Software Requirements Specification

for

Crisis Management System

Straw Hat Paradise

11th April 2019

Table of Contents

1.Introduction

1.1.Purpose

The purpose of this document is to provide a detailed description of the web application Crisis Management System (CMS). This document includes information on the target audience, features, interfaces, as well as the relevant design considerations for the system. It explains the system constraints, the different states in which the system must operate and how the system will react to external input.

1.2.Document Conventions

The below conventions were followed in the write-up of the SRS:
Font size: 11
Font type: Arial
Higher-level requirements are inherited by detailed requirements.
A table of the data glossary is included in Appendix A.

1.3.Intended Audience and Reading Suggestions

This document is intended for:

1. the software analyst as a formal documentation of the agreement of requirements with the client(relevant government agencies);
2. the implementation of the CMS by the programmers of our group;
3. the maintenance and enhancement of the CMS by future developers;

Reading suggestions according to reader types:

1. Users

Introduction -> functional & non-functional requirements

2. Current programmers

Introduction -> functional & non-functional requirements -> system architecture -> class diagram

3. Future developers of the system

Introduction -> functional & non-functional requirements -> dialogue map -> class diagram

1.4.Product Scope

In line with the Ministry of Home Affairs (MHA)'s call for seamless collaboration between government agencies in times of emergency, we have decided to implement a Crisis Management System (CMS) in the form of web application. CMS aims to provide real-time monitoring functionality for key decision makers regarding different types of crisis including car accident, gas leak, fire and terrorist activities, together with notification to the relevant agencies rendering assistance. The CMS also provides timely, organised information to members of the public via email and social media, so that they may be empowered to participate in the relief effort within their neighbourhoods and communities, and to be made known of impending crises.

1.5.Data Dictionary

Term	**Definition**
Public	Everyone who accesses the CMS subscription page.
Caller	Anybody who calls the call operators to report an incident.
Call Center Operators	Government employee whose job is to take calls from Public and record incidents and incident reports in the system as required.
Government Agencies	Government agencies include: Singapore Civil Defence Force (SCDF) ● Emergency Ambulance ● Rescue and Evacuation ● Fire-Fighting Singapore Power (SP) ● Gas Leak
Prime Minister's Office	System sends an email to designated email address by prime minister's office to receive status updates PMOffice2019@gmail.com
Social Media API	Social Media API used to update public Include 2 API:

	1. Facebook 2. Twitter
External Source API	1. Weather forecast API 2. PM2.5 readings API 3. Dengue clusters API 4. Google Maps API 5. Facebook API 6. Telegram API 7. SMS API 8. Email API
Internal API	1. Firebase API
Incident Status	Possible incident status include: Reported, Handling, Closed.
Crisis Level	Crisis level is classified into 2 levels namely CAT1 and CAT2. CAT1 refers to the highest level of emergency. It impacts a significant portion of the community and the impact is usually catastrophic. e.g. Fire, Terrorist Activity, Gas Leak CAT2 refers to crisis that that requires small incident management team. e.g. Car Accident.
Webhook	A webhook (also called a web callback or HTTP push API) is a way for an app to provide other applications with real-time information. A webhook delivers data to other applications immediately.
Incident	A specific instance of a crisis reported by a caller and recorded by a call operator, which can be: fire, car accident, gas leak, terrorist activities.

2.Overall Description

2.1.Product Perspective

The Straw Hat Development Team will develop a web application called Crisis Management System (CMS). CMS provides up-to-date information about the ongoing crisis in Singapore for both government agencies and public users. It serves as an efficient collaboration solution for

call operators and government agencies to manage the incidents by gathering, organising and presenting information in an integrated manner.

CMS is in the form of a web portal which is accessible by computers and mobile phones/tablets. Separate user interfaces are provided for the relevant agencies and the public respectively. Call operator and government agency accounts, after logged in, are able to access a centralised map with integrated crisis information as well as to manage incidents. CMS also provides a notification system that sends updates about crisis via email and SMS to the government agencies periodically. Moreover, CMS has a dedicated subscription page for the public users who would like to receive notification for ongoing incidents via social media, namely Telegram, Facebook and SMS.

CMS will be drawing its data from our local database, Firebase Cloud Firestore and Realtime Database, as well as the government weather APIs.

2.2. Product Functions

Our system has the following functions:

1. Functions Performed by the System:
    - to display a login page (for call operator and government agency users
    - To display an incident map integrated with weather conditions
    - To display a list of incidents
    - To display details of an incident and the report(s) under the incident
    - To generate and send status report to the Prime Minister's Office via email
    - To send incident information to the relevant government agency via SMS
    - To post crisis information on Facebook
    - To send crisis information to CMS Telegram Bot
    - To display a SMS subscription page for the public
    - To send crisis information to people in affected region via SMS

2. Functions Performed by the administrator:
    - To log in / log out from the system
    - To create or delete accounts for call operators and government agencies

3. Functions Performed by call operators:
    - To log in / log out from the system
    - To view the incident map
    - To view a list of incidents
    - To view details of an incident
    - To create record for a new incident
    - To an add incident report under an incident record

4. Functions Performed by Prime Minister's Office:
    - To log in / log out from the system
    - To view the incident map
    - To view a list of incidents
    - To view details of an incident

5. Functions Performed by government agencies:
    - To log in / log out from the system
    - To view the incident map
    - To view a list of incidents
    - To view details of an incident
    - To manage incident status (from reported to handling / from handling to closed)
    - To manage incident reports (change status / add unit dispatched)

6. Functions Performed by public users only:
    - To subscribe to the CMS notification system

2.3. User Classes and Characteristics

The expected user base of the website will be:

- Registered users
    - Administrator which manages the accounts of the other registered users
    - Call operators who are given the access to the incident map. They can also view incident list, incident details, add new incident record, add reports for each incident, as well as change incident status.

