both operational information about the objects monitored in real time, and additional information: medical file, attending physician, contacts of relatives, schedule of regular visits by the teams of the Home Care Centres to each of the users, etc.

The CCC will provide round-the-clock monitoring and will maintain constant contact with all Home Care Centres and mobile units (during their working hours).

According to the data received from the information system about:

- The specific situation regarding the condition of the users at their homes;
- Any additional supporting information on each user,

CCC operators will also contact other health and social care providers such as emergency services, medical centres, social institutions, GPs, and relatives. If the call is not possible, the CCC operator shall organize the most appropriate response in accordance with the established response protocols.

#### **4.1.3. Functions related to the administration of the software product.**

**The functions related to the administration of the software product shall include:**

- User administration;
- Support for different types of user;
- Report on the users' interactions with the system;
- Management and monitoring of the system and system parameters;
- Administration of subscriber notification lists;
- Access control (identification) mechanism based on username and password;
- Security against network attacks, manipulation and retrieval of the data stored in the system;
- Data integrity in multi-user mode of operation and seamless information input or update by multiple users at the same time;
- Registration and storage of service information for all actions of users regarding the entry, change and/or deletion of data;

- Keeping a history of the changes in the data with traceability of the changes made in time;
- Configuring the “time out” period of user sessions. The user registration process shall be as simple and fast as possible, but shall include the following specific steps:
  - Display of information about the registration steps and information related to the process of confirming the registration and activating the user profile. Tips for users on how to check the settings of email clients regarding the blocking of spam, and advice to white-list the domain of the Assignor;
  - Choice of a username with inline validation, including of the selected username;
  - Choice of a password with inline validation and visualization of the password complexity as “weak”, “normal” and “strong”;Implementation of a functionality for confirmation and activation of the registration by a message sent to the registered e-mail address of the user via a hyperlink, with a one-time generated token valid for a limited time for confirmation of the registration. Possibility for subsequent forwarding of the confirmation email in case it has been blocked by the user's system.
- Upon logging in to the system, the user shall receive clear and unambiguous notification that there are requests which have been started but are unfinished/unsent/unsigned, and be prompted to open the module for reviewing the transaction history.

The administrative functions must ensure traceability of the actions of each user (audit), as well as a version of the previous state of the data the user has changed as a result of his or her actions (system log). The attributes to be retained for each record shall include the following data as a minimum:

- Date/time of the action;
- Action;
- Object affected by the action;
- Additional information;
- User IP address.

The system shall have one administrator with full administrator rights, as well as several types of standard user, whose rights are listed in the table below.

**Table 1. Roles and administrative rights of the users of the *Unified system for monitoring and provision of Teleassistance/Telecare Service.***

<b>User type</b>  <b>Rights</b>	<b>Project management team, regional coordinator, medical activities supervisor</b>	<b>Head of the Home Care Centre</b>	<b>Mobile staff of the Home Care Centre</b>	<b>Staff of the Home Care Centre, incl. mobile units</b>	<b>CCC Operators</b>
<b>Registers a new user of the Home Care Centre also for the Teleassistance/Telecare Service</b>	-	+	-	-	-
<b>Sets a schedule for regular visits</b>	-	+	-	-	-
<b>Tracks data from personal devices with consumers</b>	-	-	+	+	+
<b>Enters information about current events in the respective Home Care Centre (reaction after an alert is filed from the CCC) – during its working hours</b>	-	+	+	+	+
<b>Enters information about current events (response after an alert from the CCC) – outside the working hours of the Home Care Centre and mobile units</b>	-	-	-	-	+
<b>Sees the entire information in the</b>	+	-	-	-	-

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<b>software on all Centres/users, incl. all actions performed</b>					
<b>Sees supporting information on users</b>	+	+	+	+	+
		<b>Only for the respective centre</b>	<b>Only for the respective centre</b>	<b>Only for the respective centre</b>	
<b>Raises an alert to the respective Home Care Centre/mobile unit regarding an event in the user's home</b>	-	-	-	-	+
<b>Alerts other health/social services in case of an event in the user's home</b>	-	-	-	-	+
<b>Deletes a Teleassistance/Telecare Service user</b>	-	+	-	-	-
<b>Sees a schedule for regular visits by the teams of the Home Care Centres</b>	+	+	+	+	-

