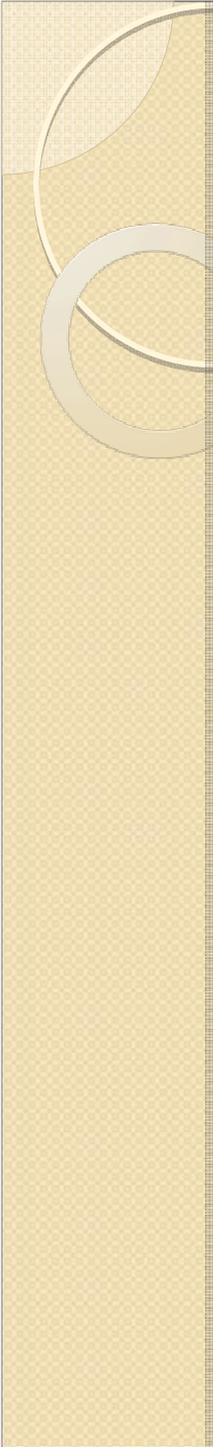


# **UPDATE ON MALAYSIAN GNSS INFRASTRUCTURE**

**MUSTAFA DIN SUBARI**

National Space Agency of Malaysia  
(ANGKASA)



# GNSS Applications in Malaysia

## The Geodetic and mapping users:

- Geodetic Datum of Malaysia (GDM 2000)
- Coordinated Cadastral System (CCS)
- GIS database implementations & maintenance
- Engineering survey, hydrographic survey, photogrammetry, airborne gravity survey, etc

## The navigation users:

- **The Marine sector**
  - Marine Electronic Highway (MEH)
  - Automatic Vessel Identification System (AVIS)
- **The Aviation sector**
  - In progression with ICAO Implementation Plan
- **Land navigation sector**
  - Vehicle tracking, fleet management, intelligent transportation system, etc.

## The Precise Time Users:

- Precise Time Keeping, Time Transfer & time dissemination



# Policies and Strategies

- Future applications of GNSS in Malaysia will not be an isolated activities, rather, going along with the rest of the world.
- Malaysia need to put in necessary strategies to ensure the full benefits of GNSS implementations in Malaysia.
- Three strategic areas to be given attention, namely the:
  - i. GNSS infrastructure
  - ii. GNSS technology development
  - iii. GNSS applications



# GNSS Infrastructure

## Objective :

- Ensuring full coverage of GNSS services throughout the country

## Strategies :

1. To participate with GNSS Core Service Providers
2. To develop sufficient Domestic GNSS Infrastructure
3. To participate in the Regional GNSS Augmentation System
4. To develop our own SBAS



# Implementation Strategy:

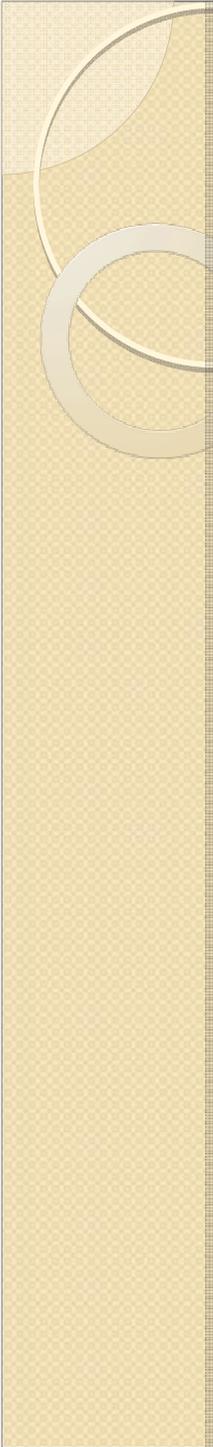
## 2. Developing Domestic GNSS Infrastructure

Current:

- The **MyRTKnet**
- The **SISPELSAT**

Future:

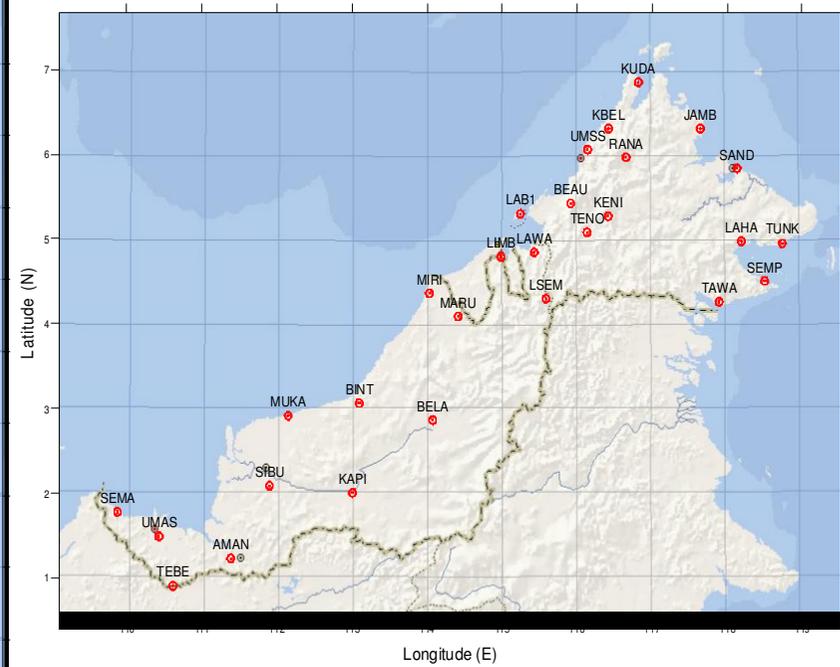
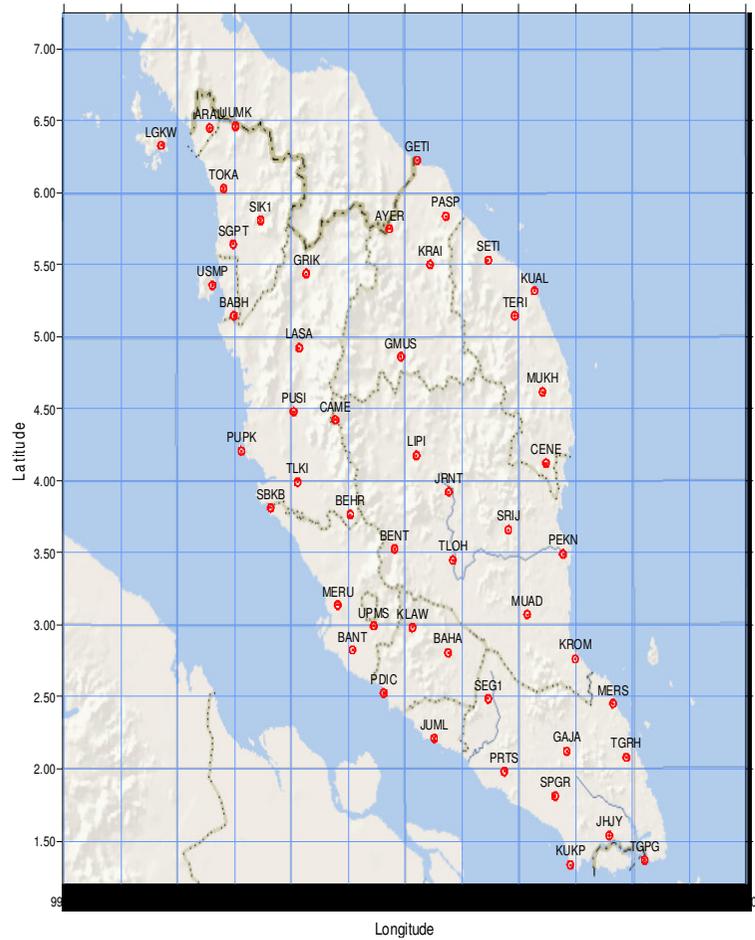
- **Malaysian SBAS**

