MPOB's DIFFERENTIAL GPS BASE STATION FOR THE OIL PALM INDUSTRY

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Presently, interest in precision agriculture has increased the use of Geographic Information System (GIS) and Differential Global Positioning System (DGPS) technologies in the oil palm industry. While GIS provides a management decision-making tool, DGPS is used for collecting data efficiently to build the GIS database. Global Positioning System is a satellite-based radio-navigation system which is capable of providing accurate 3-dimensional location data. However, DGPS has its limitation. Factors such as signal blockage, noise, bias, and blunders can cause inaccuracies in its readings. The Malaysian Palm Oil Board (MPOB) is setting up a DGPS base station to provide base data to the industry for correcting such inaccuracies. Setting up of this base station will help the industry to optimize the use of DGPS in the field, reduce capital cost and avoid the uncertainty of using other commercial base stations.

OBJECTIVE

To enhance and optimize the use of DGPS receivers in oil palm plantation management.

TARGET

To ensure availability of base data for differential correction of DGPS rover data.

BENEFITS

a. Reduced cost and redundancy of using other commercial base stations;
b. Provides almost real time information for field data collectors to check the sufficiency and accuracy of data collected; and
c. Enhances data sharing in the oil palm industry.

THE SYSTEM

The DGPS base station set up at MPOB uses the Trimble Community Base Station (CBS) Receiver (Pathfinder Pro XR receiver). The GPS antenna (compact L1 Geodetic

antenna) is installed on the roof of the biology building using terrestrial survey techniques. It links and logs directly to a computer located in the GIS laboratory using Trimble Reference Station (TRS) software.

The TRS software logs five types of data files; Dat files, Receiver Independent Exchange Format (RINEX) files, Standard Storage Format (SSF) files, Almanac files, and Log files. The Almanac files and Log files are for error messages and information about the satellites tracked respectively. The position information of the GPS for the base station is stored in the Dat, RINEX, and SSF files. The Dat and SSF files are Trimble standard data files designed for survey and mapping applications respectively. The RENIX data file is used for differential correction of DGPS receivers other than the Trimble receiver.

MPOB's base station collects data for post-processing differential correction. Roving receiver data can be corrected using the base data if the rover operation:

• Is within the range of 500 km from the base station;
• Uses the satellites the base station uses; and
• Collects data while the base station is operating.

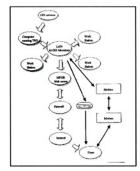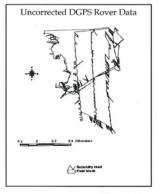*Figure 1. Base data management at MPOB's DGPS base station.*

The management of the base data at the MPOB's DGPS base station is shown in *Figure 1*. The base data collected at the station is available for use by the industry. Ultimately, users can access the base data through the MPOB homepage in the Internet. Presently, the base data is available to users through e-mail or they can personally collect the data from the station.

Differential correction carried out on the rover data improved its accuracy; *Figure 2* shows the uncorrected and corrected rover data respectively using MPOB's DGPS base station data.

CONCLUSION

The setting up of the DGPS base station at MPOB will stimulate and enhance the adoption of new technologies in the oil palm industry. Base data collected at the station is good for correcting rover data 500 km around the station. It improved the accuracy of DGPS data collection in the field and reduced the overhead cost of using DGPS in the plantation.
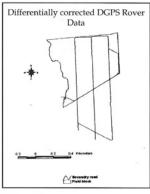
Uncorrected DGPS Rover Data

Differentially corrected DGPS Rover Data

Figure 2. Uncorrected and corrected DGPS Rover Data.

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