#### 4.1.4. Monitoring functions

**The monitoring functions shall include at least the following:**

- 4.1.4.1.24/7 support of the CCC activities, including upon an S.O.S. alert sent by the system;
- 4.1.4.2 Integration with an unlimited number of monitoring devices, sensors, etc. (minimum 500) while supporting the following capabilities:
- Monitoring of patients with a connection possibility;
  - Real-time monitoring of vital signs;
  - Maintenance of functionalities for medication planning;
  - Automatic alarm in case of an S.O.S. signal, including:
    - ✓ An alert sent by a Panic Button;
    - ✓ Emergencies (fall detection, data or lack of data sufficient to define a life-threatening situation – S.O.S.);
    - ✓ Vital signs going beyond certain (pre-defined) parameters;

- Notifications about the battery status and/or device malfunction at the user's home no later than one hour after occurrence of the event.

#### 4.1.4.3 Organization of regimes (tasks) for users and monitoring their implementation by the teams of the BRC at the seven Home Care Centres, including:

- An alert for visiting a certain address – done by the CCC employees;
- Definition of a “Protocol” to be followed in specific cases;
- Reception of a signal and information about the completion of a task.

#### 4.1.5. Display functions:

- Interface based on a dynamic map supported, to be controlled by standard GIS functions (pan, zoom in, zoom out, etc.);
- Visualization of data needed to maintain an overall picture (OP) on a dynamic map, including real-time monitoring of the position of the:
  - Monitoring devices;
  - Bulgarian Red Cross Mobile teams.
- Appropriate access to:
  - Current (real time) data;
  - Historical data coming from monitoring devices (up to 7 days back).

#### 4.1.6. Maintenance of supporting information:

The system shall keep supporting information on each of the monitored objects, including:

- Collection and tracking of data with the possibility of individual personalization of the status of each patient (for no fewer than 500 users), including:
  - Monitoring of the current state;
  - Condition over a certain period of time;
  - Historical data;
- Maintenance of data on general physical condition, including:
  - Data obtained through integration with the existing electronic database of the Assignor;
  - Additional data.
- Personal data, including:
  - General Practitioner;
  - Contacts of relatives;
  - Specific conditions;
  - Other.

## 4.2. INTEGRATION WITH EXTERNAL INFORMATION SYSTEMS

For the functioning of the basic processes, the system shall allow integration with the following information systems:

- BRC's statistical electronic system, containing the users database. The integration shall ensure the use of existing data in a way that does not require manual re-entry and maintenance of data in the Unified System for Monitoring and Provision of Teleassistance/Telecare Service.

## 4.3. GENERAL FUNCTIONAL REQUIREMENTS

The application program interfaces shall meet the following architectural, functional and technological requirements:

- The online service interfaces shall be provided as web-services and provide for sufficient scalability and performance to service real time sync pull requests;
- A module of Distributed Caching of Hot Data received by the System and/or exchanged through the service online interfaces shall be integrated, with the logic of the System ensuring Cache Coherence between the cached data and the data stored in the databases;
- Data encryption in the database. Encrypted fields: personal data, document number, medical data;
- Database – Relational Model using parameterized queries, protecting against SQL Injection attacks, without database restriction;
- Protection of login and registration forms.

System users must obtain sections of the information by filtering, rearranging and aggregating the data. The result shall be presented by:

- Visualization of tables;
- Graphic on-screen display;
- Printing on paper;
- Export of data in one or several of the listed formats – ODF, Excel, PDF, HTML, TXT, XML, CSV.

## 5. NON-FUNCTIONAL REQUIREMENTS

### 5.1. Copyright

All copyright and neighbouring rights on the Unified System for Monitoring and Providing of Teleassistance/Telecare Service shall arise for the Assignor in full without restrictions in its use and modification and the System is a work created by order of the Assignor according to Art. 42, Para. 1 of the Copyright and Neighbouring Rights Act.

