

REPORT FROM SOUTH AFRICA

1. National Activities

- a. Time/frequency activities
- b. Survey/geodesy/GIS activities

Most organizations using GPS in South Africa in both the public and private sectors are involved in surveying and GIS data collection for a variety of applications such land use planning and monitoring, development of infrastructure, topographical mapping and engineering and cadastral applications.

In support of these activities, the Chief Directorate of Surveys and Mapping (CDSM) has established a network of active GPS base stations known as TrigNet. CDSM is the national surveying and mapping agency for South Africa. Currently, August 2002, the network consists of 28 active GPS base stations distributed throughout the country at between 200km and 300km spacing. Each station is equipped with two geodetic GPS receivers each connected to the same choke ring antenna. L1, L2 data is recorded at 1sec epochs and made available to the users in Rinex format the day after recording for post processing applications.

8 of the 28 stations are connected to a central control station through a frame relay telecommunication cloud and data is streamed continuously at 1 sec epochs to the central station situated at CDSM head office where it is processed and archived. Data from the remaining 20 stations is collected once a day in compressed Rinex format.

The geodetic co-ordinates of the base stations are based on the Hartebeesthoek 94 co-ordinate system which uses the ITRF 91 (epoch 1994.0) co-ordinates of the VLBI antenna at Hartebeesthoek Radio Astronomy Observatory (HARTRAO). The WGS84 reference figure is used in the Hartebeesthoek 94 system. The positions of the base stations are monitored monthly using the Bernese GPS software to carry out the computations.

Four GPS stations are operated and maintained by HARTRAO. One of the stations is situated at the HARTRAO facilities near Johannesburg and is collocated with VLBI, SLR and DORIS observing systems. A second receiver is located at the South African Astronomical Observatory at Sutherland while the remaining two, one each at

Richard's Bay and Simon's Town harbors, are collocated with tide gauges. All these stations form part of the global network of IGS stations. HARTRAO is also an IGS Regional and Operational Data Centre. Three TrigNet stations are also to be included in the IGS network.

2. Differential Services

The Lighthouse Services of the National Ports Authority has established a network of 4 DGPS stations on the South African coast namely Cape Columbine, Cape Agulhas, Cape Recife and Cooper Light. Each of these stations transmits RTCM messages between 291 kHz and 310kHz with an expected range of between 100NM and 150NM. The stations were installed in July 2000 and are still in a testing and validation stage before being declared fully operational. At this point no further stations are planned.

3. Development Activities

a. Land use

The implementation of a real-time GPS correction service is being tested in conjunction with a private sector company. At the same time consideration is being given to the establishment of a public private partnership to provide such a service.

- b. Maritime use
- c. Aviation use
- d. Space use
- e. Military use
- f. Time/frequency use
- g. Survey/geodesy/GIS

Interest is being shown by researchers in the application of GPS data from permanent GPS arrays such as TrigNet, the Lighthouse Services DGPS stations and the HARTRAO stations for regional ionosphere mapping.

4. Industrial Aspects

A number of private sector companies provide vehicle tracking and recovery services using GPS as the primary positioning tool. These companies operate mainly within the major centres in South Africa and are also expanding to the major centres of other Southern African countries.

5. National Policy activities and decisions

6. National Responsible Authorities

The Chief Directorate of Surveys and Mapping is responsible for the establishment, maintenance and extension of the services of TrigNet as parts of its responsibility to provide a national control survey network.

The Lighthouse Services of the National Ports Authority is responsible for the establishment and maintenance of the DGPS service provided in terms of its mandate to provide a lighthouse and navigation service to mariners.

7. Relevant Conferences/Seminars/Exhibitions held within nation

8. National Point of Contact

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