    - Government agencies which are given the access to the incident map. They can also view incident list, incident details as well as change incident and report details.
    - Prime Minister's Office which are given the access to the incident map. They can also view a list of all incidents and details for each incident.

- Unregistered users
    - Public users who are only allowed to access the subscription page.

2.4. Operating Environment

The website shall be a django web application, which uses python to construct the framework. It shall extract relevant data from publicly available datasets (e.g. external weather API, Google Map API) and APIs from various social media channels including Facebook, Telegram and SMS. The application can operate on a PC or laptop with Windows/Mac Operating System installed.

2.5. Design and Implementation Constraints

One of the primary limitations of the system is to keep all the real-time information updated. For example, the incident map needs to support real-time updates on incident, weather, haze and dengue markers. As such, the system shall use webhook and internal incident handler to realise such real-time updates on the incident map.

Increasing number of incidents and reports in the database may lead to an increase in the time required to fetch, process and display data upon an request. As such, the system should be carefully designed to ensure that the performance of the system falls under an acceptable range in all circumstances.

The need for Internet connection is also a constraint for the web application. Since the database needs to get data from the API over the Internet frequently, and since the website needs to be put upon the Internet for user access, stable Internet connection is required for the application to function.

2.6. Assumptions and Dependencies

- All API connections are successful
- The available APIs are stable in providing useful information that is need by the system
- Users have active Internet connections
- Users have an Internet browser to access the application
- Connections to Firebase Cloud Firestore and Realtime Database are successful
- The CMS server works as expected

3. External Interface Requirements

3.1. User Interfaces

The system shall implement the following user interfaces:

1. Login UI
2. Register UI
3. Incident List UI
4. Incident Detail UI
5. Create Incident UI
6. Update Incident Status UI
7. Create Incident Report UI
8. Update Incident Report UI
9. Incident Map UI
10. Public Subscription UI

The system shall follow GUI standards:

GUI-REQ-1: Font

1. Font style must follow the default HTML standard i.e. Times New Roman
2. Body font size must follow the default HTML standard e.g. 16px for body text

GUI-REQ-2: Map Display Format

1. Google Map should be used as the incident map both on the main page as well as on the individual Incident Detail pages.

2. The incident map displayed on all the Incident Detail pages should follow the same size, zoom, and position on each page.
3. The marks on the map should be consistent throughout the app

GUI-REQ-3: Message Display Standard

1. Error message must be displayed in red color at the right hand side of a field.
2. Success message must be displayed on the center of a UI for 3 seconds

GUI-REQ-4: Persistent Buttons

1. Buttons including 'Incident List', 'Map' and 'Username' should be displayed at a fixed position on top of every page

3.2.Software Interfaces

Connections between this product and other specific software components:

1. Posting requests must be successfully received and handled by Facebook and Telegram APIs.
2. Messaging requests must be successfully received and handled by SMS API.
3. The system must be able to store information on incidents, incident reports and registered users in the Firebase database.
4. The communication between the website and the external APIs (e.g.weather) shall consist of reading operations only.
5. The communication between the website and registered users in the database shall consist both reading and writing operations.

The following data items/messages must be able to go into/ out of the system whenever there is a need:

1. External information (e.g. weather) that are fetched from APIs must be processed and displayed on the incident map upon requests
2. Incident Map Filter options, when selected / deselected by a user, must be detected by the system as requests to display or remove markers on or from the map.

3. Registered user information input by the users must be stored in the database: to validate user login, generate recommended courses based on user profile, keep track of view history of registered users.
4. Registered user information must be displayed upon access to the User Profile page
5. Error messages must be displayed when two passwords do not match, required fields are not filled, input is invalid and no search results are found.

3.3. Communications Interfaces

Web Browser

The system must be accessed with a web browser that supports HTML5 such as Safari, Google Chrome, Internet Explorer 9 with active internet connection. The communication protocol used for the web server to interact with the web browser shall be HTTP (HyperText Transfer Protocol).

API

The system must be able to establish communication with external APIs (details specified in functional requirements) from authentic websites using the HTTP.

The system must be able to send SMS to government agencies and public subscribers when needed (details specified in functional requirements under System Features) using SMS API Twilio.

The system must be able to post on Facebook and Telegram Bot when needed (details specified in functional requirements under System Features) using Facebook and Telegram APIs.

The system must be able to obtain information from weather, haze and dengue API and pass the information to google map API when needed (details specified in functional requirements under System Features).

