1. **Introduction**
   1. **Purpose**

The purpose of this SRS is to detail and describe the requirements specification for B-Safe Boat Tracking System. The documentation comprises the specification of the application, attributes and functionality of the system. The SRS is written in regards to those who requires a more detailed description and guide of the system.

* 1. **Project Scope and Product Features**

B-Safe Boat Tracking System is a system that is designed to allow boat users to implement a tracking system in their navigation during voyage at high efficiency and minimal cost. The system is developed on mobile platform to cater to operating simplicity and affordability for many of the target demographic’s background. The system provides an intuitive and simple tracking feature for the boat drivers and the spotter on the coast to reliably know the whereabouts of the vessels, and, in case of emergency such as capsizing and sinking, the abrupt cut of transmission of the signal will alert the spotter to respond better in time.

|  |  |  |  |
| --- | --- | --- | --- |
| **Feature ID** | **Feature** | **Description** | **Accessible Role** |
| F001 | Start voyage | To allow boat drivers to go to voyage initiation interface in the apps | Driver |
| F002 | Start transmission | To allow boat drivers to start voyage mode and begin location transmission, also to allow boat drivers to continue to a new waypoint from an existing voyage. | Driver |
| F003 | Send notification | To allow boat driver to send custom message or notification to spotters and other drivers | Driver |
| F004 | Stop transmission | To allow boat driver to end location transmission of the voyage | Driver |
| F005 | End voyage | To allow boat drivers to end voyage, conclude and finalize their voyage details. | Driver |
| F006 | Receive notification | To allow boat drivers to receive notification from spotter | Driver |
| F007 | View voyage history | To allow boat drivers to view their previous voyages’ details | Driver |
| F008 | View current active driver | To allow spotter to view currently active drivers in voyage | Spotter |
| F009 | View notification | To allow spotter to view posted notification by drivers | Spotter |
| F0010 | Broadcast notification | To allow spotter to broadcast notification posted by drivers | Spotter |
| F011 | View warning | To view warning generated by system due to abrupt termination of transmission by users | Spotter |
| F012 | View real-time active drivers’ location | To allow spotter to view all currently transmitting drivers’ location | Spotter |
| F013 | View driver’s details | To allow spotter to view drivers’ details | Spotter |
| F014 | Manage profile details | To allow user to view and edit their profile details | Driver / Spotter |

* 1. **Definitions, Acronyms, and Abbreviations**

BTS = Boat Tracking System

SRS = System Requirement Specification

UI = User Interface

* 1. **References**
  2. **Overview**

1. **Overall Description**
   1. **Product Perspective**

This subsection will detail about the system interaction with other system in existence. The subsection will also describe how the system operates under different constraints. Such constraints include:  
1. System interfaces;   
2. User interfaces;   
3. Hardware interfaces;

4. Software interfaces;

5. Communications interfaces;

6. Memory;

7. Operations;

8. Site adaptation requirements.

* + 1. **User interfaces**

The user interface for the system shall be compatible to be used with the standard display of current mobile display at both 16:9 and 4:3 ratio.

The user interface must also sport blue themed interface in tandem with relation to the colour of the navy as the system relates to boat tracking.

* + 1. **System interfaces**

The system shall be compatible to be ran on any device capable of running minimum baseband android version of 4.4 (KitKat). Any android version lower than 4.4 is not guaranteed to be able to run the system at full capacity.

* + 1. **Hardware interfaces**

Device that operates the system be able to utilize at least 2G connection, and ability to establish GPS connection for better precision. The system also requires a local storage server to store footprints of the voyage physically (for retrieval in future use).

