

I-5-10. Topside Soundings of the Ionosphere

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Relative to the presence of irregularities and ducts in the F region mentioned by Dungey, I would like to describe briefly a recent rocket experiment involving radio pulse reflections from the topside of the ionosphere. A sounder pulsing at two fixed frequencies, 5.97 Mc/s and 4.07 Mc/s, was carried to an altitude of 1060 km at about 1800 local time on June 24, 1961 at Wallops Island, Virginia. The sounder was above the peak of the F layer for about 15 minutes. During 13 of these 15 minutes, good reflections were obtained on one or both frequencies from the topside of the F layer. Exceptionally strong returns with apparent multiple reflections,

which were observed shortly after "breaking out" of the topside of the F layer, suggests that the field-guided mode of propagation may have been present. The second point I wish to make concerns irregular scattered returns that were observed as the sounder passed through the 750-950 km region on both upgoing and downgoing portions of the flight. These observations suggest the occurrence of ionization irregularities in this altitude region. The flight took place during quiet magnetic conditions; however, a moderate magnetic storm had occurred two days earlier.