4.System Features

Use Case ID:	UC01		
Use Case Name:	**Create Account**		
Created By:	Lee Qian Yu	Last Updated By:	Jiang Nan
Date Created:	14 Feb 2019	Date Last Updated:	10 April 2019

Actor:	Administrator
Description:	Administrator creates account for call operators and government agencies.
Preconditions:	1. Active internet connection 2. The administrator is logged in
Postconditions:	1. The account will be created in the system. 2. The system returns to the previous page.
Priority:	High
Frequency of Use:	Low
Flow of Events:	1. Administrator navigates to the Users Page 2. Administrator selects the "add user" button 3. Administrator enters username once and Password twice 4. Administrator click on "create new user" button 5. System checks that username is not used by an existing user 6. System checks that the two entries of passwords match each other 7. System creates the account and displays " The user was successfully created" message
Alternative Flow:	
Exceptions:	EX-S4: The username belongs to an existing user 1. The system displays an error message " The username has already been taken!" EX-S5: The 2 entries of passwords do not match 1. The system displays an error message " The passwords do not match!"
Includes:	
Special requirements:	
Assumptions:	
Notes and Issues:	

Functional Requirements:

1. The application shall allow the administrator to register accounts for Prime Minister's Office, call operators and government agencies:
    1.1. The relevant government agencies include:
        1.1.1. Singapore Civil Defence Force(SCDF)
        1.1.2. Singapore Power
    1.2. The administrator shall provide the following information during registration:
        1.2.1. Username
            1.2.1.1. The system shall check against the existing database to ensure the uniqueness of the username
                1.2.1.1.1. If there is an existing account in the database with the same username:
                    1.2.1.1.1.1. The system shall prevent the administrator from creating the account.
                    1.2.1.1.1.2. The system shall display an error message to inform the administrator that the username has been used by another account.
        1.2.2. Password
            1.2.2.1. The administrator shall enter the password twice for verification.
                1.2.2.1.1. If the two entries of the new passwords do not match:
                    1.2.2.1.1.1. The system shall prevent the administrator from creating the account.
                    1.2.2.1.1.2. The system shall display an error message that inform the administrator of the mismatched passwords.
        1.2.3. The account type, which can be:
            1.2.3.1. Prime Minister's Office,
            1.2.3.2. call operators,
            1.2.3.3. government agencies
        1.2.4. The account accessibility, which can be:
            1.2.4.1. View Incident Map, View Incident Details (for Prime Minister's Office account)
            1.2.4.2. View Incident Map, View Incident Details, Create Incident, Add Incident Report, Manage Incident, Manage Incident Report (for Government agency)
            1.2.4.3. View Incident Map, View Incident Details, Manage Incident, Manage Incident Report (for Call operators)
        1.2.5. Valid Singapore Contact number to which SMS can be sent (for government agencies)

1.2.6. Valid Email Address to which email can be sent (for Prime Minister's Office) 1.3. If any of the required fields are empty: 1.3.1. The system shall prevent the administrator from creating the account. 1.3.2. The system shall display an error message that some fields are not filled up.

Use Case ID:	UC02		
Use Case Name:	**Modify Account**		
Created By:	Lee Qian Yu	Last Updated By:	Jiang Nan
Date Created:	14 Feb 2019	Date Last Updated:	10 April 2019

Actor:	Administrator
Description:	Administrator changes account information for an existing user account.
Preconditions:	1. Active internet connection 2. The administrator is logged in 3. The target user account exists in the system
Postconditions:	1. The account information is modified in the system. 2. The system returns to the previous page.
Priority:	Low
Frequency of Use:	Low
Flow of Events:	1. Administrator navigates to the Users Page 2. Administrator clicks on the username of the account to be modified 3. Administrator is directed to the Change Account Information page 4. Administrator modify the relevant fields 5. Administrator click on "save" button 6. System displays " The account was successfully modified" message
Alternative Flow:	
Exceptions:	
Includes:	
Special requirements:	Username and passwords cannot be changed.

	Information that can be updated include: Email address User permission (which differentiates call operator from government agencies)
Assumptions:	
Notes and Issues:	

2. The system shall allow the administrator to modify the following account information for other users:
    2.1. password
        2.1.1. The administrator must enter the new password twice for verification.
            2.1.1.1. If the two entries of the new passwords do not match:
                2.1.1.1.1. The system shall prevent the user from changing password.
                2.1.1.1.2. The system shall display an error message to inform the user of the mismatched passwords.
    2.2. Email address (for Prime Minister's Office)
    2.3. Contact number
    2.4. Account accessibility

Use Case ID:	UC03		
Use Case Name:	**Delete Account**		
Created By:	Lee Qian Yu	Last Updated By:	Jiang Nan
Date Created:	14 Feb 2019	Date Last Updated:	10 April 2019

Actor:	Administrator
Description:	Administrator delete account for call operators and government agencies.
Preconditions:	1. Active internet connection 2. The administrator is logged in 3. The target user account exists in the system
Postconditions:	1. The account information is deleted from the system. 2. The system returns to the previous page.
Priority:	Low

Frequency of Use:	Low
Flow of Events:	1. Administrator navigates to the Users Page 2. Administrator clicks on the username of the account to be deleted 3. Administrator is directed to the Change Account Information page 4. Administrator clicks on "delete" button 5. System deletes the account and displays " The account was successfully modified" message
Alternative Flow:	
Exceptions:	
Includes:	
Special requirements:	Username and passwords cannot be changed. Information that can be updated include: Email address User permission (which differentiates call operator from government agencies)
Assumptions:	
Notes and Issues:	
Functional Requirements:	
3. The system shall allow the administrator to delete the account of an existing user.	

