2.9 = UNMANNED AERIAL VEHICLE APPLICATION FOR MAPPING INDIVIDUAL PLANTS: THE CASE OF THE NEBRODI BEECH FOREST

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The UAVs (Unmanned Aerial Vehicles) are small unmanned aircraft remote controlled electronically, commonly called "drones", which can serve as a vector to carry one or more sensors for georeferenced digital image capture. The development of these platforms is begun in the 50s for military purposes and is today successfully applied in the civil sphere with levels of technology and higher performance.
It is a remote sensing technique to the scale of detail that allows for monitoring, measuring and mapping of several environmental data in a short time.
The use of NDIR sensors (Non Dispersive Infrared sensor) for the detection of plant cover, allows discriminating plant species, mapping individual plants and evaluating the vegetative state.
This technology has been tested to monitoring the state of health of the beech forests of Monte Soro, in the Nebrodi Natural Park (Sicily), which in recent years are show signs of desiccation of numerous stumps. It was drawn up a map of the stumps of beech distinct classes of health: l) healthy plants; 2) diseased plants; 3) dead plants. The goal is to develop a useful document to manage the evolution of the process of spreading the disease.
For the case study, the apparatus used was a mini-UAV planing belonging to the "Tactic", subcategory mini UAVs (classification dell'Unmanned Vehicle Systems International Association, 2008), which are more suitable for wide-ranging surveys with predominantly horizontal flight.
It is driven by an electric engine and equipped with a navigation system with control of flight altitude, barometric pressure sensor, GPS receiver with sub-meter positioning accuracy and signal transmission, navigation system and autopilot module. The drone is connected with the ground-station for real-time viewing of flight conditions and makes all adjustments necessary for the proper configuration of the system during the flight.
The data collected are comparable in terms of spectral resolution to high-resolution satellite images (IKONOS, QuickBird, GeoEye), while ensuring a geometric resolution incomparably greater. Therefore, this technology has allowed execution speed greater than detection methods in the field, such as GPS, and costs much lower than the common methods of remote sensing (aerial or satellite images).
The application of this technology of ecological analysis in protected areas confirmed to be efficient and proved to have lower environmental impacts.