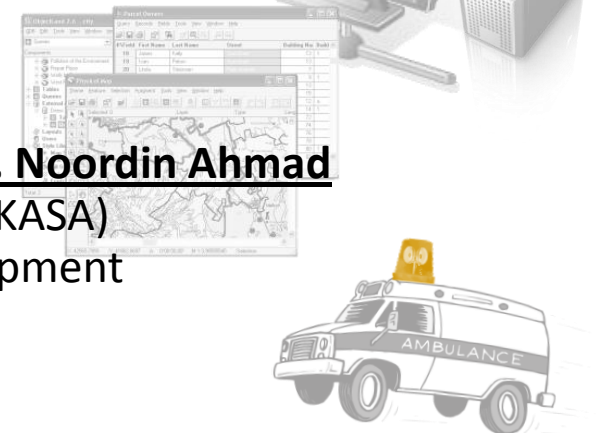


Integrating Navigation Technology in Emergency Medical System Services in Malaysia

Sr Shahrizal Ide b. Moslin

Ooi Wei Han, Norhan Mat Yusoff, Mohd Firdaus, Dr. Noordin Ahmad

National Space Agency of Malaysia (ANGKASA)
Space Application and Technology Development
National Space Centre
Banting, Selangor



Agensi Angkasa Negara (ANGKASA)

- National Space Agency of Malaysia, est. in 2004
- An agency under Ministry of Science, Technology and Innovation

VISION

- Harnessing space as a platform for knowledge generation, wealth creation and societal well-being

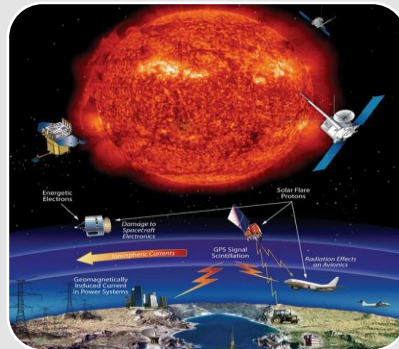
MISSION

- To develop the country's potential in the space sector to support the development of the new economy, generate knowledge and strengthen the national security infrastructure.

Agensi Angkasa Negara (ANGKASA)



**Administration &
Human Resource
Division**



**Space Science &
Education Division**



**Operations and
Space System
Division**



**Technology
Development &
Space Applications
Division**

ANGKASA Campuses



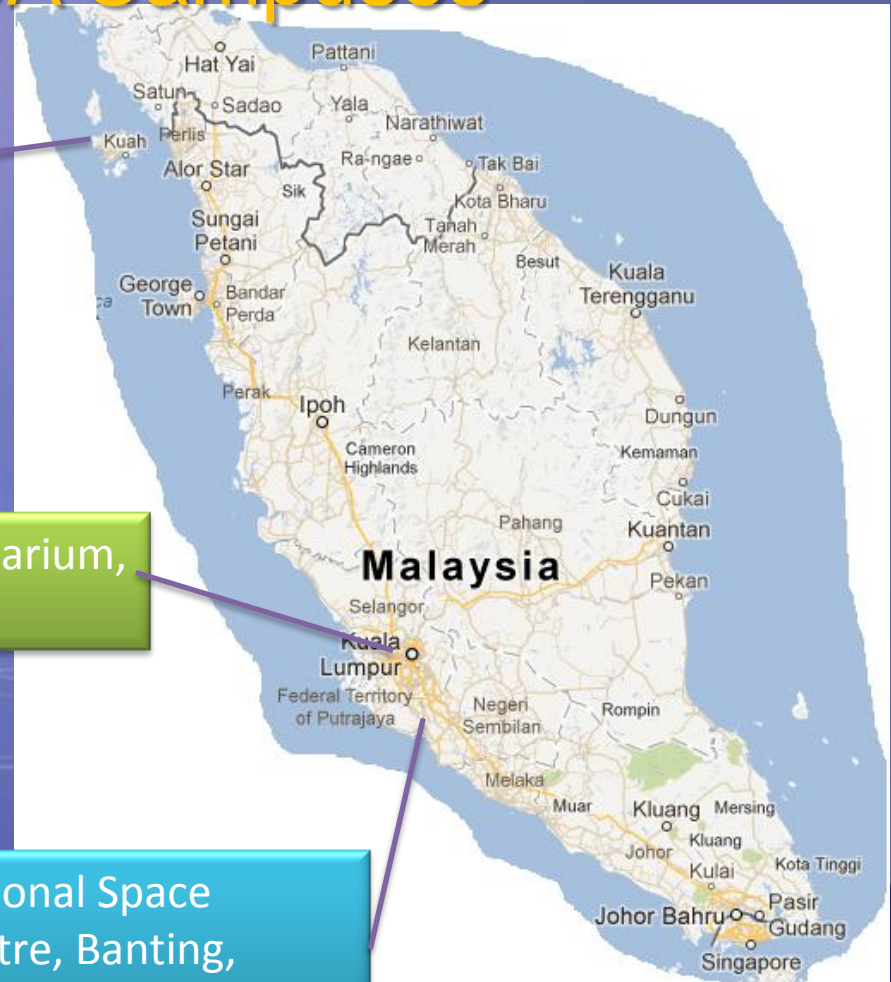
Langkawi National Observatory, Kedah



National Planetarium, Kuala Lumpur



National Space Centre, Banting, Selangor



Integrating Navigation Technology in Emergency Medical System Services in Malaysia