Use Case ID:	UC04.1		
Use Case Name:	**Log In**		
Created By:	Li Bingzi	Last Updated By:	Jiang Nan
Date Created:	14 Feb 2019	Date Last Updated:	10 April 2019

Actor:	Registered User
Description:	The user logs in to the system using his username and password.
Preconditions:	1. Active internet connection 2. The user has an existing account in the system 3. The user is not logged in
Postconditions:	The user is logged in to the system.
Priority:	High
Frequency of Use:	High
Flow of Events:	1. The user navigates to login page. 2. The user enters username and password. 3. The user clicks on "sign in" button 4. The system detects if there is any empty field(s)

	5. The system verifies the account ID and password. 6. The system navigates to home page.
Alternative Flow:	AF-S3: The system detects an empty field. 1. The system displays an error message “Please fill in this field” beside the empty field 2. The system returns to step 4. AF-S5: The system detects a non-existing username or wrong password for the account ID 1. The system displays an error message “invalid username/password”. 2. The system returns to step 4.
Exceptions:	
Includes:	
Special requirements:	
Assumptions:	
Notes and Issues:	
Functional Requirements:	

4. Login & Logout

4.1. The system shall allow registered users to log into their account through the web portal if they wish to.

4.1.1. When logging in, users shall provide their username and password.

4.1.1.1. If any of the two fields is not provided:

4.1.1.1.1. The system shall prevent the user from logging in.

4.1.1.1.2. The system shall display an error message that some fields are not filled up.

4.1.1.2. If the two fields do not match:

4.1.1.2.1. The system shall prevent the user from logging in.

4.1.1.2.2. The system shall display an error message that the login is unsuccessful.

Use Case ID:	UC04.2		
Use Case Name:	**Log Out**		
Created By:	Jiang Nan	Last Updated By:	Jiang Nan
Date Created:	14 Feb 2019	Date Last Updated:	10 April 2019

Actor:	Registered User
Description:	The user logs out from the system

Preconditions:	1. Active internet connection 2. The user is logged in
Postconditions:	The user is logged in to the system.
Priority:	Medium
Frequency of Use:	High
Flow of Events:	1. The user clicks on his/her username at the top right hand corner of a page 2. The system displays a 'sign out' button 3. The user clicks on the 'sign out' button 4. The system displays a message "Successfully logged out" 5. The system directs the user to the Login page
Alternative Flow:	
Exceptions:	
Includes:	
Special requirements:	
Assumptions:	
Notes and Issues:	
Functional Requirements:	
4 Login & Logout 4.2 The system shall allow logged in users to log out from the web portal if they wish to.	

Use Case ID:	UC05		
Use Case Name:	**View All Incidents**		
Created By:	Jiang Nan	Last Updated By:	Jiang Nan
Date Created:	14 Feb 2019	Date Last Updated:	10 April 2019

Actor:	Registered User
Description:	User views a list of all incidents (including closed incidents) on the All Incidents page
Preconditions:	
Postconditions:	
Priority:	High
Frequency of Use:	High
Flow of Events:	1. The user navigates to the All Incident page 2. The system displays a list of all incidents (including closed incidents)
Alternative Flow:	
Exceptions:	
Includes:	

Special requirements:	
Assumptions:	
Notes and Issues:	
Functional Requirements:	
5. The system shall allow all registered users to view a list of all incidents.	

Use Case ID:	UC06		
Use Case Name:	**Create Incident**		
Created By:	Le Tan Khang	Last Updated By:	10 April 2019
Date Created:	14 Feb 2019	Date Last Updated:	

Actor:	Call Operator
Description:	The call operator creates a new incident
Preconditions:	1. Active internet connection 2. The user is logged in 3. The user is on the Incident List Page as described in the use case UC05 View All Incidents
Postconditions:	1. Incident details will be stored in the database and 2. An incident detail page will be created and 3. An entry for the incident will appear in the incident list page and 4. A marker for the newly created incident will appear on the incident map as described in UC001
Priority:	High
Frequency of Use:	High
Flow of Events:	1. The call operator clicks the ‘Add new incident’ button 2. The system directs the call operator to a new page with incident creation form 3. The call operator fills up the form 4. The call operator clicks ‘Confirm’ button 5. The system displays a "Successfully created" message for 2 seconds 6. The system redirects the user to the Incident List page. 7. The system sends a SMS to the relevant government agencies as described in the use case UC14 Send SMS to Government Agencies.

	8. The system updates the incident marker on the incident map as described in the included used case UC12 Update Incident Map 9. If the incident has the crisis level of CAT1, the system sends the information on the newly created incident to social media APIs using UC15 Notify the public through Social Media
Alternative Flow:	
Exceptions:	
Includes:	UC12 Update Incident Map UC14 Send SMS to Government Agencies
Special requirements:	
Assumptions:	
Notes and Issues:	

Functional Requirements:

6. The system shall allow call operators to create incident via the system.
    - 6.1. To create an incident, the call operators shall provide the system with the following information:
        - 6.1.1. incident type, which can be:
            - 6.1.1.1. Fire
            - 6.1.1.2. Gas Leak
            - 6.1.1.3. Terrorist Activities
            - 6.1.1.4. Car Accident
        - 6.1.2. Number of casualties
        - 6.1.3. Address of the incident
        - 6.1.4. A brief description of the incident
        - 6.1.5. The type(s) of assistance requested, which may include:
            - 6.1.5.1. Emergency Ambulance
            - 6.1.5.2. Rescue and Evacuation
            - 6.1.5.3. Fire-Fighting
            - 6.1.5.4. Gas Leak Control
        - 6.1.6. Reporter details, which include:
            - 6.1.6.1. name of the reporter
            - 6.1.6.2. the time of the call
            - 6.1.6.3. the phone number
    - 6.2. An incident detail page should be created. The incident detail page should include:
        - 6.2.1. The address of the incident location
        - 6.2.2. A map showing the incident location integrated with weather condition
        - 6.2.3. Type of incident
        - 6.2.4. Number of casualties

