SPP methods for positioning of aircrafts using products of IGS services

Radosław Fellner (1), Andrzej Fellner (2), Henryk Jafernik (3), Kamil Krasuski (4), and Janusz Śledziński (5)

(1) Civil Aviation Personnel Education Centre of Central and Eastern Europe, Silesian University of Technology, Poland (rfellner@wp.pl), (2) Department of Aviation Technologies, Silesian University of Technology, Poland (Andrzej.Fellner@polsl.pl), (3) Department of Aviation Technologies, Silesian University of Technology, Poland (Henryk.Jafernik@polsl.pl), (4) Team of Satellite Techniques, Dęblin, Poland (kk_deblin@wp.pl), (5) Faculty of Technical Sciences, Higher School of National Economy, Kutno, Poland (sledzinski@gik.pw.edu.pl)

This paper presents studies results of standalone positioning using GPS observations in kinematic mode. For this purpose C1 code observations from Topcon TPS Hiper dual-frequency receiver were used. Computations in RTK-LIB software (RTKPOST module) were executed and SPP method was used for position determination. In paper two experiments were realized: firstly user's position was estimated based on the data from broadcast ephemeris only (I test), and in the second case data from precise ephemeris SP3, IONEX format, CLK format, DCB format and ANTEX format were applied also (II test). Utilization precise products of IGS service improve standard deviation of X coordinate on the level 1 m, standard deviation of Y coordinate on the level 0,7 m and standard deviation of Z coordinate on the level 1,3 m, respectively. Additionally RMS-3D error was estimated based on results from I and II experiments. Average value of RMS-3D parameter amounts to 4 m, with magnitude order between 3,7 m and 6,7 m.