

The Test of Processing Modules of Global Positioning System (GPS) Softwares by Using Products of International GPS Service (IGS)

Ismail SANLIOGLU and Cevat INAL, Turkey

Keywords: Global Positioning System (GPS), International GPS Service for Geodynamics (IGS), Processing Software, Ashtech Office Suite 2.0, Pinnacle, SKI 2.3, Trimble Geomatics Office 1.5

SUMMARY

This study has been conducted to test the processing modules of Global Positioning System (GPS) softwares by using products of International GPS Service for Geodynamics (IGS) and to evaluate contributions of these products to the results obtained by GPS softwares. For this purpose, the use of IGS products, the need of ambiguity fixed solution for softwares, optimum processing procedure of all tested softwares, correlations between errors at horizontal and vertical positions and baseline length, correlation between errors at horizontal and vertical positions and height difference have been investigated.

This study has been carried out by the use of Ashtech Office Suite 2.0 (AOS), Pinnacle, Static Kinematic Software 2.3 (SKI), Trimble Geomatics Office 1.5 (TGO) GPS processing softwares. Test network, which is used in this study, consists of 19 permanent GPS stations; most of them are in Italy, and in the region between Italia-Austria-France

The results show that all of the tested softwares have an ability for the use some of IGS products. The best results were obtained by using precise ephemerides in these softwares. Ionosphere-free float solution demonstrated the best result in AOS, SKI, and TGO. Root mean square errors obtained by this solution are ± 12.8 mm, ± 12.3 mm, ± 13.5 mm at horizontal position and, ± 57.0 mm, ± 35.0 mm, ± 34.2 mm at vertical position respectively. The best result is obtained by special wide-lane fixed solution in Pinnacle software. Root mean square errors obtained by this solution are ± 12.1 mm at horizontal position and ± 45.9 mm at vertical position. Investigations show that errors in a horizontal position are dependent on height difference and independent baseline length as results of AOS and SKI softwares. Errors in a horizontal position are dependent on baseline length and independent height difference as results of Pinnacle and TGO software.