6.2.5. An incident report which includes: 6.2.5.1. Reporter details 6.2.5.2. A brief description of the incident 6.2.5.3. The type(s) of assistance required 6.2.5.4. Unit dispatched 6.2.5.5. Status of the report 6.2.6. An 'add report' button for UC09 Add Incident Report 6.2.7. A delete incident button for UC08 Delete Incident

Use Case ID:	UC07 Update Incident Status		
Use Case Name:	**Update Incident Status**		
Created By:	Okkar Min	Last Updated By:	Jiang Nan
Date Created:	14 Feb 2019	Date Last Updated:	10 April 2019

Actor:	Government Agency / Call Operator
Description:	Government Agency / Call Operator updates the status of an incident
Preconditions:	1. Active internet connection 2. The user is logged in 3. The user is on the Incident List Page as described in the use case UC05 View All Incidents
Postconditions:	1. Incident status is updated in the database, and 2. The updated status is reflected in the incident detail page
Priority:	High
Frequency of Use:	High
Flow of Events:	1. User clicks the 'Details' button beside an incident 2. The system directs the call operator to the Incident Detail page 3. User changes the status of the incident to handling or closed 4. The system sends a SMS to the relevant government agencies as described in the use case UC14 Send SMS to Government Agencies. 5. The system updates the incident marker on the incident map as described in the included used case UC12 Update Incident Map 6. If the incident has the crisis level of CAT1 and the status of incident is updated to 'closed', the system sends the information on the newly closed incident to social media APIs using the use case UC15 Notify the public through Social Media

Alternative Flow:	nil
Exceptions:	nil
Includes:	UC12 Update Incident Map UC14 Send SMS to Government Agencies
Special requirements:	
Assumptions:	The relevant government agencies is capable of verifying the situation and updating the incident status promptly.
Notes and Issues:	nil
Functional Requirements:	
7. The system shall allow call operators and government agencies to update incident status via the system. 7.1. An incident can be in one of the following status: 7.1.1.1. Reported 7.1.1.2. Handling 7.1.1.3. Closed	

Use Case ID:	UC08		
Use Case Name:	**Delete Incident**		
Created By:	Jiang Nan	Last Updated By:	Jiang Nan
Date Created:	14 Feb 2019	Date Last Updated:	10 April 2019

Actor:	Government Agency / Call Operator
Description:	Government Agency / Call Operator deletes an existing incident
Preconditions:	1. Active internet connection 2. The user is logged in 3. The user is on the Incident List Page as described in the use case UC05 View All Incidents
Postconditions:	1. The incident will be deleted from the database, and 2. The incident will be deleted from the incident detail page
Priority:	Medium
Frequency of Use:	Low
Flow of Events:	1. User clicks the ‘Details’ button beside an incident 2. The system directs the call operator to the Incident Detail page 3. User clicks on the ‘delete’ button 4. The system displays a message “successfully deleted!” and directs the user back to the All Incidents page

	5. The system updates the incident map as described in the included used case UC12 Update Incident Map 6. The system sends a SMS to the relevant government agencies as described in the included used case UC14 Send SMS to Government Agencies 7. If the incident has the crisis level of CAT1, the system sends the information on the newly deleted incident to social media APIs using the use case UC15 Notify the public through Social Media
Alternative Flow:	nil
Exceptions:	nil
Includes:	UC12 Update Incident Map UC14 Send SMS to Government Agencies
Special requirements:	
Assumptions:	The relevant government agencies are capable of verifying the situation and update through the system promptly.
Notes and Issues:	nil
Functional Requirements:	
8. The system shall allow call operators and government agencies to delete duplicate / fake incidents.	

Use Case ID:	UC09		
Use Case Name:	**Add Incident Report**		
Created By:	Jiang Nan	Last Updated By:	Jiang Nan
Date Created:	14 Feb 2019	Date Last Updated:	10 April 2019

Actor:	Call Operator
Description:	The call operator creates a new report under an incident
Preconditions:	1. Active internet connection 2. The call operator is logged in 3. The call operator is on the Incident Detail Page
Postconditions:	1. Report details will be stored in the database and 2. An entry for the report will appear in the Incident Detail page
Priority:	High
Frequency of Use:	High
Flow of Events:	1. The call operator clicks the ‘Add new report’ button on the Incident Detail page 2. The system displays a report creation form 3. The call operator fills up the form 4. The call operator clicks ‘Confirm’ button

	5. The system closes the form and displays a "Successfully created" message for 2 seconds 6. The system sends a SMS to the relevant government agencies as described in the included used case UC14 Send SMS to Government Agencies
Alternative Flow:	
Exceptions:	
Includes:	UC14 Send SMS to Government Agencies
Special requirements:	
Assumptions:	
Notes and Issues:	
Functional Requirements:	

9. The system shall allow call operators to add incident reports via the system.
    9.1. There should be an ‘add report’ button in each incident detail page.
    9.2. To add a new report for an incident, the call operators shall provide the system with the following information:
        9.2.1. Number of casualties
        9.2.2. Address of the incident
        9.2.3. A brief description of the incident
        9.2.4. The type(s) of assistance requested, which may include:
            9.2.4.1. Emergency Ambulance
            9.2.4.2. Rescue and Evacuation
            9.2.4.3. Fire-Fighting
            9.2.4.4. Gas Leak Control
        9.2.5. Reporter details, which include:
            9.2.5.1. name of the reporter
            9.2.5.2. the time of the call
            9.2.5.3. the phone number
    9.3. If the number of casualties reported is greater than the existing figure for the incident, the system should replace the newly reported number of casualties with the old figure.
    9.4. After adding an incident report, an entry for the new incident report should be displayed in the Incident Detail Page, which contains the following information:
        9.4.1. The reporter details as mentioned in section 9.2.5
        9.4.2. Assistance requested as mentioned in section 9.2.4
        9.4.3. Unit dispatched (initially empty)
        9.4.4. A brief description of the incident
        9.4.5. Status of the report