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## 5.2. System and applied architecture

The following requirements shall be met when designing the system and application architecture:

- The system shall be implemented as a distributed modular information system. The system must be implemented with standard technologies and maintain generally accepted communication standards that will ensure compatibility of the system with future developments. Existing functionality modules shall be refactored and/or upgraded in such a way as to ensure performance if the current requirements;
- Application program interfaces and information objects shall support a version attribute;
- The version of APIs provided through web services shall support the version in one or more of the following ways:
  - As part of the URL;
  - As a GET parameter;
  - As an HTTP header (Accept or other).
- The Assignee shall provide mechanisms for implementing future changes to the System without changing the existing program code. Where this is not possible, the time for modification, compilation and commissioning must be kept to a minimum;
- The architecture of the System and all software components (system and application) shall be selected and/or developed in such a way as to ensure that it is operable and failsafe, with non-discriminatory installation (without different conditions for installation in a physical and virtual environment) and that it operates in a productive mode in a virtual infrastructure;
- The Assignee shall design, prepare, install and configure the following System environments as a minimum:
  - Test environment;
  - Productive environment.
- In its Technical Proposal, the applicant shall describe the good practices that it will apply in relation to each aspect of the System and application architecture of the System;
- An administrative interface shall be created through which the software can be configured;
- Each object in the system shall have a unique identifier.

## 5.3. Speed and scalability

- At the application level the system shall support requests from the same client address both to the web content pages and requests to application programming interfaces, available publicly or for in-house use like Web Services or REST Services and service interfaces;
- When displaying web pages, the systems shall provide high performance and minimum response time – the average request time is recommended to be less than 1 second, with a

maximum of 1 second standard deviation for 95% of requests, not including Network Latency when transporting packets between the client and the server.

#### 5.4. Information security and data integrity

- Storing passwords of administrators, internal and external users and accounts for accessing systems (if used) in an unhidden way is not allowed. All passwords shall be protected by appropriate secure algorithms (e.g. BCrypt, PBKDF2, scrypt (RFC 7914)) for password storage and, where possible, transparent data-at-rest encryption shall be used;
- A system for daily backup of data, to be stored outside the system infrastructure, shall be envisaged;
- All web pages (internal and publicly available on the Internet) must be accessible only through the HTTPS protocol. Encryption shall be based on a secure certificate with Verified Identity, allowing the mandatory application of TLS 1.2, issued by a certification authority recognized by the most commonly used browsers (Microsoft Internet Explorer, Google Chrome, Mozilla Firefox). The annual re-issuance and renewal of the certificate shall be included as costs and activities in the warranty support for the entire support period;
- Security tests shall be performed on all web pages, at least through SSL Labs' automated server security testing tools (<https://www.ssllabs.com/ssltest/>);
- When deploying all Web Services, only the HTTPS protocol shall be used with a mandatory application of minimum of TLS 1.2;
- The programming code shall include methods for automatic sanitation of the data entered and user actions for protection against malicious attacks, such as SQL injections, XSS attacks and other known methods of attacks, and comply, where necessary, with the Ordinance on the General Requirement for Interoperability and Information Security;
- A module for traceability of actions and events in the System shall be built. It shall contain the following attributes for each action (adding, deletion, modification, reading):
  - Unique number;
  - Exact time of occurrence of the event;
  - Type;
  - Data about the information system where the event has occurred;
  - Name or identifier of a component in the information system that registered the event;
  - Priority;
  - Description of the event;
  - Event details.

- The astronomical time for certifying the occurrence of facts of legal or technical significance shall be reported to the nearest year, date, hour, minute, second and, if necessary, milliseconds, written in accordance with the BDS ISO 21110:2019 standard.

## 5.5. Usability

- The functionalities of the user interface of the System shall be independent of the Internet browsers and devices used by the users, provided that the latter are with versions still supported by the respective manufacturers.
- It should be possible to use the public modules of the applicable services through mobile devices – tablets and smart phones – through optimization of the user interfaces for mobile devices (Responsive Design);
- Custom buttons of a Unified size and easy-to-understand texts in the same style shall be used on the screen forms in the System.
- All text elements of the user interface must be visualized with fonts that are suitable for display on the screen and that ensure maximum compatibility and Unified reproduction under different client operating systems and browsers.
- Fields, menu options, and command buttons that are not allowed for the specific role of the logged in user shall not be available to that user. This does not eliminate the need to restrict the access to the business logic of the application through a declarative or program approach.
- Each screen form shall have a name displayed at the top of the screen form. The names shall suggest to the user what the form is for.
- All searches shall be case insensitive.
- Password fields shall be case sensitive.
- Username fields shall allow the use of email addresses as a username, including all characters regulated in RFC 1123 for host names;
- The uppercase and lowercase letters of the data shall remain unchanged as entered, the System shall not change the capitalization of the data entered by the users;
- The system shall allow the entry of data containing both Bulgarian characters and characters of the official languages of the EU;
- The names of the fields shall be in Bulgarian and be sufficiently descriptive, being as close as possible to the nature of the data contained in them;
- The system shall support interruption of user sessions in the absence of activity.
- Long lists of results shall be divided into numbered pages with appropriate navigation elements to go to the previous, next, first and last page, and to a specific page. The navigation elements shall be logically separated and linked to the relevant list and be displayed at the beginning of the HTML container containing the list;

