Acoustic system for turbulent layers in Costa Rica

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It has been shown (Garbanzo-Salas, 2015) that layers and patches of turbulence are common in Costa Rica. During the first half of the year (dry season) 3 layers (or more) of turbulence can be observed in the first 4 km of the troposphere for as much as 30 percent of the time. During rainy season the presence of layers decreases but isolated patches of turbulence are observed. The maximum depth of the planetary boundary layer (PBL) also increases during rainy season, meaning that the turbulent top of the PBL can reach deeper into the atmosphere. For these reasons the Costa Rican Met Service (IMN) and the Department of Civil Aviation (DGAC) have requested that the University of Costa Rica develops a system capable of detecting turbulence in the lower troposphere, specially near the ground in order to improve aircraft safety and support early warning systems. An acoustic system was chosen by the institutions due to power consumption (must be solar powered), size (must be mobile and small) and capabilities to monitor the atmospheric region of interest. A prototype consisting of 16 element transmitter and 16 element receiver was used to test the concept. Atmospheric information can be obtained with a 45 W solar panel, a 12 V – 60 W (max) amplification system and a computer. Preliminary results of the system and its measurements are presented.

Garbanzo-Salas, Marcial, "High resolution tropospheric studies with an MST type radar" (2015). *Electronic Thesis and Dissertation Repository*. 3312. http://ir.lib.uwo.ca/etd/3312