

Time and Position Accuracy using Codeless GPS

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The Global Positioning System has allowed scientists and engineers to make measurements having accuracy far beyond the original 15 meter goal of the system. Using global networks of P-Code capable receivers and extensive post-processing, geodists have achieved baseline precision of a few parts per billion, and clock offsets have been measured at the nanosecond level over intercontinental distances. A cloud hangs over this picture, however. The Department of Defense plans to encrypt the P-Code (called Anti-Spoofing, or AS) in the fall of 1993. After this event, geodetic and time measurements will have to be made using codeless GPS receivers.

There appears to be a silver lining to the cloud, however. In response to the anticipated encryption of the P-Code, the geodetic and GPS receiver community has developed some remarkably effective means of circumventing AS without classified information. We will discuss various codeless techniques currently available, and the data noise resulting from each. We will review some geodetic results obtained using only codeless data, and discuss the implications to time measurements. Finally, we will present the current status of GPS research at JPL in relation to codeless clock measurements.