

Developing a Dual radio satellite station receiver to estimate differential Total Electron Content (TEC)

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ABSTRACT

A radio beacon receiver system is being developed at the Jicamarca Radio Observatory. This ground-based receiver will be used to obtain ionospheric total electron content (TEC) over the Peruvian region by detecting satellite radio beacon signals. The research in this region is important because of closeness to the equatorial ionosphere.

In this poster, we present a description of the initial design of the beacon receiver system which is based on Quadrifilar Helix Antennas, cavity filters, amplifiers and a software-defined radio equipment. Initial simulations, common errors and tests of the different stages which conform the receiver system will be shown. Specially about the design of our cavity filters which has a better performance than commercial ones.

Finally, we show how the receiver system determinates the TEC value in ionosphere using the Differential Doppler technique and how multiples scientific satellites constellations like COSMOS and COSMIC satellites help us to do our measurements.

Key words: Ionosphere, Differential Doppler, Total electron content (TEC), Jicamarca Radio Observatory.