- Idea came in 2013 since when ANGKASA was implementing the '**Rural Emergency Medical System using Geospatial Technology (REMS 1)**'
- REMS 1 was a pilot project funded under MOSTI's **Inclusive Innovation Fund 2013**
- REMS 1 Objectives are:
 - **To enhance the rapidness of emergency vehicle** to individual who need immediate treatment cause by illness.
 - **To enhance the quality of emergency medical services** to the community.

GPS Personal Locator



Rural Medical Emergency System (REMS1)



Registered Patients with the hospital / EMS



Alarm by patient to the hospital / EMS



Legend :

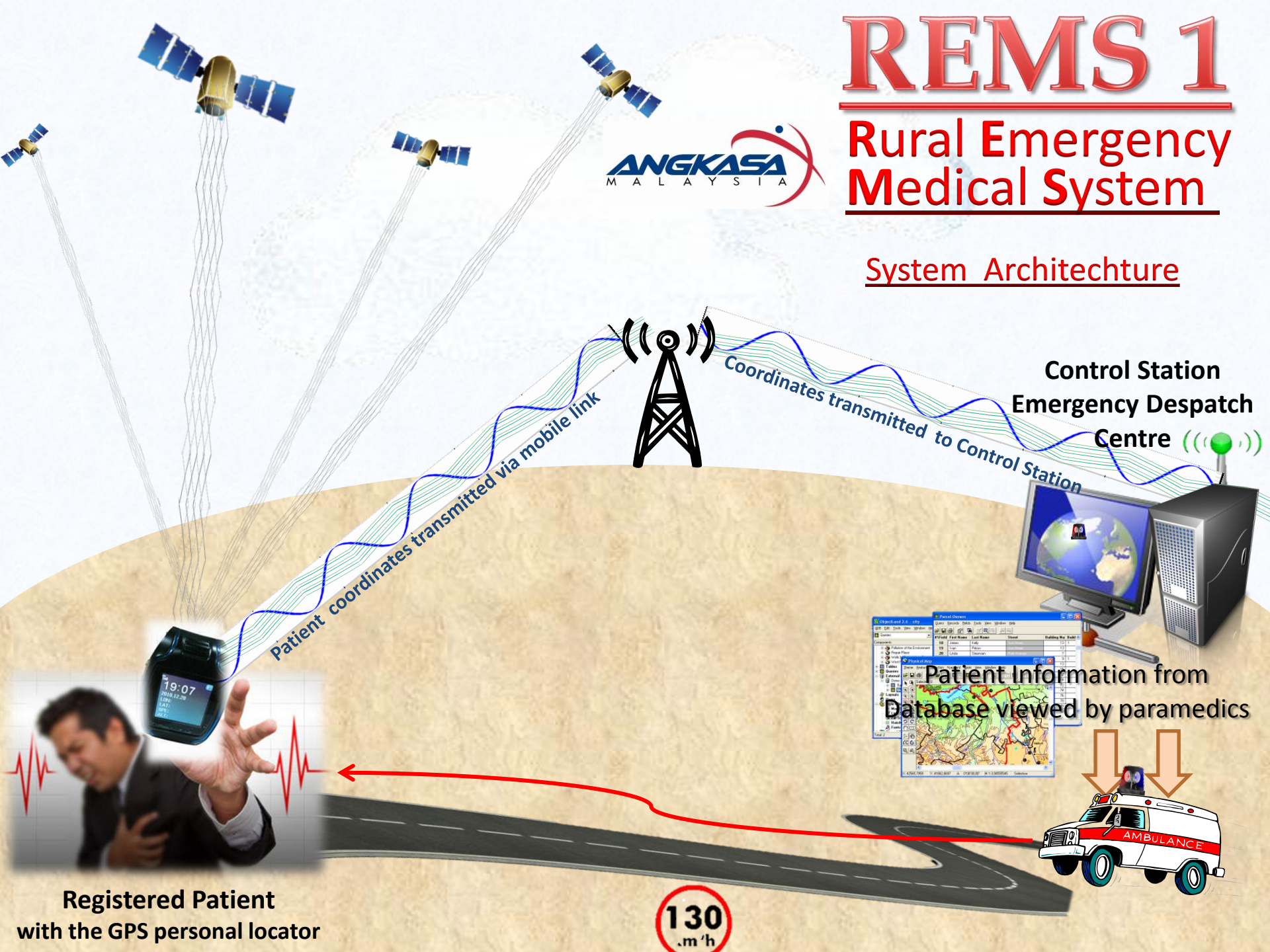
-  SOS Signal
-  SOS Signal (OTW) - Ambulance On The Way