* + 1. **Software interfaces**

SQLite is used for database management for storing of user accounts details and pathways for voyage footprints

* + 1. **Communication interfaces**

Not applicable

* + 1. **Memory constraints**

Not applicable

* + 1. **Operations**

Not applicable

* 1. **Product Functions**
  2. **User Classes and Characteristic**

|  |  |  |
| --- | --- | --- |
| User class | Description | Required Knowledge |
| Boat driver | User who operates the vessels on the sea. Have limited access to the system | Basic knowledge and understanding of how to utilize the system |
| Spotter | User who do not partake in being at the sea. Monitors boat drivers during operation. Has extended access to the system’s feature. | Good knowledge and understanding of how monitoring and the system works together |

* 1. **Constraints**

CT1: The system should be fully developed by 14 June 2020

* 1. **Assumptions and Dependencies**

AS1: All users have access to internet connection at all times

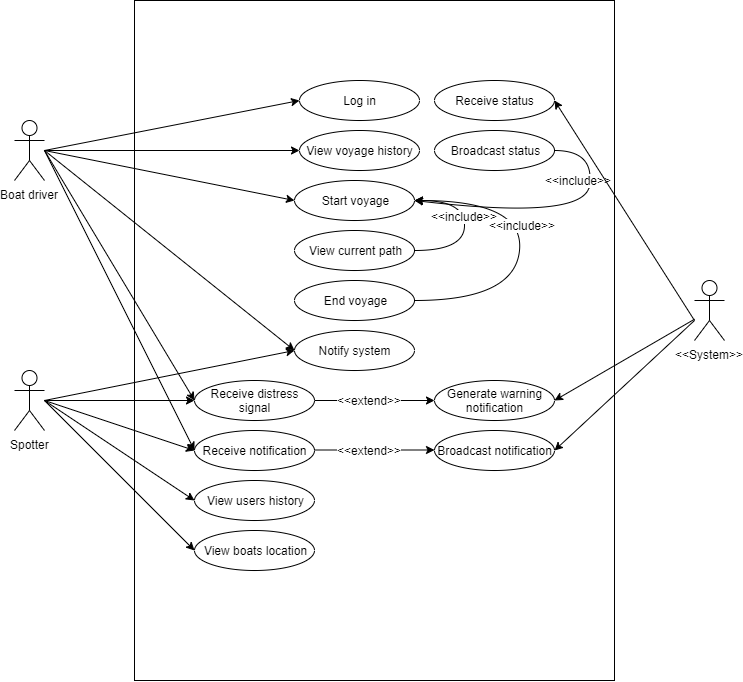
AS2: All users have access to device running android 4.4 and above

AS3: All users have access to device that is able to establish GPS connection

* 1. **Apportioning of Requirements**

1. **System Features**

This section provides overview on the functional requirement of the B-SAFE BTS. The figure below shows overall user case of the system.

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**Figure 3.1 Use case diagram**

|  |  |
| --- | --- |
| Requirement ID | Description |
| RQ\_F001 | The system shall record all location footprints transmitted by the driver |
| RQ\_F002 | The system shall notify the spotter any abrupt termination of signal transmission by the driver |
| RQ\_F003 | The system shall be able to broadcast notification sent by the driver to all other drivers and spotters |
| RQ\_F004 | The system shall be able to display live-location of active drivers using the system |
| RQ\_F005 | The system shall be able to store and show last known location of missing transmission from the driver. |

* 1. **Start voyage**
     1. **Description and Priority**

Description: This feature allows the user (boat driver) to initiate the voyage start.

Priority: High

* + 1. **Functional Requirements**

|  |  |
| --- | --- |
| Name | Start voyage |
| Purpose | Action that brings the user to the voyage initiation interface |
| Primary actor(s) | Boat driver |
| Other actor(s) |  |
| Pre-condition | User is logged in to the system with a valid account |
| Post condition |  |
| Result(s) | User is brought to the voyage initiation interface |
| Main scenario | 1. User logged in with their account credentials 2. User are brought to the home tab saying “no recent voyage history” and “start voyage” button 3. User clicks on the “start voyage” button 4. User are brought to the “voyage initiation” modal that displays details of user’s current location and time on a live map with “start” button, “stop”, “notify” and “end” button greyed out. |
| Alternative scenario | 2a. User has recent voyages or activities in his history  2a1. User are brought to the home tab with previous events displayed along with the “start voyage” button |
| Exception scenario |  |

* 1. **Start transmission**
     1. **Description and Priority**

Description: This feature allows the user’s device to start transmitting its location to the server machine to be relayed to the database and the spotter