Use Case ID:	UC10		
Use Case Name:	**Update Incident Report**		
Created By:	Jiang Nan	Last Updated By:	Jiang Nan

Date Created:	14 Feb 2019	Date Last Updated:	10 April 2019

Actor:	Government Agency / Call Operator
Description:	Government Agency / Call Operator updates the details of an existing report under an incident
Preconditions:	1. Active internet connection 2. The user is logged in 3. The user is on the Incident Detail Page
Postconditions:	3. The report details will be updated in the database and 4. The updated details for the report will be reflected in the Incident Detail page
Priority:	High
Frequency of Use:	High
Flow of Events:	1. The user clicks the 'manage button beside an incident report on the Incident Detail page 2. The system displays the Edit Report window 3. The user changes the details of the incident report 4. The user clicks 'Finish' button 5. The system closes the window and displays a "Successfully updated" message for 2 seconds 6. The system sends a SMS to the relevant government agencies as described in the included used case UC14 Send SMS to Government Agencies
Alternative Flow:	
Exceptions:	
Includes:	UC14 Send SMS to Government Agencies
Special requirements:	
Assumptions:	
Notes and Issues:	The call operators and relevant government agencies might want to update an incident report when: 1. A new unit is dispatched to provide assistance 2. The report status is changed to handling or closed
Functional Requirements:	
10. The system shall allow call operators and government agencies to update incident reports via the system. 10.1. There should be a 'manage report' button for each incident report in the Incident Detail page. 10.2. the system shall allow call operators or government agencies to change the following information: 10.2.1. Unit dispatched, which may include: 10.2.1.1. Singapore Civil Defence Force (SCDF) 10.2.1.2. Singapore Power 10.2.2. Status of the report, which can be: 10.2.2.1. Reported	

10.2.2.2.	Handling
10.2.2.3.	Closed

Use Case ID:	UC11		
Use Case Name:	**View Incident Map**		
Created By:	Jia Wei	Last Updated By:	Jiang Nan
Date Created:	13 Feb 2019	Date Last Updated:	10 April 2019

Actor:	Registered Users
Description:	The user views the Incident Map on a web graphical user interface.
Preconditions:	1. Active internet connection 2. The user is logged in 3. The user is on the Incident Detail Page
Postconditions:	NIL
Priority:	High
Frequency of Use:	High
Flow of Events:	1. The user navigates to the “Map” page of the system. 2. The page loads a a map that is integrated with real-time weather conditions, dengue hotspots, information on haze, fire and terrorist activities. 3. (Optional) The user selects/deselects the markers to be displayed on the map using map filters. 4. The system adds / removes the corresponding markers to / from the map. 5. (Optional) The user clicks on a weather / incident marker 6. The system displays an information window above the weather / incident marker. 7. (Optional) The user clicks on the close (×) button located at the top righthand corner of an information window. 8. The system removes the information window from the map.
Alternative Flow:	
Exceptions:	
Includes:	
Special requirements:	
Assumptions:	
Notes and Issues:	

Functional Requirements:
11. The system shall display an Incident Map of Singapore for logged in users. 11.1. The map shall be integrated with: 11.1.1. Weather markers for each region 11.1.1.1. Different types of weather markers should be used to represent different weather conditions 11.1.1.2. Each marker should be located at the centre of the corresponding region 11.1.1.3. Each marker shall display an information window upon clicking, which contains the following information: 11.1.1.3.1. Name of the region 11.1.1.3.2. Weather condition in words 11.1.1.3.3. Timestamp 11.1.2. Dengue hot spot markers 11.1.3. Haze hot spot markers 11.1.3.1. Each marker shall display an information window upon clicking, which contains the following information: 11.1.3.1.1. 1-hr PM2.5 value 11.1.3.1.2. Update timestamp 11.1.4. Incident markers 11.1.4.1. Different types of incident markers should be used for CAT1 and CAT2 crisis level respectively. 11.1.4.2. Each marker shall display an information window upon clicking, which contains the following information: 11.1.4.2.1. Incident ID 11.1.4.2.2. Incident Type 11.1.4.2.3. Incident Status 11.1.4.2.4. Creation Timestamp 11.2. The map shall contain filters to allow user to show or hide different types of markers, including: 11.2.1. One filter for each type of incident 11.2.2. One filter for each crisis level 11.2.3. A filter for weather markers 11.2.4. A filter for dengue hotspots 11.2.5. A filter for haze hotspots

Use Case ID:	UC12		
Use Case Name:	**Update Incident Map**		
Created By:	Okkar Min	Last Updated By:	Jiang Nan