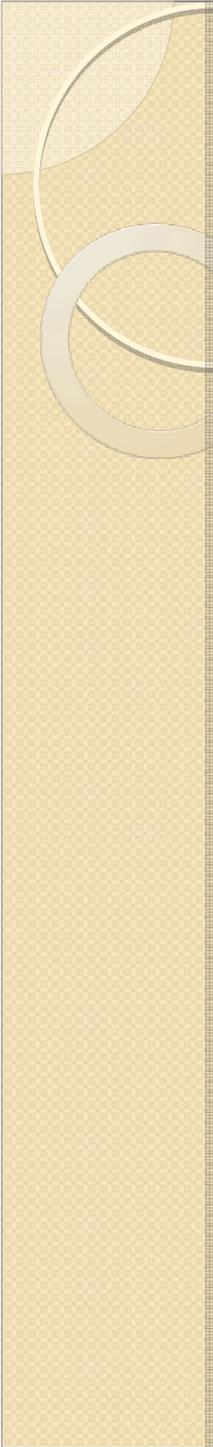


# The MyRTKnet

- i. Owned and Operated by Department of Survey and Mapping Malaysia (JUPEM).
  
- ii. MyRTKNet Configuration:
  - o Network of **50** dual frequency GPS reference stations in Peninsular Malaysia
  - o Network of **28** dual frequency GPS reference stations in East Malaysia
  - o Control Centre at JUPEM Headquarter, Kuala Lumpur.

# MyRTKnet Reference Stations





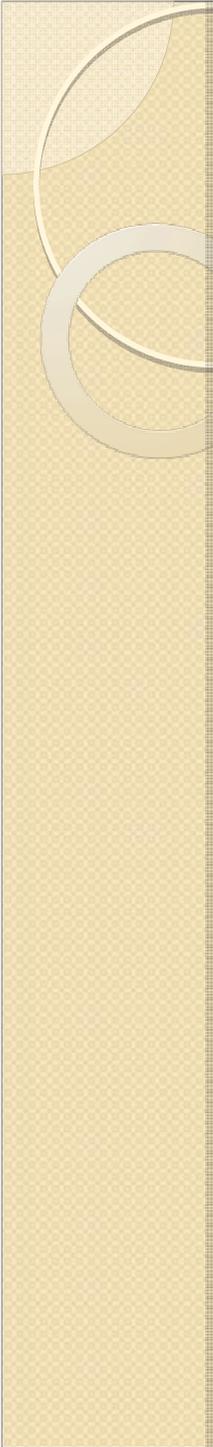
# The MyRTKnet

## iii. Functions:

- Geodetic Infra. for GNSS Real-time Positioning.
- Reference Frame and Coordinates System, GDM2000.
- Monitoring of Tectonic Movement.
- Geodynamic Studies.

