

Ionospheric observations made by a fast Doppler ionosonde

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A KEL IPS71 was operated at a middle latitude site (Salisbury, South Australia) at a five-minute sounding rate using the unique features of this ionosonde to provide a Doppler resolution of 0.04 Hz over a Doppler range of ± 2.5 Hz at each sounding frequency. The Doppler operation provides such high resolution measurements over a full ionosonde frequency range by the time interleaving of frequency samples. Software has subsequently been written to display the Doppler variations and their equivalent Doppler velocity as a function of time, frequency and height. Doppler variations near the ionospheric critical frequency were found to be proportional to the rate of change of foF2 in accordance with a simple theoretical model. A range of travelling ionospheric disturbances were ever present in the observations and their characteristics are shown. Observations of sporadic E revealed the existence of two distinct Doppler forms namely spread and non-spread. Examples are shown along with the method to calculate horizontal and vertical drift from the Doppler-spread form of sporadic E as well as some forms of spread F.