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*** Research Project Title**

Wood prognosis from homogeneous forests of *Eucalyptus spp.* throughout airborne LiDAR data.

*** 500 word project description.**

The rational utilization of forest resources has motivated the utilization of remote sensing data not only as a tool for controlling and monitoring, but also as a support to forest inventory and its results have contributed for studies in several fields, from carbon emission

to quantitative analyses of wood biomass for the cellulose production. As hypothesis, this search presumes a high correlation between the wood prognosis obtained by the multivariate regression considering Total Height, Number of Trees, Crown Area and Crown Cover Percent; and the wood prognosis obtained by the traditional methods (ground truth). The main aim of this search is evaluating the potential use of airborne LiDAR to wood prognosis in homogeneous forests of *Eucalyptus spp* with 0.5 to 7 years of age, located in Vale do Paraíba region, São Paulo state. It will be sampled 2,065 ha located around Igaratá, São José dos Campos and Monteiro Lobato municipalities, which will regard several sort of forest management.

It will be employed an Optech ALTM 2050 sensor of 50KHz, with a 0.20m footprint, an 0.15m altimetric error and an 0.50m planimetric error; GPS Novatel Millennium of 1Hz; inertial measure system Applanix. of 200Hz, and high resolution metric camera (RGB). The first stage consists of generation of digital models (Digital Surface Model – DSM and, Digital Terrain Model – DTM). The DTM will be validated through four altimetric profiles (with and without forest canopy; plain and hilly topography) pointed at every 2.5m by the use of optical level, precision clinometer and positioned by a DGPS and Total Station. By the subtraction of a model in another one, it will be obtained the Digital Hypsometric Model (DHM). After the discrimination of the trees, the following variables will be obtained: Number of Trees, Total Height and Crown Area. There are 110 rectangular plots of 360m² in the farms cited above, which have been positioned with DGPS and Total Station, where the following variables have been measured: Number of Trees, DBH, Total Height, Crown Area and Crown Cover Percent. The power of correlation between these variables will be evaluated, and is be expected that there is high correlation between Total Height and DBH; Crown Area/ Crown Cover Percent and DBH, mainly. If the hypothesis be confirmed, is technically possible using the LiDAR to forest inventory in homogeneous forests of *Eucalyptus spp*.

The following products will be obtained from this search: DSM; DTM; DHM; Harvest Map; Replanting Map; Hydrographic Map; Topographic Map (1:10.000) and the following tables information: Number of Trees, Crown Area, Crown Cover Percent, Total Height and Wood Prognosis.

KEYWORDS: LiDAR. Forest Inventory. Forest Structure, *Eucalyptus* stands, Remote Sensing