Map viewed by the Hospital Ambulance Dispatch Centre

REMS 1

Rural Emergency Medical System

System Architecture



Control Station
Emergency Dispatch
Centre

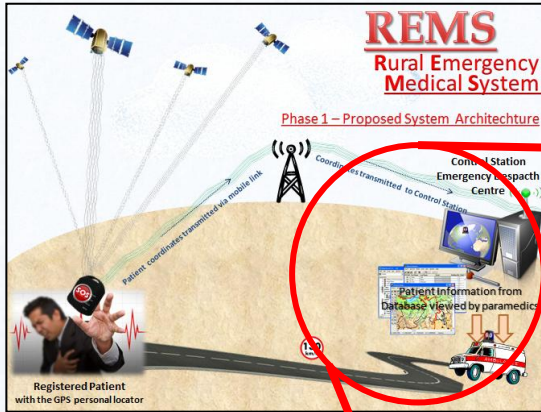
Patient coordinates transmitted via mobile link

Coordinates transmitted to Control Station

Patient Information from Database viewed by paramedics

Registered Patient with the GPS personal locator

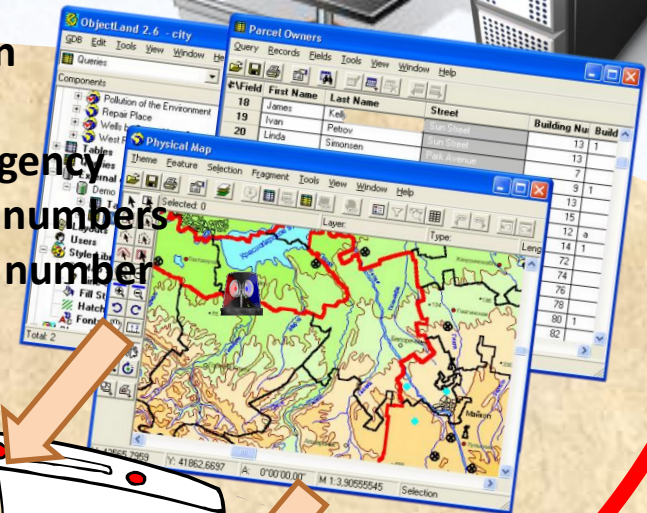
130
.m/h



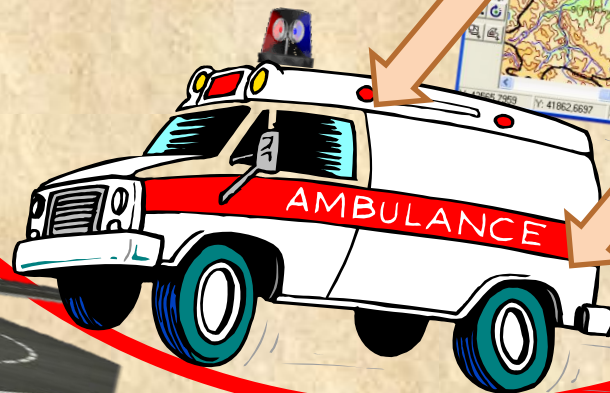
Control Station

Patient Information

1. Personal locator /GPS ID
2. Patient basic information
3. Patient health information
4. Coordinate of emergency
5. Pin point on map of emergency
6. Patient Important contact numbers
7. Patient verification phone number