- In large hierarchical categorizations, it should be possible to navigate by level or via a lazy load.
- The System shall be able to store and simultaneously display data and content entered/generated in different languages;
- All software components of the System, the software libraries and development kits used, the application servers and the database management servers, the elements of the user interface, the application program interfaces, etc. shall support as a standard and be explicitly configured to comply with minimum the Unicode 5.2 Standard when storing and processing text data, respectively only use UTF-8 text data encoding.
- All publicly accessible user interfaces should support multilingualism, at least Bulgarian and English.
- When numbers are displaying, a thousands separator shall be used in the form of an interval.
- When dates and exact time are displayed in elements of the user interface in reports or in electronic documents generated, all date and time formats shall comply with the language/location selected by the user in the settings of his or her profile:
  - The standard format for Bulgaria is "DD.MM.YYYY HH:MM:SS", and whether the time is also displayed with the date depends on the type of information displayed and the business sense of displaying the exact time;
- There shall be in-line validation in the electronic forms. The validation shall be performed in real time on the server, and in case of successful validation the data from the respective field shall be saved by the server;
- When designing and implementing the user interface, it shall be borne in mind that it shall also be equally usable by mobile devices (e.g. tablets), which do not have a mouse, but have touch screens.

## 5.6. Database design and interaction

When using a relational database, the good practices for design and interaction with the database shall be applied, including:

- The design of the database schema shall be with a maximum level of normalization, unless this would seriously impair performance;
- The system shall also be able to work with open source databases;
- The names of the tables and columns shall follow a uniform convention;
- Certain columns need to be indexed so as to optimize the most frequently used queries; the creation of an index shall be motivated and supported by measurements;
- The relationships between tables shall be defined through a foreign key;
- Query analysis shall be regularly performed, including through EXPLAIN (for SQL databases), and measures should be taken to optimize slow ones;

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- Transactions shall obligatorily be used;
- When performing batch operations, transactions blocking the system resources for a long time shall be avoided;
- Queries shall be limited in terms of the number of records returned;
- When using ORM or another layer of abstraction between the application and the database, the number of redundant queries (so-called “N+1 selects problem”) shall be minimized.

## 6. HARDWARE REQUIREMENTS

### 6.1 Server (hosting)

The software of the “Unified System for Monitoring and Providing of Teleassistance/Telecare Service” shall be installed on the server of the Assignor. A dedicated server, cloud server or space may also be used after the Assignee submits their requirements.

### 6.2 Personal devices for collecting vital parameters (sensors designed to be permanently worn on the user's body during sleep and in motion)

The delivery, integration and installation of the vital parameters collection devices shall be the responsibility of the Assignor. They shall all be able to provide a minimum of information for real time simultaneous monitoring of the parameters below.

The Assignee shall provide a total of 500 personal devices for collection of vital parameters, of which:

6.2.1. Type I: 465 devices with the following functions as a minimum:

- HR – heart rate monitoring 30-250 beats per minute – ability to simultaneously track 465 users;
- Emergencies (fall detection, data or lack of data sufficient to define a life-threatening situation – S.O.S.); – ability to simultaneously track 465 users;
- Sleep monitoring – ability to simultaneously track 465 users;
- A reminder/ an alarm for taking medicines;
- Waterproof;
- Maximum weight – up to 55 g, incl. battery.

6.2.2. Type II: 35 devices with the following functions as a minimum:

- ECG – minimum 3-channel, allowing simultaneous real-time monitoring of 35 users;
- Blood pressure – allowing simultaneous real-time monitoring of 35 users;
- Temperature – allowing simultaneous real-time monitoring of 35 users with an accuracy of 0.02°C;

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- Photoplethysmography (PPG) – allowing simultaneous real-time monitoring of 35 users;
- Maximum weight – up to 180 g incl. battery.

