

THE IPS-42 IONOSONDE STATION

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The IPS-42 typ. ionosonde (Fig. 1), produced by the KEL Aerospace is to sound the ionosphere at regular intervals by the pulse-echo technique.

The operating frequency of a pulse transmitter is varied over the range 1 MHz to 22.6 MHz. The resulting echoes from the ionosphere are detected by a receiver tuned automatically to the same frequency as the transmitter. The echoes received are processed to remove noise and interference and are displayed on a cathode ray tube along with a graticule indicating virtual height along one axis and frequency along the other.

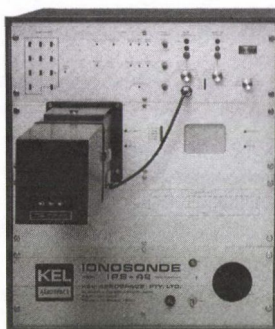


Fig. 1. The IPS-42 ionosonde

The instrument is connected to an IBM PC with a special interface and the data are stored in the hard disc. These records are called ionograms (Fig. 2).

Further technical specifications of the instrument are the following.

The transmitter final power amplifier produces a 5 kW peak pulse-power output. The digital Frequency Synthesizer provides coverage from 1 MHz to 22.6 MHz in 576 logarithmic steps. A complete frequency sweep to produce an ionogram takes 12 seconds of a 20 seconds program cycle. A group of front panel switches allows the operator to select manually any of the synthesizer's 576 channels.

The transmitter pulse width is 41.67 μ s and the pulse interval is 5.33 ms.

The configuration of the antenna system is illustrated in Fig. 3.

We employ two vertical delta antennas. Each antenna consists of a large trian-

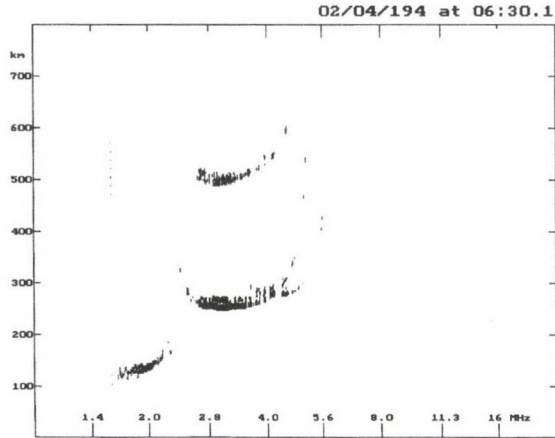


Fig. 2. Sample ionogram recorded in Nagycenk Observatory with IPS-42

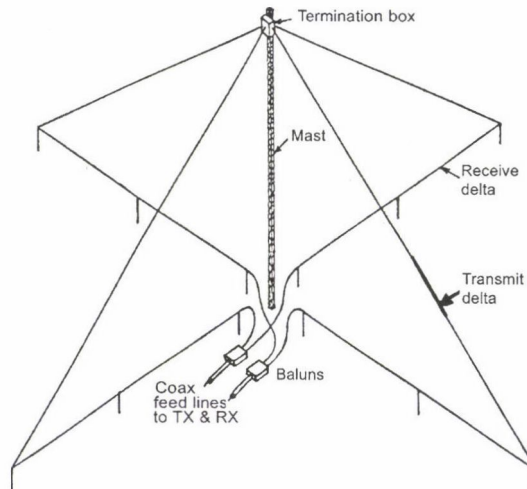


Fig. 3. Vertical delta antenna

gular loop of wire, supported at the apex. The height of the mast is 30 m and the horizontal part of the delta is 2 m from the ground. The antennas are mounted orthogonally to reduce coupling between them. The Vertical Delta antenna has an average feedpoint impedance of about 600 ohms and requires a balanced feedline.

The Maximum Virtual Height Range of the instrument is 800 km and the Height Marker Interval is 100 km.

The regular measurements began in 1998. The ionograms are archived in CD ROM and are available by special arrangement.