Precise Positioning applications and developments in meeting market needs in MALAYSIA

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Infrastructure 1: MyRTKnet

i. Owned and Operated by Department of Survey and Mapping Malaysia (JUPEM).

ii. Objectives:
   * For GNSS Real-time Positioning.
   * Reference Frame and Coordinates System.
   * Geodynamic Studies.

iii. Use of a network of reference stations to model the systematic errors and provides the possibility of an error reduction.
i. Network of **50** dual frequency GNSS reference stations in Peninsular Malaysia

ii. Network of **28** dual frequency GNSS reference stations in East Malaysia

iii. Control Centre at JUPEM Headquarter, Kuala Lumpur.
MyRTKnet Reference Station Monuments
MyRTKnet Services

VRS Correction

a) Within the limits of our MyRTKnet Dense Network, MyRTKnet provides VRS GPS corrections with an accuracy of 1 to 3 cm horizontally and 3 to 6 cm vertically.

b) Distance dependent errors are considerably minimized with utilization of the MyRTKnet network, thereby achieving increased accuracy and reliability.

c) RTK Surveying works at its optimum with a base station network to achieve the pinnacle of RTK Technology production potential.

Accuracy

- VRS and Single Base RTK
  - $\pm$ 3 cm

- DGPSnet
  - $\pm$ 20 - 50 cm

- Post-process Virtual Rinex Data
  - $< \pm$ 3 cm
IALA Recommendation on the Performance and Monitoring of DGNSS Services in the Frequency Band 283 - 325 kHz

DGNSS system with coverage of Peninsular Malaysia:
- Control Station: Port Klang
- 2 Remote Monitoring Stations
- 4 Broadcasting (Reference) Station:
By improving accuracy and safety of maritime navigation, the DGNSS system is able to accomplish the following:

- Increased nominal accuracy from 10-15m (GPS only) to 1-3m with DGPS.
- Faster transit times for commercial shipping
- Increased safety through reduced risk of collisions
- Cleaner seas through reduced risk of maritime accidents
- Better position for marine studies – hydrographic survey
- Aids to navigation system – positioning of Buoy
- Oceanographic studies/research
- Oil exploration
- Fisheries
ISKANDARnet

- A GPS positioning support system that provides a precise and accurate GPS satellite data correction services.
- Coverage of Iskandar Development Region (IDR)
- Three CORS stations.
Platform Subsidence

- detect subsidence due to reservoir compaction
- effect on structural integrity
• **EXPLORATION**
  - Vessel positioning
  - Sensor positioning
  - Fish traps survey

• **APPRAISAL**
  - Rig positioning
  - Vessel positioning

• **DEVELOPMENT**
  - Vessel positioning
  - Barge positioning
  - Platform positioning
  - Pipeline positioning

• **PRODUCTION**
  - Barge positioning
  - Vessel tracking
  - Subsidence survey
Initiatives for Precision Farming

Components of Precision Farming

Machinery System

Global Positioning System

Mapping System

Control System

Variable Rate Applicator

- Fertilizers
- Pesticides
- Seed Application
- Fertigation

Site Specific Management

Database of Field Information

- Geostatistics
- Mapping of Field Information
- Kriging Method
- Vector Attribute Table
- VAT Map
- Fertilization
- Pesticide
- Seed

Expected Effects

- Optimum Profitability
- Sustainability of Agriculture
- Protection of Environment

Sensing System

- Satellite Remote Sensing
- Soil Sensor
  - pH
  - EC Sensor
  - OM Sensor
- Water Sensor
  - Flow meter
  - Depth indicator
- Growth Sensor
  - SPAD
  - Height
  - Tiller Sensor
  - Spectro-radiometer
- Yield Sensor
  - Flow
  - Moisture Sensor
Various integration of GNSS into Precision Farming
Nature Conservation
Elephant Satellite Tracking Movement Study
Dispersal of Turtle Hatchings Pattern
Other Initiatives for Precision Farming

Department of Agricultural

- Soil Investigation, Fertility, Conservation
- Land-use Investigation
- Crop pest diagnostic services
- Quality control
- Engineering
- Horticulture
Thieves sent to Japan for ‘courses’

Call centre operations are becoming big business, resulting in these methods.

Theft occurs often on the streets, especially during the night. The thieves will use GPS to track the movements of the victim’s car.

Japan is the country of thieves, where they are not considered as criminals. They use their knowledge of the terrain to escape from the police.

The thieves have a special technique, using rubber bands to stretch the car’s body and make it difficult to track.

The system is installed in the car, using a sensor attached to the vehicle’s body. The sensor sends signals to a central computer, which can then track the car’s movements.

The system is equipped with a GPS receiver, which allows the computer to calculate the car’s position and send the information to the central computer.

The central computer is able to track the car’s movements in real-time, and can send alerts to the police if the car is suspected of being involved in a crime.

The thieves use this system to escape from the police, and to avoid being caught.

The system is also used to track vehicles that are suspected of being involved in a crime, allowing the police to locate the vehicle and抓获 the perpetrators.
The Way Forward

- Ensure full capitalization of GNSS usage in country
- Participate in International works on GNSS applications and development
- Promote and Optimized GNSS infrastructure usages
- Intensify GNSS related R&D
- Encourage local GNSS industries development
- Encourage locally produced GNSS applications
THANK YOU