

## Anomalous propagation of VHF radio waves used for instrument landing system due to the sporadic E layer

# Jun Sakai[1]; Keisuke Hosokawa[1]; Ichiro Tomizawa[2]; Susumu Saito[3]  
[1] UEC; [2] SSRE, Univ. Electro-Comm.; [3] ENRI, MPAT

The sporadic E (Es) layer, which is a localized dense ionospheric layer occasionally appears at the altitude around 100 km, is known to be a medium of anomalous propagation of very high frequency (VHF) radio waves. A statistical study showed that the intensity of radio signal that is anomalously propagated from a distant radio station may exceed the one from a local station and this phenomenon may potentially disturb VHF air navigation receivers used in systems such as VHF omni range (VOR) and instrument landing system localizer, (ILS LOC) (Sakai et al., 2019). Using the same data set we have studied an extreme case of anomalous propagation due to Es (EsAP) of ILS LOC radio waves. On 15 May 2014, VHF monitoring receiver recorded strong signatures of EsAP on a few ILS channels, in addition to several VOR channels, at Kure, Hioshima, observation site. In one ILS LOC channel which normally receives no signal at all, the recorded signal intensity was about -80 dBm, which is about 50 dB higher than that of the background level, for more than three hours. We found that the source location of the EsAP wave was about 1500 km away from the observation site. This EsAP signal, from an ILS LOC, is stronger than typical EsAP signal from VOR stations. Since the transmitting power of ILS LOC is relatively low (usually 10 W) compared with that of VOR (100 to 200 W), the above case is rather unexpected. This case suggests that Es may cause strong disturbance on mission-critical radio receivers.