130
.m/h

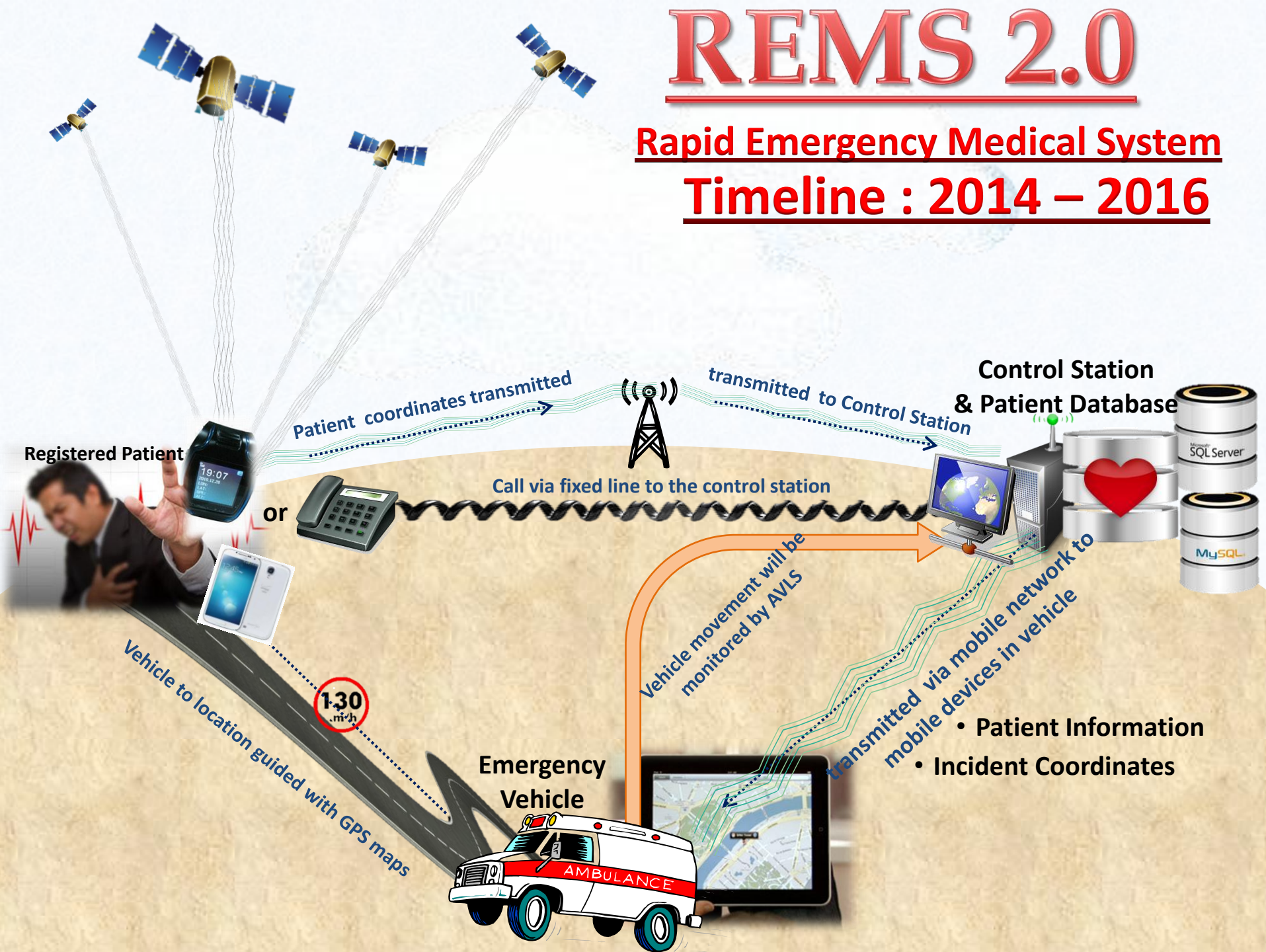


REMS 1 advantages

- **Locating patient using GPS personal locator**
 - ✓ GPS Personal Locator is given to selected patients who have critical illness (recommended by the doctor)
 - ✓ From the patient own initiative, they can register themselves
- **Easy emergency/distress flagging (SOS button)**
 - ✓ Press SOS button to signal for distress
- **Control Centre is located at emergency vehicle dispatch centre**
 - ✓ Display patient location (coordinates) on a digital map at the control station; viewed by the operator and paramedics.

REMS 2.0

Rapid Emergency Medical System Timeline : 2014 – 2016



REMS

Rapid Emergency Medical System



Patient Tracing System (PTS)

Patient Information System (PIS)



Ambulance Management System (AMS)



Ambulance Tracking System (ATS)

Rapid Emergency Medical System (REMS 2.0)

A GNSS-based system for a rapid EMS with tracking & tracing capability and comprehensive emergency medical care for registered/subscribed patients. The system provides:

- i. emergency notification to the EMS provider using a personal locator, mobile device or a fixed line
- ii. precise incident location of the patient by using GNSS positioning
- iii. advanced patient information for the paramedic in the emergency vehicle
- iv. emergency vehicle tracking system using GNSS for navigation guidance

■ Problem & Solution

- a. Improve the quality of EMS in Malaysia, benefiting either the government or private medical services by minimizing the Response Time (RT) using GNSS (item i, ii and iv)
- b. Providing comprehensive emergency medical care for patient (item iii).

