

## Reply

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Our previous paper (Yamashita et al.,1983) indicated that a direction finder of the type described by Krider et al.,(1976) was found to exhibit presumably large angle errors. Professor M.A.Uman suspected the large angle errors, and he requested to-give a circuit diagram of the gated, wideband magnetic DF or to describe testing procedures for noise rejection capability. So, we note the reply to him.

The schematic diagram of the DF built ourselves is shown in Fig.1. The display gate circuit is designed to open the gate of 2 ms widths after an initial field pulse is detected. The bearing direction corresponding to the initial pulse is displayed on a CRT to be photographed. Once the initial pulse is received, the shutter of the equipped camera being usually opened, is automatically closed with a delay of several tens milliseconds. The delay incurs the simultaneous display with different directions when successive pulses are received. Gamagohri observation site for the gated, wideband DF was adjacent to motor parking area on the top of the mountain, and so the photographic records were sometimes contaminated by the interferences of ignition noises of motor-cycles. In these cases, a few different directions were indicated on a photograph, as is shown in Fig.2. Fig.3 shows a photographic record with a single direction being caused by a lightning discharge. This direction surely corresponds to the radar-echoes in the south-west direction.

Fig.4 shows the occurrence distribution of bearing angles without including the data of different directions, obtained by the DF during a larger period (~1h40m) of 13h40m-15h20m August 19,1982, along with the radar-echo data at 14h. On the Fig.13 in the previous paper, the distribution of the bearing angles was not exhibited in the south-west direction for such a short duration as 6 minutes, and there were no radar-echoes corresponding to the distribution peak in the southern

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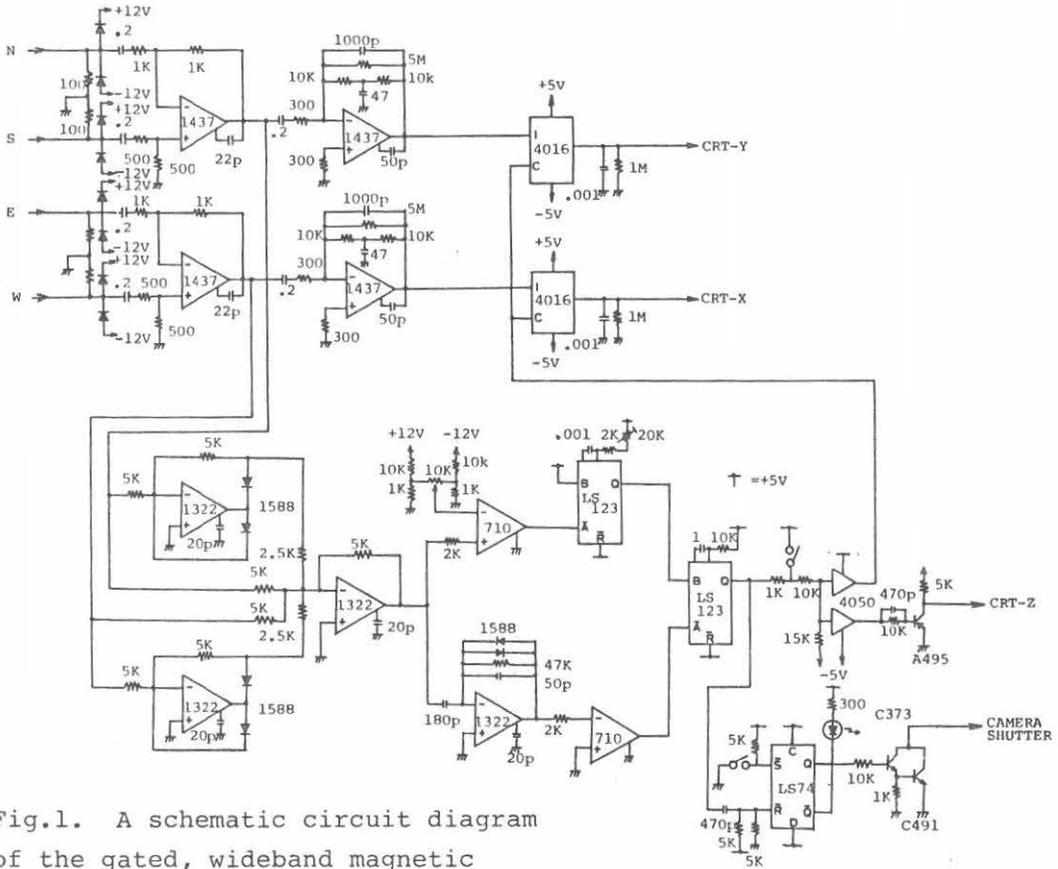


Fig.1. A schematic circuit diagram of the gated, wideband magnetic direction finder.