## **7. Data transfer**

The transfer of data from the personal devices for collection of vital parameters (sensors), installed in the homes of the users, to the server of the System shall be carried out according to a schematic solution proposed by the Assignor, valid for the entire warranty support period. All costs in this regard, incl. the costs for the data transfer (Internet subscription fees and/or other costs according to the solution proposed by the Assignor) over the entire period after conclusion of a contract until 17.05.2023 for all 500 users shall arise simultaneously at the expense of the Assignee.

In case mobile or stationary devices (Raspberry PC, smart phones) are required for this purpose, they shall be provided by the Assignee at its expense.

## **8. TRAINING**

Within the scope of the activity, employees of the Assignor shall be trained to work with the System as follows: Employees at the National Council of the Bulgarian Red Cross in Sofia, employees of the CCC, Vratsa, as well as employees in the Home Care Centres in the towns of Vratsa, Byala Slatina, Oryahovo, Krivodol, Vidin, Belogradchik and Montana.

The following requirements shall be met when planning the training:

- All teaching materials must be in Bulgarian;
- The training methodology must include the following parts:
  - Lectures;
  - Practice;
  - Tests;
- At least two training programs shall be developed:
  - For administrators;
  - For users of the System.

The Assignee shall provide the following for the trainings:

- The hardware necessary;
- The software necessary;
- Teaching materials;
- Training program;
- Trainers.

After completion of the activity, the programs and the training materials shall be provided to the Assignor.

Training shall be provided to the following groups of System users:

- Training of at least 1 (one) administrator with full administrator rights;
- Training of at least 5 (five) users of the System (according to Table 1) able to see all the information, incl. any actions performed in it;
- Training of at least 25 (twenty-five) users of the system (according to Table 1) able to enter and review information according to the competencies of each of them.

## 9. WARRANTY SUPPORT

The Assignee shall provide at its own expense warranty support after the commissioning of the information system.

During the warranty period, activities must be carried out to ensure the operational suitability of the software and the personal devices in order to be effectively used by the Assignor.

The minimum scope of support shall include:

### ➤ **Regarding the software:**

- Diagnostics of a reported issue in order to ensure the proper functioning of the systems and modules;
- Elimination of defects found in software modules modified or developed within the scope of the project;
- Consultations for solving issues of the environment configuration proposed by the Assignor (operating system, database, middleware, hardware and networks), used by the application, including changes in the configuration of the software infrastructure at the installation site;
- Recovery of the system and the data in case of possible system failure, as well as data repair due to errors in the system;
- Expert consultations by phone and e-mail to the administrators of the Assignor for identification of defects or errors in the software;
- Update and submission of a new version of the source code and the system documentation in case of obvious discrepancies with the actually implemented functionalities, as well as in the cases in which actions for elimination of defects and errors have been performed, within the warranty support;
- Setting up and enhancing the system performance, if necessary.

➤ **Regarding the personal devices:**

- Keeping spare hardware devices and parts therefor on stock, replacing defective devices with working ones until the technical problem is eliminated;
- Repair or replacement of defective components or devices.

During the warranty period, the Assignor shall obligatorily ensure:

- The use of a web-based system for registration and tracking of defects, to be used jointly by representatives of the Assignee and the Assignor;
- Single access point for receiving telephone and e-mail messages;
- A system for prioritizing the problems, in which the priority is determined by the Assignor depending on the impact of the problems on the work of its employees. The order of troubleshooting shall be determined by their priority.

Minimum warranty period of the Unified System for Monitoring and Providing of Teleassistance/Telecare Service (the System): 36 months as of the date of signing the final Acceptance Protocol.

The warranty period shall cover the entire system and applicants are not allowed to offer separate warranty periods for the software and the hardware. Offering different warranty periods for hardware and software will result in the candidate dropping out of the procedure.

An applicant offering a warranty period of less than 36 months will be excluded from participating in the procedure.

Maximum indicative budget: BGN 448,099.17 ex. VAT.

Applicants offering a price exceeding the maximum indicative budget will be excluded from the procedure.