

Development of Prototype Test System for the Verified Position Service

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We have developed a prototype test system for the Verified Position Service. The Verified Position Service is a new concept we defined as a service to verify the positions of arbitrary locations upon requests from arbitrary users. The prototype test system has been developed to technically demonstrate one realization of the Verified Position Service and to identify operational requirements or difficult problems which have to be solved to realize the service. The developed system uses the Advanced Precise Positioning System (APPS) to automatically analyze the observation data recorded by precise geodetic GPS receivers. The prototype system then provides the user interface to accept the observation data from users, and it has the database system which archives the analyzed results as well as the observation data submitted from the users. The system also provides the verification function to the analyzed results based on the ID information issued by the server. The APPS is the name of the system which has been developed under the cooperation between National Institute of Information and Communications Technology and Nippon GPS Solutions Corporation since 2001. The prototype test system for the Verified Position Service acts as an interface for users to obtain the analyzed results of the GPS data from the APPS server, and in parallel, the analyzed data and the observation data are archived in the database system and it provides the function for any users to browse the results upon requests. Once the observation data is obtained for about 24 hours by using a static geodetic GPS receiver, the data file saved in the RINEX format is uploaded to the prototype test server through the WWW page interface, and then the data is passed to the APPS server and is automatically analyzed. The result is notified to the user along with the ID information to verify the position of the receiver. The user can use the precise position information as the verified position. The user can also tell the ID information to other people and the others can confirm the information is correct by browsing the results on the prototype test server. As the results, the position can be used as officially verified information. By realizing such Verified Position Service, it is expected to be used for basic or public surveys, investigations of the land history, establishing reference points in the geographic information infrastructure, and various other applications. The prototype test system is only designed to provide positions in WGS84 reference frame, but we are planning to improve the system to adequately convert the position information to any reference frames. We are also planning to improve the accuracy and precision by using numerical weather model and ionospheric models to introduce better compensation for the propagation delay. In addition, in the future, we want to develop a method to evaluate the precise error under the multi-path environment, and a method to protect inappropriate usages.