Date Created:	14 Feb 2019	Date Last Updated:	10 April 2019

Actor:	Google Maps API
Description:	Update the incident map being displayed on the web portal
Preconditions:	1. Active internet connection 2. Invocation as an included use case by UC06 Create Incident, UC07 Update Incident Status and UC08 Delete Incident.
Postconditions:	Map being displayed on the main page is either updated with: 1. Addition of a new incident marker 2. Removal of closed/deleted incident marker 3. Update of an ongoing incident status as shown in the information window of the incident marker
Priority:	High
Frequency of Use:	High
Flow of Events:	1. The system detects a change in the incident status / a newly created incident / a deleted incident 2. System send an update marker request to the Google Map API 3. Google Map API returns request with updated markers on the map
Alternative Flow:	
Exceptions:	
Includes:	
Special requirements:	
Assumptions:	
Notes and Issues:	
Functional Requirements:	

12. The system shall provide real-time updates on the map.

12.1.1.1. The system shall update the incident markers when there is:

12.1.1.1.1. A newly created incident

12.1.1.1.2. An update on the status of an existing incident

12.1.1.1.3. An update on the assistance requested of an existing incident

12.1.1.1.4. An update on the unit dispatched of an existing incident

12.1.1.1.5. A newly closed incident

12.1.1.1.6. A newly deleted incident

12.1.1.2. The system shall update the weather, dengue and haze markers when:

12.1.1.2.1. It is 30 minutes after the last update

12.1.1.2.2. There is an update on incident markers

12.1.1.3. The system shall display the exact time of update on the information window that belongs to each marker.

Use Case ID:	UC13		
Use Case Name:	**Send Status Report to Prime Minister's Office**		
Created By:	Ooi Yue Ying	Last Updated By:	Ooi Yue Ying
Date Created:	14 Feb 2019	Date Last Updated:	10 April 2019

Actor:	Email API
Description:	The system sends a status report via email using the Email API to the Prime Minister's Office every 30 mins.
Preconditions:	1. Active internet connection
Postconditions:	The email will be sent to the Prime Minister's office
Priority:	High
Frequency of Use:	Every 30 mins
Flow of Events:	1. The system computes the information to be included in the status report 2. The system sends the status report and email address of Prime Minister's office to the Email API. 3. Email API sends the information to the Prime Minister's office via email.
Alternative Flow:	
Exceptions:	Network is unavailable nothing can be done
Includes:	
Special requirements:	Forces deployed 1.2 Number of casualties 1.3 State of crisis 1.3.1 Verification of crisis 1.3.2 Managing of crisis 1.3.3 Close crisis
Assumptions:	
Notes and Issues:	
Functional Requirements:	
13. The system shall send a status report to the Prime Minister's Office every 30 minutes 13.1. The report shall be sent over email 13.2. The report shall contain a summary of key indicators and trends in the form of graphs. 13.2.1.1.1. There should be 2 graphs for each of the 4 incident types, namely: 13.2.1.1.1.1. A graph with a timespan of 3 hours and 30-minute intervals		

13.2.1.1.1.2. A graph with a timespan of 24 hours and 4-hour intervals

13.2.1.1.2. Each graph should show the following information across the timespan:

13.2.1.1.2.1. Number of incidents in each status, namely:

13.2.1.1.2.1.1. Handling

13.2.1.1.2.1.2. Closed

13.2.1.1.2.1.3. NOTE: status 'reported' and 'deleted' are not included since we do not want to include fake reports into the figure. Moreover, once reported, an incident is expected to be handled immediately, thus we believe that having handling alone is representative of the real incidents which have not been closed.

13.2.1.1.2.2. Number of casualties

Use Case ID:	UC14		
Use Case Name:	**Send SMS to Government Agencies**		
Created By:	Jason	Last Updated By:	Jiang Nan
Date Created:	14 Feb 2019	Date Last Updated:	10 April 2019

Actor:	SMS API
Description:	When a new incident is created in the system, the system sends a SMS to the relevant government agencies using the SMS API.
Preconditions:	1. Active internet connection 2. Invocation as an included use case by Use Case Number UC06 Create Incident, UC07 Update Incident Status, UC08 Delete Incident, UC09 Add Incident Report, UC10 Update Incident Report.
Postconditions:	The SMS is sent to the relevant government agencies
Priority:	High
Frequency of Use:	High
Flow of Events:	1. The system decides on the relevant government agencies involved in handling the incident base on the type of assistance requested. 2. The system sends information about the incident / incident report and the contact number of the relevant government agencies to the SMS API.

	3. SMS API sends the information to the relevant government agencies via SMS.
Alternative Flow:	
Exceptions:	
Includes:	
Special requirements:	
Assumptions:	
Notes and Issues:	
Functional Requirements:	

14. The system shall send the incident information to the relevant agencies using SMS.
    14.1. The system shall send the SMS to the relevant agencies when an incident is:
        14.1.1. Created
        14.1.2. Updated
        14.1.3. Closed
        14.1.4. Deleted
    14.2. The relevant agencies might be:
        14.2.1. Singapore Civil Defence Force (SCDF)
            14.2.1.1. SCDF is considered relevant when an incident involves the following types of assistance:
                14.2.1.1.1. Emergency Ambulance
                14.2.1.1.2. Rescue and Evacuation
                14.2.1.1.3. Fire-Fighting
        14.2.2. Singapore Power
            14.2.2.1. Singapore Power is considered relevant when an incident involves the following types of assistance:
                14.2.2.1.1. Fire-Fighting
    14.3. The SMS should include the following information about the incident:
        14.3.1. Incident type
        14.3.2. Incident status
        14.3.3. Incident description
        14.3.4. Number of casualties
        14.3.5. Incident location
        14.3.6. Type of assistance requested
        14.3.7. Unit dispatched