Rapid Emergency Medical System (REMS 2.0)

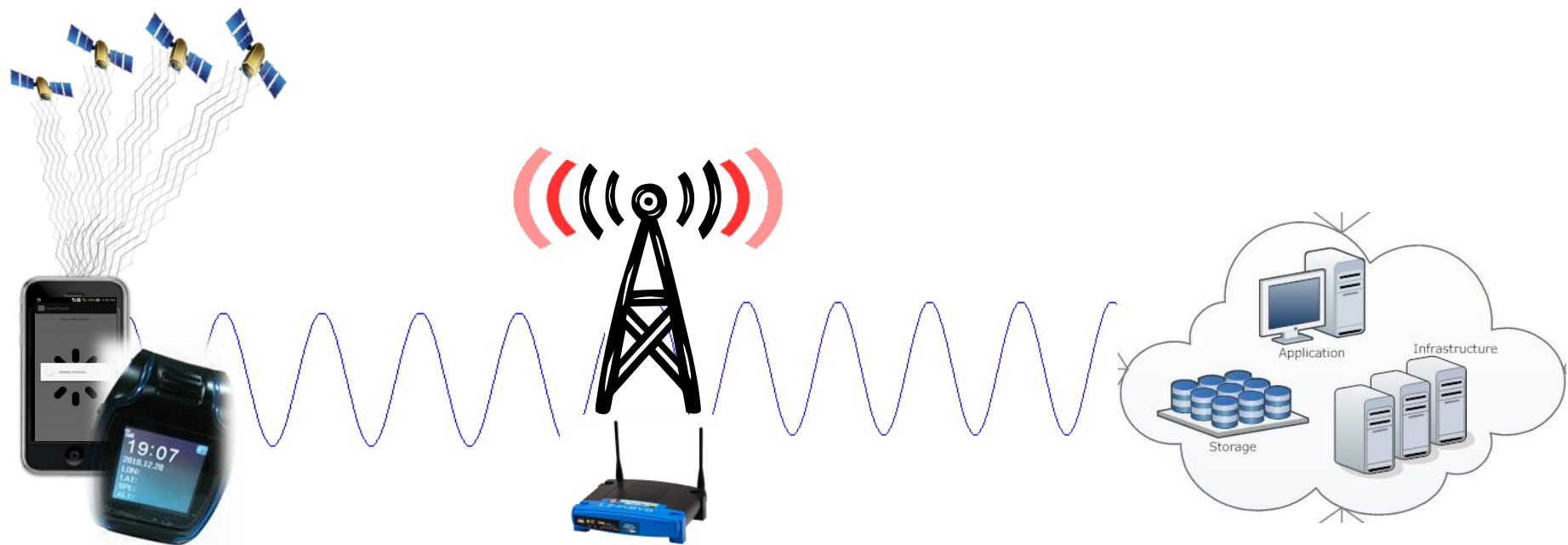
- Advantages of REMS 2.0
 - Rapid EMS with no phone call needed by the user/subscriber.
 - Rapid EMS alert through any mobile platform using iOS and Android.
 - Full medical record of the subscribers available in case of emergency
 - Advanced preparedness either with equipment or medicine by the medical staff in the emergency vehicle
 - Tracking & tracing capabilities with comprehensive emergency medical care.
 - Tracking of all emergency vehicle and the status of availability

Rapid Emergency Medical System (REMS 2.0)

- **Identified addressable market** will be in the health sector segment. The market will be from
 - i. public and private hospitals,
 - ii. EMS agencies,
 - iii. old folks homes,
 - iv. charity homes,
 - v. insurance companies
 - vi. individuals.
- **The product positioning** in the market will be as a fast, easy and accurate location positioning for subscribers to get medical help from EMS using GNSS based technology.
- **Other possible applications for the product/service** will be the like of **Mobile Workforce System** and **Virtual Boundary Monitoring** alert.

Rapid Emergency Medical System (REMS 2.0)

