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TOMOSCAND – A MESOSCALE, MULTI-FREQUENCY 3D IONOSPHERIC TOMOGRAPHY NETWORK FOR FENNO-SCANDIVANIA

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Abstract: We present plans for a new three-dimensional mesoscale ionospheric tomography system in Scandinavia. The system will be based on a dense grid of both GPS and dual-frequency beacon satellite receivers.

Additional measurements from e.g., satellite occultations, ionosondes and incoherent scatter radar can also be used to aid the inversion of the limited angle tomography problem. The initial steps of the project will be to design a flexible low cost software de- fined beacon satellite receiver and to study the possible measurement geometries. The multi-sensor inversion procedure is also being investigated theoretically to determine what spatial and temporal resolutions can be achieved, and how they depend on different measurement geometries and sensor combinations. We present a comparison of tomographic inversion results from the present Beacon receiver chain in Finland, consisting of five receiver stations, and results from the dense Finnish GPS receiver network, for the same timesteps. These results are used to discuss advantages and shortcomings of using ionospheric tomography based on either Beacon or GPS alone.