Priority: High

* + 1. **Functional Requirements**

|  |  |
| --- | --- |
| Name | Start transmission |
| Purpose | To start transmitting the device’s coordinate to the server |
| Primary actor(s) | Boat driver |
| Other actor(s) | None |
| Pre-condition | User is logged in to the system with a valid account |
| Post condition | User will be able to:-   * Stop the transmission * Notify the spotter with simple text function at his location |
| Result(s) | User’s device will transmit and ping its location to a remote server machine, which will relay it back to the spotter’s device for live monitoring. |
| Main scenario | 1. User clicks on the “start” button 2. The “start time” box should display current timestamp 3. The “start location” box should display current timestamp 4. The “duration” box should start ticking 5. Timestamp and start location of user’s device will be sent to the server machine 6. The live map windows should show the user’s location moving in real time while blinking as the user moves 7. Device’s live-time footprint will be periodically sent to server’s machine for caching |
| Alternative scenario | None |
| Exception scenario | None |

* 1. **Send notification**
     1. **Description and Priority**

Description: This feature allows the user to send notification through text messages to the spotter

Priority: Medium

* + 1. **Functional Requirements**

|  |  |
| --- | --- |
| Name | Send notification |
| Purpose | Allows the user to send text notification to the spotter in case of emergency or unusual events |
| Primary actor(s) | Boat driver |
| Other actor(s) | Spotter |
| Pre-condition | User must be transmitting his position during voyage |
| Post condition |  |
| Result(s) | Text notification is sent to the server, which will relay it to the spotter for further action |
| Main scenario | 1. User press on the notify button during voyage 2. User are brought to a modal popup with 2 text box that implies “title” and “message” 3. User press “submit” button on the modal 4. Spotter is notified of the message and can choose to broadcast the notification or not |
| Alternative scenario | None |
| Exception scenario | None |

* 1. **Stop transmission**
     1. **Description and Priority**

Description: This feature allows the user to stop transmitting his position to the server machine

Priority: High

* + 1. **Functional Requirements**

|  |  |
| --- | --- |
| Name | Stop transmission |
| Purpose | To stop transmitting the device’s location to the server machine |
| Primary actor(s) | User |
| Other actor(s) | None |
| Pre-condition | User must be transmitting his position during voyage |
| Post condition | User can:   1. End the voyage 2. Start transmitting again and go to another waypoint |
| Result(s) | The device stops pinging its location to the server machine |
| Main scenario | 1. User presses on “stop” button 2. The “end time” box should display current timestamp 3. The “end time” box should display current location 4. The “duration” box should stop ticking 5. Timestamp, end location of user’s device and device’s location footprint will be sent to the server machine |
| Alternative scenario | None |
| Exception scenario | None |

* 1. **End voyage**
     1. **Description and Priority**

Description: This feature allows user to end and conclude the voyage to be finished

Priority: High

* + 1. **Functional Requirements**

|  |  |
| --- | --- |
| Name | End voyage |
| Purpose | Ends the current voyage for the user to be archived as history |
| Primary actor(s) | Boat driver |
| Other actor(s) | None |
| Pre-condition | Has at least 1 cycle of start and stop voyage performed |
| Post condition | None |
| Result(s) | 1. User will have its current voyage terminated without problem 2. User will have its current voyage in his history tab |
| Main scenario | 1. User presses the “end” button 2. User receives notification that his voyage ends successfully 3. User is given option to add remarks to the voyage 4. User is returned to the home tab |
| Alternative scenario | 1a. User presses other button than “end” button (notify or start)  1a1. User presses the "notify" button  1a2. User is prompted with a modal popup with 2 text box that implies “title” and “message”  1a3. User press “submit” button on the modal  1a4. Spotter is notified of the message and can choose to broadcast the notification or not  1b1. User presses the "start" button  1b2. The system follows function 3.2 (Start transmission) from scenario 1. |
| Exception scenario | None |

* 1. **Receive notification**
     1. **Description and Priority**

Description: This feature allows spotter to receive notification from boat driver