 User activates the Distress button



Mobile app / GPS personal locator retrieve GPS information from satellite

Mobile app sending signal using based station

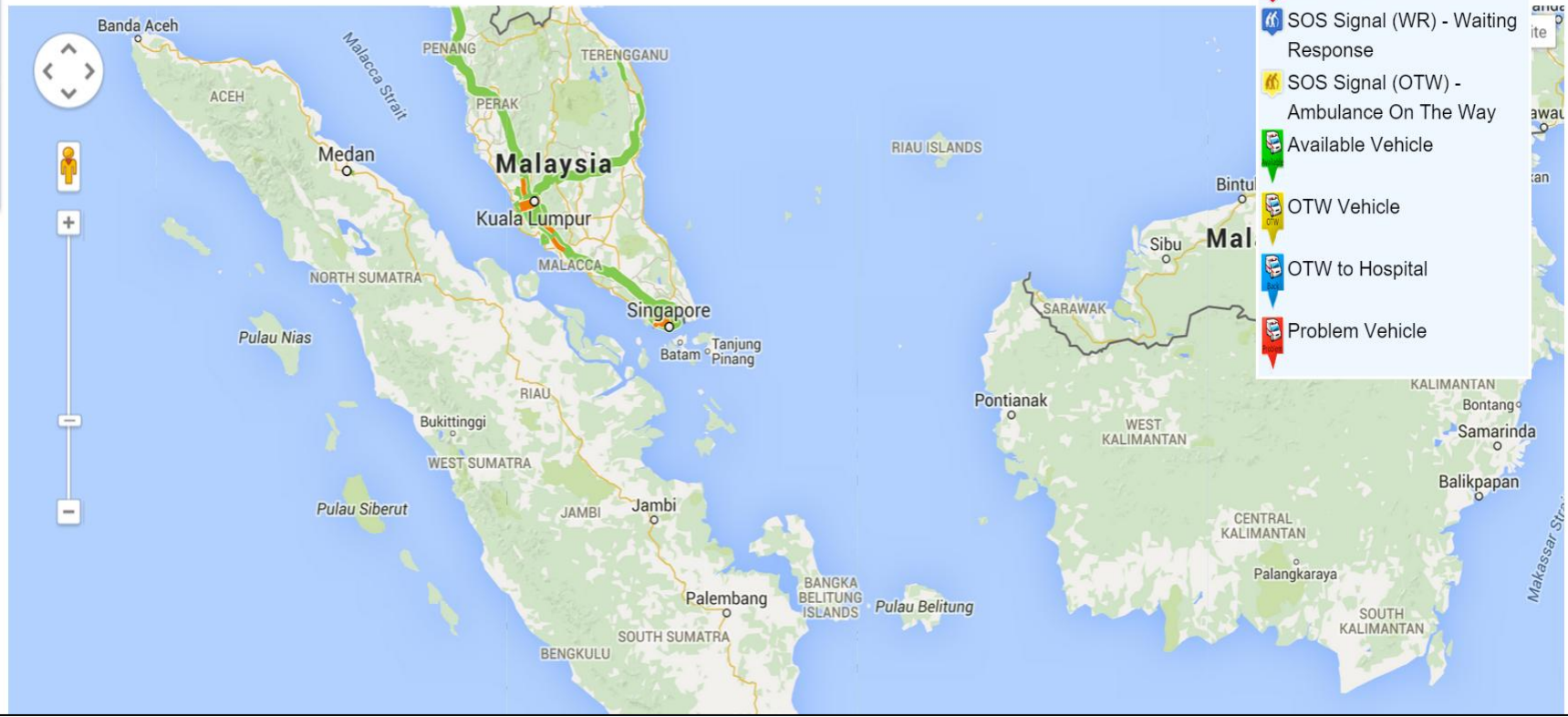
Web App accepted the signal and store into database(server)

