



Acoustic measurements of atmospheric electrical discharges for planetary probes

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We present acoustic measurements carried out in a high voltage laboratory in order to characterise signals from various discharge processes, e.g. lightning or corona discharge. The investigations are in the frame of the Acoustic Sensor Package (ACU) for Titan Saturn System Mission (TSSM), a proposed post Cassini-Huygens mission. The multi-microphone system ACU has the scientific objective to characterise acoustical phenomena in Titan's atmosphere with heritage from Huygens Atmospheric Structure Instrument (HASI/PWA) on Huygens probe. We investigate the possibility to use acoustic measurements for the study of atmospheric electrical discharges. The experiments in the high voltage lab used a generator with voltages up to 1.9 million volts with different polarities. Various discharges have been generated and acoustical signals detected. From the sound signature we derive parameters which influence the technical design of ACU, e.g. filter coefficients for capturing fast transient acoustical phenomena and intermittent signals. In addition multi-microphone sound systems can be used to estimate the location of discharges.