

SWEPOS Automated Processing Service

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Abstract

SWEPOS is a multipurpose network of permanent reference stations in Sweden, supplying users with data for both real-time and post-processing on cm to meter-level. In order to facilitate the use of SWEPOS for accurate static post-processing, an automated processing service has been developed. The service uses the Bernese GPS Software and Internet is used for the interface to the users.

System Design

The system is built up of several components –see figure 1. The processing service is reached through the SWEPOS Webb page. It is just open for authorised users, who have an account on SWEPOS. The user submits a RINEX-file with dual frequency static data. All relevant information like antenna type, antenna height, approximate coordinates and marker name should be included in the RINEX-header.

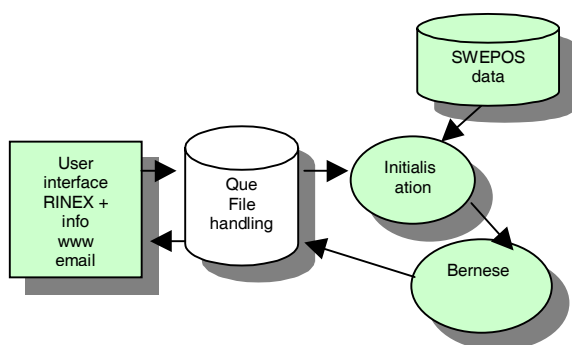


Figure 1: System design.

Before the file is put into the queue, it is checked to see that it is a proper RINEX file containing everything expected and that there is enough data.

When the file is in turn, the initialisation starts. The campaign structure for the Bernese Software is formed and corresponding SWEPOS-data for the five closest SWEPOS-stations as well as the best available precise ephemeris are fetched from the SWEPOS-server. A script for start of the Bernese processing engine (BPE) is established and started.

The automated processing in the Bernese Software uses the following strategy: baseline definition as a star from the new station, iteration of triple difference solution (to get better coordinates), float-solution with screening of residuals, ambiguity resolution using the QIF-strategy and final ionosphere free linear combination with (partial) fixed

ambiguities. Troposphere parameters are resolved for three hours intervals and 15° cut-off angle is used. IGS- or NGS-models are used for modelling the phase centres of different antennas.

When the processing is finished (typical after 5-10 minutes), the Webb page is updated and a text file with a summary of the processing is sent to the user by email. The final coordinates are delivered in SWEREF 93, which will be changed to SWEREF 99 in due time.

Test Processing

Data from so called SWEREF stations were tested in the processing service. The SWEREF-stations are determined using two independent 24 hours sessions. One 24 hours session from three different SWEREF stations were split into several 1-, 2- and 3-hour sessions, which were run in the processing service as a test. The results compared to the original coordinates can be found in table 1.

Table 1: Accuracy versus observation time (meter).

		Diff 2D	Diff Up
Brassås	rms 1 h	8	12
	rms 2 h	4	6
	rms 3 h	4	3
Ulricehamn	rms 1 h	28	10
	rms 2 h	2	6
	rms 3 h	2	6
Kapellskär	rms 1 h	35	38
	rms 2 h	4	12
	rms 3 h	2	8

Some 1-hour sessions have errors up to 1 dm. The 2- and 3-hour sessions gave cm-accuracy. Quality measures, like percentage of resolved ambiguities, rms in final solution and rms in the Helmert-fit to SWEREF 93 and ITRF, were investigated in order to identify measures for identification of bad solutions. The only quality measure that gave some information about the accuracy of the results was the percentage of resolved ambiguities– see figure 2.

Concluding remarks

The processing service will be available for the users in autumn 2000. The interface to the user is quite simple, all

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information is contained in the RINEX-file. We expect however that the users will have some problems to identify their antennas and reduce the antenna heights to ARP, the first time they use the service.