Use Case ID:	UC15		
Use Case Name:	**Notify the public through Social Media**		
Created By:	Jia Wei	Last Updated By:	Jiang Nan
Date Created:	13 Feb 2019	Date Last Updated:	10 April 2019

Actor:	Telegram, Facebook and SMS (Social Media) APIs
Description:	The Social Media API receives post content from the system and notify the public through posting on Telegram Bot, Facebook or SMS.
Preconditions:	1. Active internet connection 2. This use case extends UC06 Create Incident, UC07 Update Incident Status and UC08 Delete Incident. It is initiated when a CAT 1 crisis level incident record has been created or closed or deleted, or 3. It is 6 hours away from the last post on CAT 2 crisis level incidents
Postconditions:	1. Telegram API will post the information on CMS Telegram Bot 2. Facebook API will post the information on CMS Facebook page. 3. SMS API will send the information to subscribers of CMS in the affected region.
Priority:	High
Frequency of Use:	High
Flow of Events:	1. The system detects that it is 6 hours away from the last post on CAT2 crisis level incident(s). 2. The system sends information about the ongoing and recently closed CAT2 crisis level incident(s) to each of the three Social Media APIs.
Alternative Flow:	1. The system detects a newly created or closed or deleted CAT1 crisis level incident. 2. The system sends information about the incident to the Social Media API. 3. Social Media API posts the information on CMS Telegram Bot and on CMS Facebook page.
Exceptions:	
Includes:	
Special requirements:	
Assumptions:	
Notes and Issues:	
Functional Requirements:	
15. The system shall provide updates on ongoing and recently closed / deleted incidents to the public through social media: 15.1. The system shall post through the following social media: 15.1.1. Facebook 15.1.2. Telegram 15.1.3. SMS 15.1.3.1. The SMS shall be sent to subscribers of SMS who are in the affected region 15.2. The post should contain the following information:	

15.2.1. For each incident:
15.2.1.1. Location of the incident
15.2.1.2. Status of the incident
15.2.1.3. Type of the incident
15.2.2. Information on Civil Defence Shelter
15.2.3. Information on Hospitals and Polyclinics
15.3. The system shall post on social media when:
15.3.1. Created
15.3.2. Closed
15.3.3. Deleted
15.3.4. Singapore Civil Defence Force (SCDF)

Use Case ID:	UC16		
Use Case Name:	**Subscribe to Notification System**		
Created By:	Jiang Nan	Last Updated By:	Jiang Nan
Date Created:	13 Feb 2019	Date Last Updated:	10 April 2019

Actor:	Public Users
Description:	The public users subscribe to the SMS Notification System in order to receive SMS regarding incidents in a particular region(s).
Preconditions:	1. Active internet connection
Postconditions:	1. The system will save the subscriber information in the database
Priority:	High
Frequency of Use:	Medium
Flow of Events:	1. The user navigates to the Public Subscription page 2. The user fills up a subscription form 3. The user clicks ‘subscribe’ button 4. The system checks for empty fields 5. The system displays a message “subscription is successful!”
Alternative Flow:	
Exceptions:	EX-S6: The system detects an empty field 1. The system displays an error message “ Empty field!” beside the empty field
Includes:	
Special requirements:	
Assumptions:	
Notes and Issues:	

Functional Requirements:
16. The system shall provide an interface for public users to subscribe to the SMS Public Notification System 16.1. To subscribe to the notification system, the user shall provide the following information: 16.1.1. Name 16.1.2. A valid Singapore contact number 16.1.3. Interested Region, which can be: 16.1.3.1. South West 16.1.3.2. South East 16.1.3.3. Central 16.1.3.4. North East 16.1.3.5. South West

5.Performance Requirements

REQ-1: Prevention of Unauthorised Access to Exclusive Features

1. The system shall only allow the creation and modification of user accounts by the administrator
2. The system shall use PBKDF2 to encrypt the password for each user account before storing in the database

REQ-2: System Response Time

General:

1. Navigation between web pages must be complete within 1 seconds under all circumstances.

Feature specific:

2. For Map view: request to load / reload a map view must be completed within 2 seconds under all circumstances.
3. For Map updates: changes made to an incident must be updated and reflected on the map through changes to markers and information windows within 2 seconds

REQ-3: Workload

1. The system must be capable of supporting at least 30 users while ensuring that the response time falls under the acceptable range as mentioned in REQ-1.

REQ-4: Reliability and Maintainability

1. The system fault rate shall be less than 1 failure per 1000 hours of operation
2. The system shall have 99% uptime of internet connection
3. The system must be able to be fixed within 2 hours after any system fault

REQ-5: Correctness

1. The system must at least be able to return the correct results 99% of the time
2. Any false results, when being reported by the users, must be fixed within 2 hours

REQ-6: Connection timeout between website and database

General:

1. The system must ensure less than 1% connection timeout rate.
2. Should there be a connection timeout between the web server and the Firebase, a message must be displayed to the user that connection has timed out, and to try again.

REQ-7: Connection timeout between website and external APIs

1. The system must ensure less than 1% connection timeout rate.
2. Should there be a connection timeout between the web server and the API, a message must be displayed to the user that connection has timed out, and to try again.

REQ-8: Responsive design

1. The website must be responsive and be able to fit multiple platforms (including mobile phones, tablets, laptops and desktops) and screen orientations.

REQ-9: User convenience

1. Access to general functionalities including Incident Map, Incident List and Logout must be made available in the form of buttons on the top of every page.

N-REQ-10: Portability

1. The system must be able to run on different operating systems, including Windows, Linux, IOS, Android and Mac OS etc.