

Sensitivity Analysis and Testing of Electrically Short Dipole Antenna for Lightning Instrument for VENUS (LIVE)

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- Transient of short (10-50 μ s) duration associated with clouds/storms.
- Emission : Optical, EM in ELF/VLF, Other
- To detect the waves escaping, a Lightning Instrument for VENUS (LIVE) is proposed for future Venus orbiter mission to understand the lightning phenomena on Venus in detail.
- The sensitivity analysis of LIVE with respect to an earlier detector /instrument is presented.
- Accordingly, prototypes of different antenna configurations were fabricated and tested using an artificial source of lightning, i.e., the Van-de-Graaff generator.

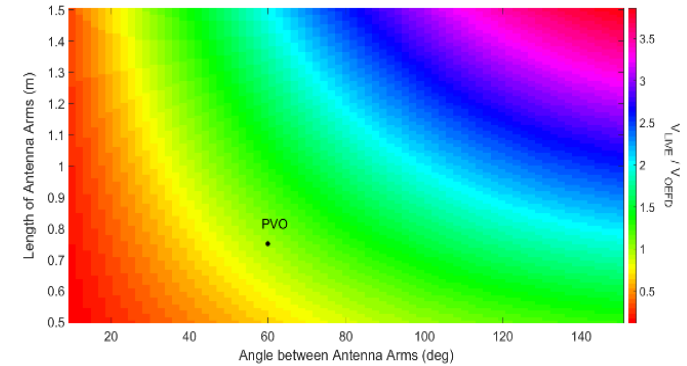


Fig 1: Ratio of induced voltage across the LIVE antenna to that of the Orbiter Electric Field Detector on PVO as a function of antenna length and the angle between two arms.

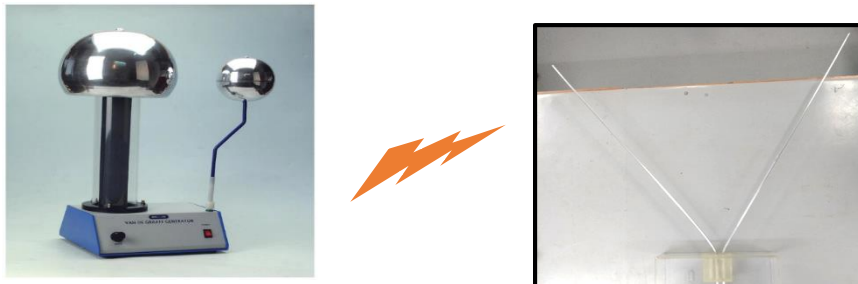


Fig 2: Testing set up for artificial lightning detection



Fig 3: Time domain pulse captured by different antenna configurations using oscilloscope at a voltage scale of 20 Volts/Div and time scale of 5 microsecond/Div.

References: [1] Russell et al. (2011), PSS, 965-973. [2] Esposito L.W. et al. (1983) Uni. Ariz. Press, Tucson, 484-564. [3] Pabari J. et al. (2018) LPSC XLIX, Abstract # 1391. [4] Kumar et al. (2019) IMICPW, 348-352. [5] Scarf et al (1980), IEEE, GE-18, 36-38.