

ABSTRACT

The Global Positioning System (GPS) is the most common surveying instrument today where we can obtain accuracies of high order with a speed and cost efficiency that has not previously been available to the survey community. Precise positioning is possible using GPS receivers at reference locations providing correction and relative positioning data for remote receivers.

The main objective of this thesis is to do practical evaluation of the influence of GPS error sources, processing strategies and reference stations on positioning accuracy e.g. single point positioning solution and relative positioning solution with different reference stations.

In GPS relative work, precise reference stations should be available that to obtain precise GPS baseline. Sometimes, a reference station is not available near the worked area. So it can be created and the results of the project will depend on it. Many factors affect creating the reference station and those factors will be studied in this thesis.

Accuracy of the relative (surveying) mode of GPS observations depends on some factors such as: Collecting the observations, processing them and tying the results with the reference stations. The factors affecting the relative mode will be investigated.

The International GNSS Service (IGS), formerly the International GPS Service, is a voluntary federation of more than 200 worldwide agencies that pool resources and permanent GPS & GLONASS station data to generate precise GPS & GLONASS products. The IGS is committed to providing the highest quality data and products as the standard for Global Navigation Satellite Systems (GNSS) in support of Earth science research, multidisciplinary applications, and education. Currently the IGS includes two GNSS, GPS and the Russian GLONASS, and intends to incorporate future GNSS. You can think of the IGS as the highest-precision international civilian GPS community.

Finally, we can get specifications for each case study of positioning techniques to help GPS users to select the best-fit type to achieve the purpose of project with the required accuracy.

Unified and permanent broadcasting GPS stations in Egypt will be investigated and suggested in this thesis these stations are important for precise and unified GPS work in Egypt and to participate in international systems such as IGS & ITRF.