Priority: Medium

* + 1. **Functional Requirements**

|  |  |
| --- | --- |
| Name | Receive notification |
| Purpose | To allow spotter to receive text message notification from boat driver through pop-ups |
| Primary actor(s) | Boat driver |
| Other actor(s) | Spotter |
| Pre-condition | User is logged in with credentials as spotter |
| Post condition | None |
| Result(s) | User is able to receive notification forwarded from spotter |
| Main scenario | 1. Spotter decides to broadcast received notification to other boat driver for response 2. Notification is accepted to user device in a form of balloon pop-up in the system interface. 3. User opens the notification by clicking on the pop-up balloon on the system UI 4. User are brought to a modal showing the notification sent by the other boat driver along with the notification text, timestamps and current location of the driver for further response. |
| Alternative scenario | None |
| Exception scenario | None |

* 1. **View voyage history**
     1. **Description and Priority**

Description: This feature allows the user (boat driver) to view their previous voyages’ history

Priority: High

* + 1. **Functional Requirements**

|  |  |
| --- | --- |
| Name | View voyage history |
| Purpose | Allows the user (boat driver) to view his previous voyage history details |
| Primary actor(s) | Boat driver |
| Other actor(s) | None |
| Pre-condition | None |
| Post condition | None |
| Result(s) | User are able to see the modal interface that lists their voyage history as well as the details for each of the voyage |
| Main scenario | 1. User click on the “History” tab on the interface menu 2. User are brought to the history tab, showing list of previous voyage embarked by the user 3. User click at one of the list item 4. A modal popup shows the timestamp and location of start and end of the voyage, along with the route traversed on a live map window on the modal 5. User can choose to add remarks to the voyage by clicking on the “add remark” button on the modal, or return to the voyage history list by clicking on the “back” button |
| Alternative scenario | None |
| Exception scenario | None |

* 1. **View active driver**
     1. **Description and Priority**

Description: This feature allows the user (spotter) to view a list of currently active boat driver on voyages

Priority: Medium

* + 1. **Functional Requirements**

|  |  |
| --- | --- |
| Name | View active driver |
| Purpose | To give an overview to the user (spotter) in the form of a list shown in the interface where all currently active and in-voyage boat driver is shown |
| Primary actor(s) | Spotter |
| Other actor(s) | None |
| Pre-condition | User must be logged in as a spotter |
| Post condition | None |
| Result(s) | Spotter is shown a list of currently active and in-voyage boat driver |
| Main scenario | 1. Spotter signs in to the system using his credentials 2. Spotter is brought to the home tab where it is listed currently active boat drivers username, timestamp, duration of voyage and status icon 3. Spotter can click on the list item to bring up a modal detailing the user’s voyage detail (timestamps and current location and traversed path on live map). |
| Alternative scenario | 2a. No current user is actively on voyage  2a1. The home tab displays “no currently active users are on voyage” message. |
| Exception scenario | None |

* 1. **View notification**
     1. **Description and Priority**

Description: This feature allows spotter to respond to notification sent by boat drivers to the system

Priority: Medium

* + 1. **Functional Requirements**

|  |  |
| --- | --- |
| Name | View notification |
| Purpose | This feature allows spotter to view sent notification by the boat driver, and respond to them by either choosing to broadcast it to other active boat driver in voyage or not |
| Primary actor(s) | Spotter |
| Other actor(s) | None |
| Pre-condition | User is logged in as spotter |
| Post condition | None |
| Result(s) | Spotter is able to view notification sent by other boat drivers |
| Main scenario | 1. The server machine checks for any notification sent from the boat driver 2. Server sends any new notification to user (spotter) device 3. User opens the notification by clicking on the pop-up balloon on the system UI 4. User are brought to a modal showing the notification sent by boat driver through the server machine 5. User can broadcast the notification to other active boat driver in use of the system or not. |
| Alternative scenario | None |
| Exception scenario | None |

* 1. **Broadcast notification**
     1. **Description and Priority**

Description: This feature allows spotter to broadcast received notification from a boat driver to all or certain other currently active boat driver

