

**UN / USA INTERNATIONAL MEETING ON THE  
USE AND APPLICATIONS OF GNSS**  
13-17 December 2004

**The Applications of GNSS in  
Malaysia:  
Status Updates**



**Dr. Mustafa Din Subari**  
**Universiti Teknologi Malaysia**

# 1.0 Introduction

# Global Navigation Satellite System (GNSS)

Also known as **Radio Navigation Satellite Systems (RNSS)**, amongst them are;

- **Navy Navigation Satellite System, NNSS (TRANSIT) (US Navy)**
- **Tsikada (USSR)**
- **NAVSTAR GPS (US Military)**
- **Global Navigation Satellite System, GLONASS (Russian military)**
- **Galileo (European Union)**

# Augmentation systems for core GNSS

Due to the low accuracy of civil services on current GNSS (30m horizontal and 36m vertical), as well as important safety issues such as reliability of system, several augmentation systems has been established for GPS and GLONASS.

Systems characteristics;

- Government, commercial systems
- Global, regional, national and local coverage
- Civil aviation, marine and land users
- Space-based (SBAS), Ground-based (GBAS)

# Augmentation systems for core GNSS

Current augmentation systems;

- ◆ WAAS
- ◆ EGNOS

Planned augmentation systems;

- ◆ MSAS
- ◆ GAGAN

Commercial augmentation systems;

- ◆ Omnistar, etc.

National (Malaysian) augmentation system;

- ◆ SISPELSAT

# 2.0 Current GNSS Applications in Malaysia – An Overview

- Geodesy, surveying and mapping
  - ◆ Geodetic Datum of Malaysia (GDM2000)
  - ◆ Coordinated Cadastral System (CCS)
  - ◆ GPS GIS systems implementations
  - ◆ Engineering survey, hydrographic survey, photogrammetric, etc.
  - ◆ Airborne gravity survey

# 2.0 Current GNSS Applications in Malaysia – An Overview

## • The navigation users

### ◆ Marine sector

- Augmentation infrastructure - SISPELSAT
- Marine Electronic Highway (MEH)
- Electronic Chart Display Information System (ECDIS)
- Automatic Vessel Identification System (AVIS)

# 2.0 Current GNSS Applications in Malaysia – An Overview

## • The navigation users

### ◆ Aviation sector

- Preparatory of Flight Procedures using RNAV
- GNSS non-Precision Approach using ABAS



# 2.0 Current GNSS Applications in Malaysia – An Overview

## • The navigation users

### ◆ Land sector

- Vehicle tracking, fleet management, intelligent transportation system, etc.
- The Surveying and Mapping Department (JUPEM) have established MASS and RTK-Net.

# 2.0 Current GNSS Applications in Malaysia – An Overview

## • The navigation users

### ◆ Space sector

- Navigation module for Low Earth Orbiting Satellites
- Precise clocks

# 2.0 Current GNSS Applications in Malaysia – An Overview

## ● The Precise Time Users

- ★ E-banking,
- ★ e-commerce,
- ★ telecommunications,

## SIRIM

1. The Malaysian Standard Timescale
2. The Broadcasting of Precise Time to Public User Project

# 3.0 The Malaysian Initiatives

- Future trends in R&D on GNSS in Malaysia will not be isolated activities, rather going along with the rest of the global scenarios.
- GNSS R&D in Malaysia should strategically be tailored to support the full implementations of GNSS in Malaysia.
- Generally three aspects could be listed, namely:
  - ◆ The GNSS infrastructure,
  - ◆ GNSS technology development and
  - ◆ GNSS applications.

# 3.1 GNSS Infrastructure

## Objective:

1. To have full coverage of GNSS services throughout the country

## Strategies:

1. GNSS Core Service
2. Regional Augmentation System
3. Infrastructure for Marine Sector
4. Infrastructure for Land Sector
5. Infrastructure for Aviation Sector
6. Infrastructure for Precise Time Scale

## GNSS Core Service

- Malaysia should become part of the Galileo consortium. By participating in the development phase of Galileo, service attainable afterwards would definitely more beneficial than merely a common end user of the service.
- Have participated (in small scale) in Galileo test-bed campaign.

## GNSS Global/Regional Augmentation System

- Two Regional GNSS Augmentation system are currently in the development, which are the Japan's MSAS and Indian's GAGAN.
- Malaysia should be more active in seeking serious participation in the development of these systems. The strategy is to have those services to cover our national airspace.

## Infrastructure for Marine sector

- Since SISPELSAT is currently the only local DGNSS infrastructure available, focus should be given to expand its service coverage;
  - ◆ Complete coverage over Peninsular Malaysia shoreline
  - ◆ Complete coverage over shore of Sabah and Sarawak
  - ◆ Service coverage for inland waterways (e.g. Sungai Rajang)



## Infrastructure for Land sector

- Currently there is no DGNSS infrastructure specifically servicing the inland navigation users. Strategy of setting up one should consider these options;
  - ◆ Expand SISPELSAT coverage to include inland areas of Peninsular, Sabah & Sarawak
  - ◆ Expand JUPEM's RTK-Net for inland navigation services
  - ◆ Set-up a new inland DGNSS infrastructure

# Infrastructure for the Aviation Sector

- Setup LAAS for all airports

## Infrastructure for Precise Time

- Setup infrastructure for precise time dissemination for civilian and commercial applications

## 3.2 GNSS Technology Dev.

### Objectives:

1. Seamless applications of GNSS technology
2. Affordable GNSS technology for local users

### Strategies:

1. To have sufficient ancillary local data such as e-maps
2. To have sufficient locally produced GNSS products (GNSS made in Malaysia)

# 3.3 GNSS Applications

## Objectives:

1. GNSS technology and services in all range of applications fully adopted in the country
2. Successful and effective implementations of applications

# 6.0 Summary

- Closer relationships between GNSS users, industries and the government is needed.
- Intensification of GNSS related R&D
- Building up GNSS related industries