Geodetic Reference Frame of Japan as Basic Infrastructure Enabling Us Precise Gnss Positioning

Basara Miyahara, Director, Toshihiro Yahagi, Director, Satoshi Kawamoto, Executive Officer, Yudai Sato, Research Officer and Koji Matsuo, Researcher (Japan)

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SUMMARY

GNSS is a powerful positioning technique enabling us to know where we are on the earth at the period of its observation. On the other hand, a geodetic reference frame, which is an underpinning basic infrastructure for all geospatial information, is commonly defined as positions of reference points at a reference epoch. However, the positions of the reference points are continuously moving because of the earth dynamics. Especially in an area located at active margins such as Japan, the deformation rate is very high, reaching ~10cm/year in certain regions. As a result, inconsistency between positions on the geodetic reference frame and positions measured by GNSS exceeds 1m in 10 years in maximum. An accuracy required by users of GNSS positioning is becoming higher year after year, and then the inconsistency cannot be negligible for applications in several emerging fields such as ICT construction, automated driving, smart-agriculture and so on. Therefore, the Geospatial Information Authority of Japan (GSI) decided to improve the current correction method, Semi Dynamic Correction which makes GNSS positioning consistent to the geodetic reference frame of Japan. The methods for improving temporal and spatial resolution of the correction parameters will be shown in this presentation.

Also, direct determination of precise orthometric height by GNSS is strongly desired and a precise geoid model is a key enabler for it. GSI has been studying the feasibility of precise gravimetric geoid model development and airborne gravity measurements. Through these efforts, we will establish nationwide basic infrastructure for precise position determination.
