

DRONES IN DUMP MANAGEMENT AND ENVIRONMENTAL CONTROL: COST-BENEFITS ANALYSIS

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Abstract

In the 1972 Donella H. Meadows and other scientists working at Massachusetts Institute of Technology issued a book, commissioned by the Club of Rome, titled *The Limits to Growth*. The conclusions of this report were that the exponential economic and population growth are unsustainable under condition of finite resource supplies. Under the action of 1973 and 1979 oil shocks, the growth sustainability became one of the most important aspects in the international, national and local policies.

The concept of natural resource included not only oil but also energetic, minery, fishery, agricultural resources, soil consumption, ecc.. In the same manner the environmental pollution starts to meaning, time by time, as reduction of emissions on ground, underground, in sea- and freshwaters and atmosphere, reducing of quantity of wastes by reducing goods and services consumption, recycling of materials and their valorization. For this reason measuring, management and control of the natural resources and the environmental pollution represent the way to drive the development of a territory.

These activities could be performed on global or wide range by satellites or airplanes opportunely equipped, but when it need operate in short range, the choice goes mandatory to Unmanned Aerial Vehicles (UAV) and commonly known as a drones.

Using specific sensors or imagine capture equipments, often working in different bands of wavelength, it is possible to execute works in field monitoring of environmental pollution by determining the concentration of specific air pollutants, or in field of land's use survey.

In this case it is possible to realize a 3D model of land surface putting in evidence critical situations as flooding, landslide, mudslide, fires or valuate the land's coverage by forests, crops or buildings. In field of urban planning, archeology and monuments preservation, the use of UAV represents a simple and economic tool to reach critical point that could be checked only by mounting scaffoldings. By mounting some special sensors it is possible check the territory to find abandoned wastes as well to perform the monitoring of physical and chemical parameters useful to manage correctly public dumps.

In the case where the UAV technology is commissioned by a third party, the analysis costs-benefits shows that the costs linked to pilot training, purchasing software, images capture and data transmission, flying and GPS equipments, are charged only by quote to costumer.

The variable costs are connected to the time necessary to perform all ordered works and are comparable with those required in job market.

The benefits are mainly due to the physical safety of the operators and the ready availability of service in comparison to those provided by military Authorities.

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