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Next Generation Global Geodetic Networks for GGOS

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Content :

We simulated future networks of VLBI+SLR sites to assess their performance. The objective is to build a global network of geographically well distributed collocated next generation sites from each of the space geodetic techniques. The network is being designed to meet the GGOS terrestrial reference frame goals of 1 mm in accuracy and 0.1 mm/yr in stability. We simulated the next generation networks that should be available in 5 years and in 10 years to assess the likelihood that these networks will meet the reference frame goals. Simulations were based on the expectation that 17 broadband VLBI stations will be available in 5 years and 27 stations in 10 years. We also consider the improvement resulting from expanding the network by 6 additional VLBI sites to improve the global distribution of the network. In the simulations, the networks will operate continuously, but we account for station downtime for maintenance or because of bad weather. We assess the agreement between the estimated SLR and VLBI coordinate differences and the survey ties by doing combination TRF solutions that tie the networks together only through the estimation of EOP. The strengths of VLBI and SLR allows them to provide the necessary reference frame accuracy in scale, geocenter, and orientation. Even with just the +5 year network operating for 10 years, simulations indicate that accuracies will be at the level of 0.03 ppb, 0.3mm, and 10 μ s. Combining the +5 year and +10 network realization will provide better estimates of accuracy.

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