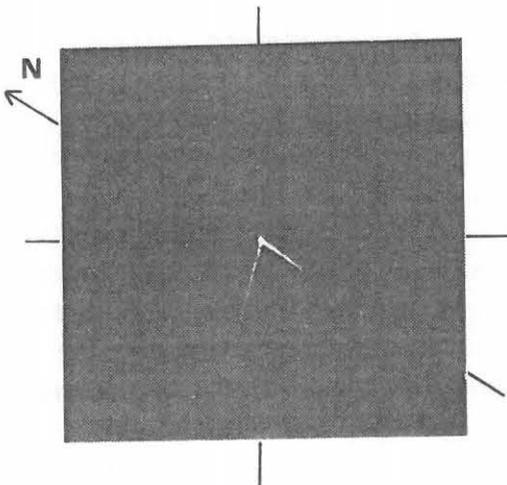


Fig.2. A photographic record with two different directions contaminated by the interferences of ignition noises of motor-cycles.

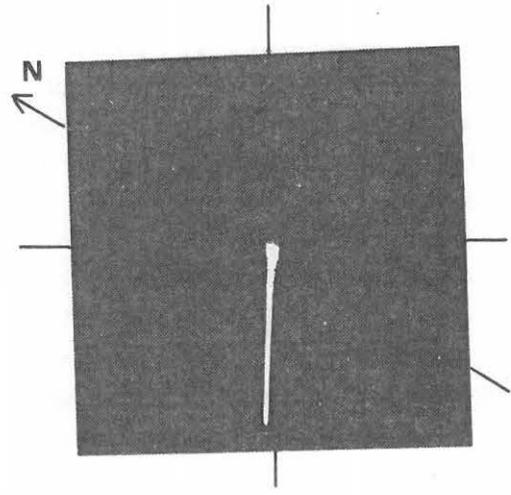


Fig.3. A photographic record with a single direction caused by a lightning discharge.

direction. So that this peak was inferred to be caused by the ignition noises. It is seen from Fig.4 that the distribution peaks in north-east and south-west directions clearly correspond to the radar-echoes. Although we have not sufficient data to evaluate the accuracy of the DF, it seems to be concluded that the exhibition of the large angle errors for the DF was caused by the contamination of interferences of ignition noises of motor-cycles. We had no chance to re-examine the DF accuracy last summer, but further examinations should be carried out.

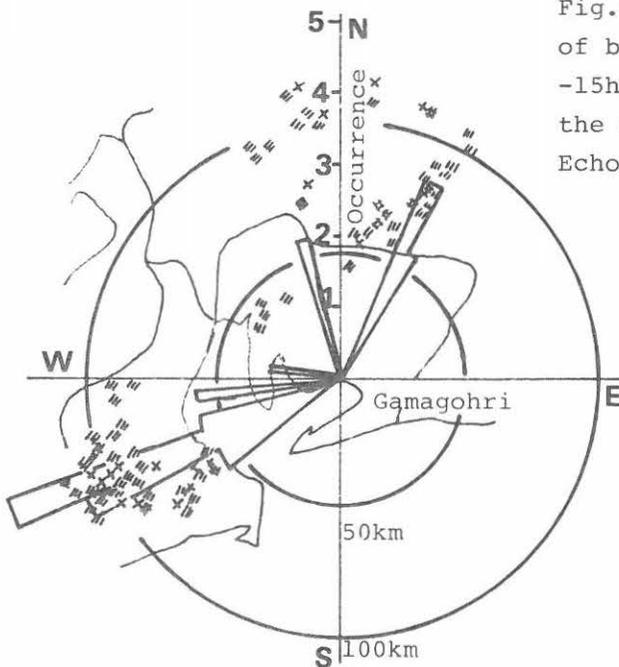


Fig.4. Occurrence distribution of bearing angles during 13h40m -15h20m Aug. 19, 1982, along with the radar-echo data at 14h. Echo intensities : < x < \* < ■

## References

- Krider, E. Phillip, R. Carl Noggle and Martin A. Uman: A gate wideband magnetic direction finder for lightning return strokes, *J. Applied Meteorology*, 15, 301-305, (1976).
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- Yamashita, H., A. Iwai, M. Satoh and T. Katoh: VHF direction finder for locating lightning at close range, *Proc. Res. Inst. Atmos. Nagoya Univ.*, 30, 15-24, (1983).