## iv. Services:

- Subscription-based

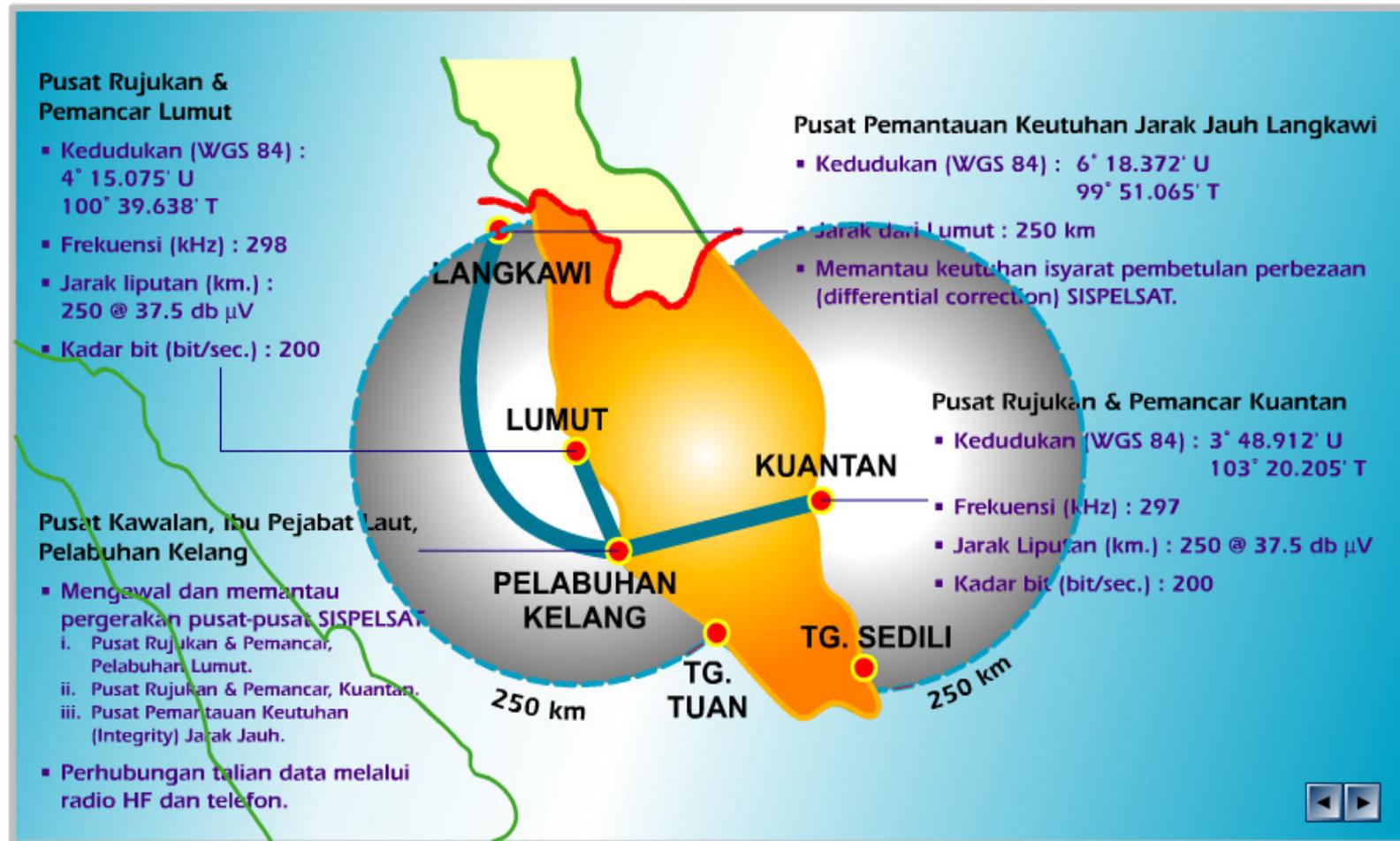


# The SISPELSAT

- Owned and operated by Marine Department of Peninsular Malaysia.
- The primary navigational-aid for vessels navigating within the shore of Peninsular Malaysia
- Design based on International Association of Lighthouse Authorities (IALA) guidelines for the Performance & monitoring of a DGNSS Service in the band 283.5 – 325 kHz.
- Guarantees service performance of providing (positioning) accuracy of better than 5m at 95% reliability level.

# SISTEM PELAYARAN SATELIT (SISPELSAT) PERAIRAN SEMENANJUNG MALAYSIA

## Rangkaian Pusat-Pusat SISPELSAT Dan Jarak Kawasan Liputan



# The SISPELSAT

Current Updates (2008/2009):

- - Master control station at Port Klang
- 4 DGNSS beacon reference stations.

Location	Coverage (nautical miles)
Bagan Datoh, Perak	160
Bandar Hilir, Melaka	120
Kuala Besar, Kelantan	180
Kuantan, Pahang	160

- 2 monitoring stations at Port Klang and Kuala Terengganu.

- Expected to be completed in Feb 2009.



## Implementation Strategy:

### 3. Participating in Regional GNSS Augmentation System

- Several regional SBAS with possible local coverage:
  - India - GAGAN, IRNSS
  - Japan - MSAS, QZSS
- Setup of several local monitoring stations



# The Malaysian SBAS

- A space-based augmentation system that fulfills a range of user service requirements by means of an augmenting GNSS core systems.
- Planned implementation:
  - 2009-2010: Feasibility Study Phase
  - 2011-2015: Development Phase



# Conclusions

- The country need to strategize its adoption of GNSS services in order to fully capitalized its benefits.
- Strategic international collaborations are to be initiated.
- Clear directions on GNSS adoption in the National Space Policy is needed.