Main Page for the Monitoring Officer

REMS 2.0

Landline List

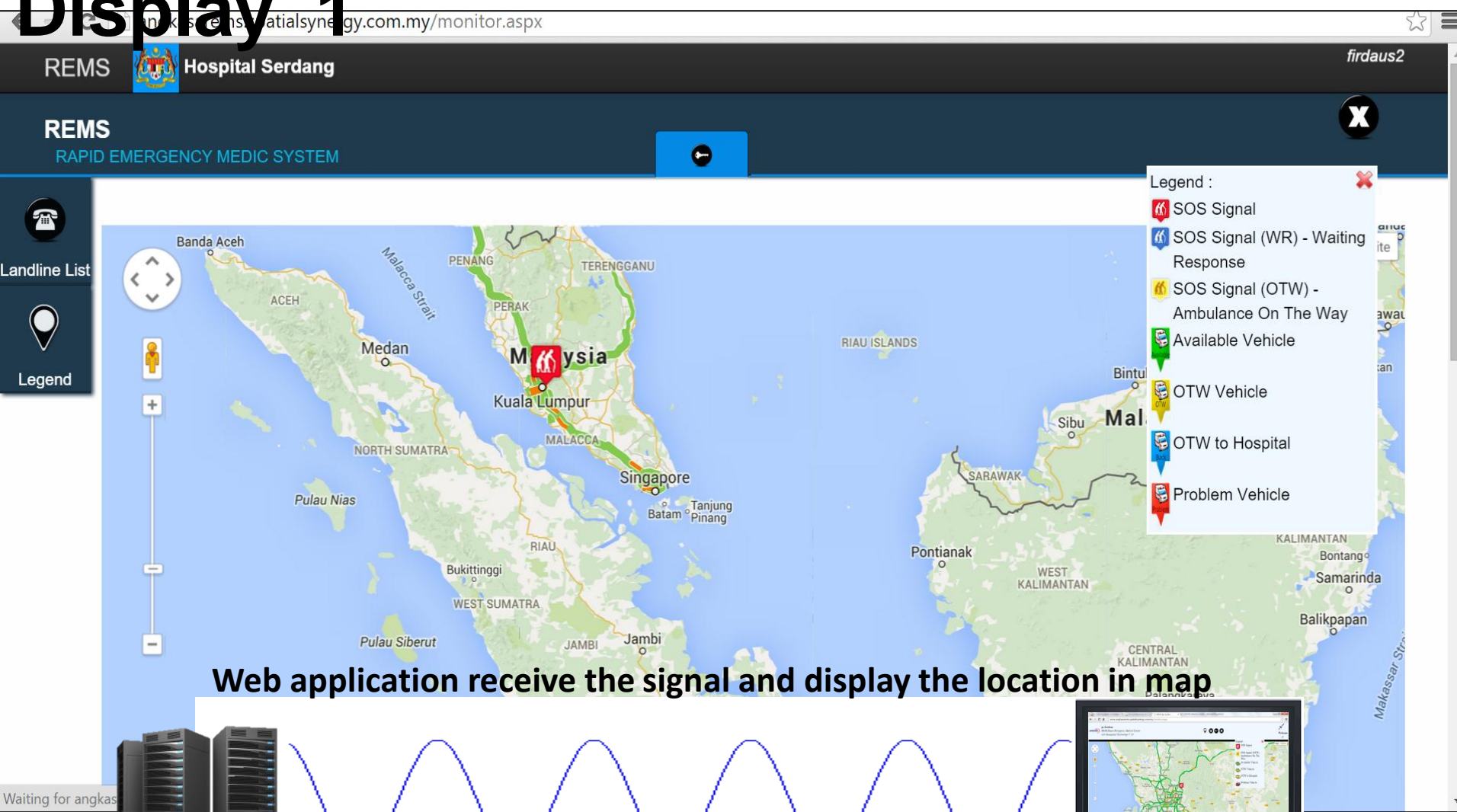
Legend



Legend :

- SOS Signal
- SOS Signal (WR) - Waiting Response
- SOS Signal (OTW) - Ambulance On The Way
- Available Vehicle
- OTW Vehicle
- OTW to Hospital
- Problem Vehicle

