

SPACE COMMUNICATIONS AND NAVIGATION SYMPOSIUM (B2)  
Space-Based Navigation Systems and Services (1)

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## GEO ORBIT DETERMINATION USING BEIDOU SYSTEM

**Abstract**

Due to economic benefits and high precision performance, the use of GNSS system is becoming an increasing attractive method for GEO autonomous orbit determination. Experiments conducted on GEO satellites have demonstrated the promising use of GPS for GEO orbit determination. With GPS modernization and evolving receiver technologies, advances of this technique are strongly expected. The main difficulty encountered in GPS GEO application is the poor satellite availability at that altitude, which also embarrasses Beidou system. However, there exists encouraging difference in constellation configuration between the two systems, which provides better opportunity for Beidou system to be applied to GEO navigation. This paper investigates the feasibility of GEO orbit determination only using Beidou system and gives suggestion for the system's subsequent construction. Performance analysis of GEO use of Beidou system focuses on satellite availability and orbit determination precision. To accomplish this analysis, rapid algorithms for computation of the satellite visibility and orbit determination error are utilized. Results of this study show that Beidou system has high potential value for GEO satellites at specific positions, while a global use could be easily achieved if the Beidou-GEO satellites are equipped with two wing antennae. That offers new possibilities for autonomous navigation for future GEO satellites.