Priority: Medium

* + 1. **Functional Requirements**

|  |  |
| --- | --- |
| Name | Broadcast notification |
| Purpose | To broadcast received notification from other boat driver to specific or all currently active boat driver |
| Primary actor(s) | Spotter |
| Other actor(s) | Boat driver |
| Pre-condition | Spotter must have currently valid notification to be viewed and broadcasted |
| Post condition | None |
| Result(s) | Spotter is able to send notifications to all or some of currently active boat driver |
| Main scenario | 1. Spotter receives notification alert relayed from server machine to the spotter’s device. 2. Spotter opens the balloon pop-up, and is presented with “broadcast” and “no action” button 3. Upon clicking on “broadcast” button, a modal listing all currently active driver with checkbox at the end of the name appears 4. Spotter can choose to broadcast said notification to individual driver by ticking on the checkbox at the end of their name, or broadcast it to everyone by checking the “to all” checkbox 5. Spotter broadcast the notification by clicking the “confirm” button at the end of the modal 6. Spotter receives notification that “broadcast is successful” and is returned to previous active tab |
| Alternative scenario |  |
| Exception scenario |  |

* 1. **View warning**
     1. **Description and Priority**

Description: This feature allows spotter to receive and view notification about abrupt termination of transmission by currently active driver

Priority: High

* + 1. **Functional Requirements**

|  |  |
| --- | --- |
| Name | View warning |
| Purpose | Spotter can receive and view details about any active driver on voyage that has suddenly stopped transmitting their location abruptly, without manual control. |
| Primary actor(s) | Spotter |
| Other actor(s) | None |
| Pre-condition | User is logged in as spotter |
| Post condition | None |
| Result(s) | Spotter is able to know any lost transmission by any currently active driver by notification and respond swiftly |
| Main scenario | 1. Spotter receives balloon notification popup on the system interface with alert sound 2. Spotter clicks on the balloon popup and is directed to the details of a driver along with its starting and latest timestamp and location. 3. Interrupted driver voyage is added to the home “active user list” tab and monitor tab 4. Spotter can remove the interrupted voyage upon confirming that the issue is resolved by clicking on the item in the list on home tab, or clicking on the driver’s username on the monitor tab, then click “resolved” button on the modal popup. |
| Alternative scenario | None |
| Exception scenario | None |

* 1. **Name**
     1. **Description and Priority**

Description:

Priority:

* + 1. **Functional Requirements**

|  |  |
| --- | --- |
| Name |  |
| Purpose |  |
| Primary actor(s) |  |
| Other actor(s) |  |
| Pre-condition |  |
| Post condition |  |
| Result(s) |  |
| Main scenario |  |
| Alternative scenario |  |
| Exception scenario |  |

* 1. **Name**
     1. **Description and Priority**

Description:

Priority:

* + 1. **Functional Requirements**

|  |  |
| --- | --- |
| Name |  |
| Purpose |  |
| Primary actor(s) |  |
| Other actor(s) |  |
| Pre-condition |  |
| Post condition |  |
| Result(s) |  |
| Main scenario |  |
| Alternative scenario |  |
| Exception scenario |  |
|  |  |

* 1. **Name**
     1. **Description and Priority**

Description:

Priority:

* + 1. **Functional Requirements**

|  |  |
| --- | --- |
| Name |  |
| Purpose |  |
| Primary actor(s) |  |
| Other actor(s) |  |
| Pre-condition |  |
| Post condition |  |
| Result(s) |  |
| Main scenario |  |
| Alternative scenario |  |
| Exception scenario |  |
|  |  |

1. **Other Nonfunctional Requirements**
   1. **Performance requirements**
   2. **Logical database requirements**
   3. **Design constraints**

* SQLite will be used as the database engine to handle storing and outputting any user information for authentication and authorization, as well as managing vessel’s footprint pathway
  + 1. **Standards compliance**
  1. **Software system attributes**
     1. **Reliability**
     2. **Availability**
     3. **Security**
* A driver cannot have access to other driver’s information (whereabouts, timestamps for voyages, footprints).
  + 1. **Maintainability**
    2. **Portability**