Emergency Alert by Registered Patient Display 1

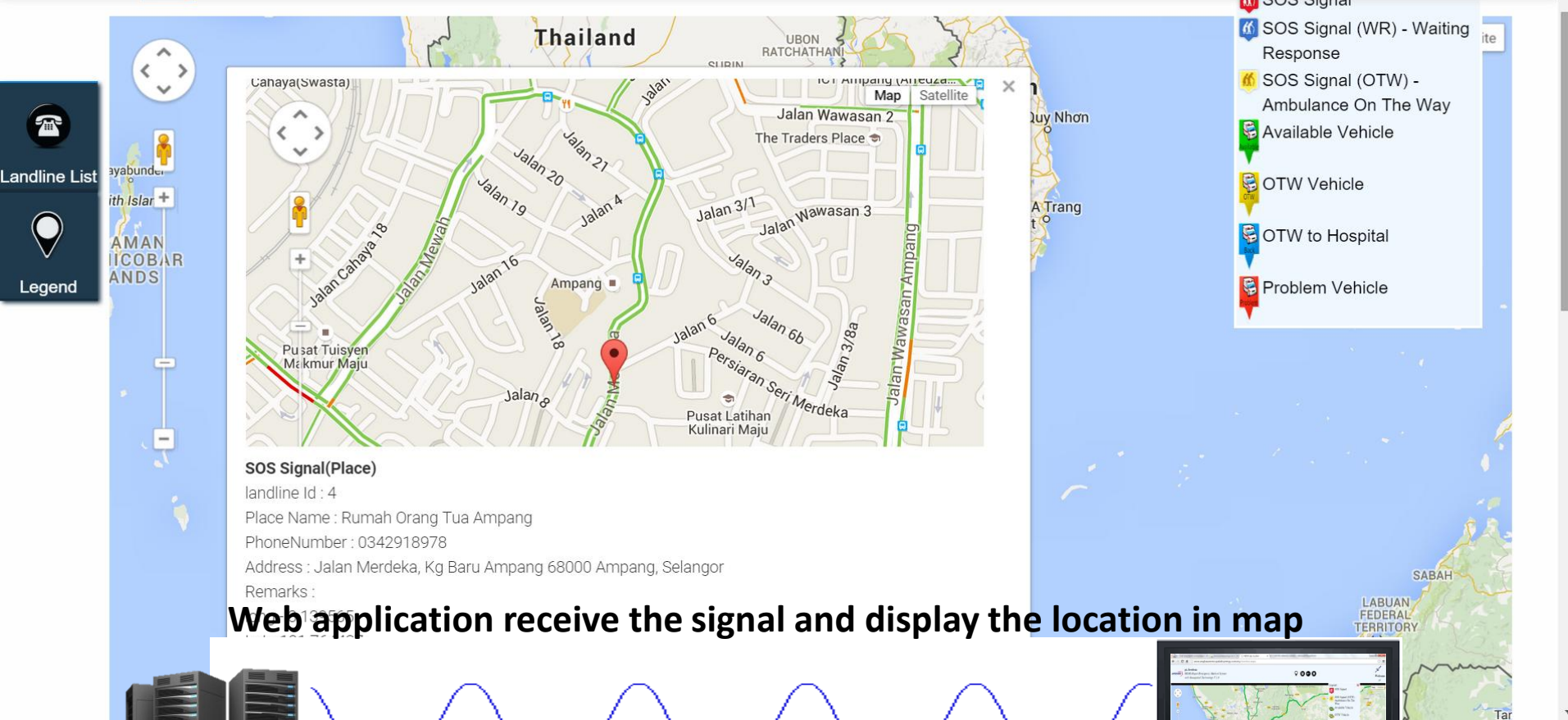


The screenshot shows the REMS (Rapid Emergency Medic System) web application. The browser address bar displays "http://ankasasensitativsneergy.com.my/monitor.aspx". The page header includes "REMS Hospital Serdang" and the user name "firdaus2". The main content area features a map of Malaysia with various states labeled (e.g., ACEH, PERAK, TERENGGANU, SARAWAK, WEST SUMATRA, JAMBI, KALIMANTAN). A red SOS Signal icon is visible on the map near Kuala Lumpur. A legend on the right side of the map defines the symbols: SOS Signal (red fire), SOS Signal (WR) - Waiting Response (blue person), SOS Signal (OTW) - Ambulance On The Way (yellow ambulance), Available Vehicle (green car), OTW Vehicle (yellow car), OTW to Hospital (blue car), and Problem Vehicle (red car). The interface also includes a "Landline List" button and a "Legend" button on the left side.

Web application receive the signal and display the location in map

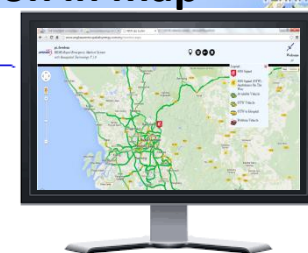
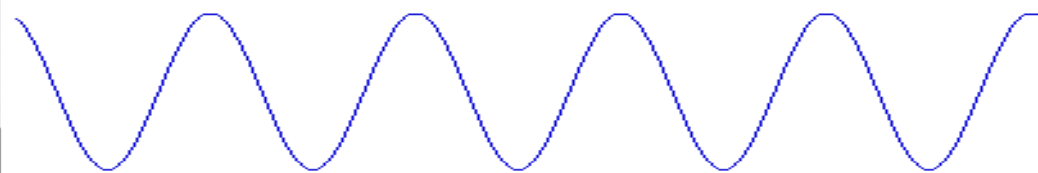


Emergency Alert by Registered Patient Display 2



SOS Signal(Place)
landline Id : 4
Place Name : Rumah Orang Tua Ampang
PhoneNumber : 0342918978
Address : Jalan Merdeka, Kg Baru Ampang 68000 Ampang, Selangor
Remarks :

Web application receive the signal and display the location in map



Achievements for REMS 1



REMS 2013 Launching by YBhg. Deputy Minister MOSTI, March 2014



- i. Gold Medal- National Innovation and Invention Competition through Exhibition 2014 (iCompEx'14), Mac 2014



- ii. Gold Medal- 2nd International Innovation, Design and Articulation (i-IDEA 2014) Sep 2014



Achievements for REMS 2.0



Dear Mr. Norhan Mat Yusoff,

Congratulations!



You have been selected as one of the finalists of the GNSS.asia Challenge!

The GNSS.asia Challenge international jury of renowned experts has selected your idea REMS (ID 151414) as one of the five best applications for the Challenge, praising its innovativeness and market potential. Your idea is now in the running to become the **GNSS.asia Challenge winner**, and potentially even the **overall winner of the European Satellite Navigation Competition 2015!**

The REMS 2.0 Team



*Space System
Engineer*

Shahrizal Ide Moslin
M.Sc. Space Sys. Engineering
(TU Delft, Holland)



Prof. Dr. Noordin Ahmad
Ph.D. (GNSS), Uni. of Newcastle

Project Leader



*Geomatics
Engineer*

Ooi Wei Han
M.Sc. Geomatics Eng. & GIS (UPM)



*Geospatial
Consultant*

Norhan Mat Yusoff
M.Sc. Remote Sensing (UTM)



*Geospatial
Solution
Integrator*



Helmi Kadir
BA Geography (UKM)



Madzwin Ansari
MBA (UIAM)

*Marketing
Consultant*



*System
Developer*

Muhammad Firdaus Mat Ghani
B.Sc. IT (UiTM)

Integrating Navigation Technology in Emergency Medical System Services in Malaysia

Thank you 😊

Sr Shahrizal Ide b. Moslin

Ooi Wei Han, Norhan Mat Yusoff, Mohd Firdaus, Dr. Noordin Ahmad

National Space Agency of Malaysia (ANGKASA)
Space Application and Technology Development
National Space Centre
Banting, Selangor