

TOPEX/Poseidon Precision Orbit Determination Using Combined GPS, SLR and DORIS

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TOPEX/Poseidon (T/P) is a joint spaceborne oceanographic mission of U.S. NASA and France CNES design launched August 10, 1992. The satellite has a variety tracking systems for both operational and precision orbit determination, Three precise tracking systems: Satellite Laser Ranging (**SLR**), Doppler Orbitography and **Radiopositioning** Integrated by Satellite (DORIS), and Global Positioning System (**GPS**) provide high quality measurements essential for reconstructing the T/P orbital height with centimeter precision. This paper presents results of simultaneously processing all three data types to exploit the inherent strength of each in a combined solution. SLR and DORIS are routinely combined to provide orbit solutions for the T/P science team. GPS orbit solutions are produced as part of the first demonstration flight of a high quality spaceborne GPS receiver. Coordinate frame and software system differences between the combined **SLR/DORIS** orbits and the GPS orbits induce **orbital** height differences of 2 to 3 centimeters. Combining the three data types within a single software system permits removal of software system differences while obtaining coordinate frame calibration information. These calibrations will aid future spaceborne GPS missions that are not complemented with SLR and/or DORIS.

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