

Using Unmanned Aerial Vehicle in Ecology

Introduction

Advancement in technological innovations is exploring areas where human ability cannot reach. As such, there has been the evolution of small robots that aid in research which is proving more reliable, efficient, and effective. In particular, Unmanned Aerial Vehicles are changing techniques of carrying out research in the field of ecology and geography. Use of Unmanned Aerial Vehicle (UAV) technology is providing the potential for very high spatial resolution when mapping very large areas (Koh & Serge. 122). Its applications in riparian areas provide mechanisms which riparian managers use to quantify riparian vegetation and terrain units. Besides, the managers are able to identify canopy mortality and standing dead wood.

Apart from trees, the technology is applicable in monitoring animals, birds, and insects such as butterflies in a wildlife setting without unnecessarily disturbing their co-existence. Koh & Serge (122) notes that some of the UAV aircraft are remotely controlled from the ground and are equipped with capable sensors which enable them to deliver fine spatial resolution data as instructed by the operator. Recent designs of UAV have improvements in miniaturization and navigation of measurement technologies, which allow spatiotemporal dynamics and the studying of an individual organism at a close range. This paper shall discuss the potential of using UAVs in researching insects such as butterflies and in vegetation mapping.

Using UAV in monitoring butterflies

In ecology and conservation, assessing the abundance of species is basic and inevitable. Butterflies population is an important indicator for measuring habitat status and environmental changes (Ivosevic, Yong-Gu & Ohseok. 2). UAV is making it easy for entomological researchers

to track the variation in population density of butterflies in a locality during conservation of species and monitoring the diversity. Regular counts of butterflies on fixed routes help in knowing changes in butterfly populations. This process is possible by using sensors, GPS, a gyroscope, an inbuilt accelerometer, and cameras mounted on a UAV aircraft (Ivosevic, Yong-Gu & Ohseok, 2). Applying this technology is more conducive and accommodating to butterflies since the traditional methods used to harm, kill, and even influence their behavior after releasing them because they are fragile in nature. Therefore, UAV technology is more efficient and effective in monitoring diversity without interfering with the natural habitat of species.

Using UAV in mapping vegetation

Researchers are currently using UAV technologies in creating vegetation maps where aerial photos from controlled UAV aircraft are analyzed and presented. Data obtained from vegetation maps aid in environmental planning (Kaneko & Seich, 2). From the maps, one is able to scrutinize the geographical spread of a plant community in an area. Apart from vegetation mapping, UAV is making it possible to collect data during disasters for agricultural sectors and remote sensing in forests, monitoring, and management of rivers, embankments when surveying and measuring topography and structures (Kaneko & Seich, 2). There is also the potential of retrieving vegetation assemblages of different species where invasive weeds are detected and appropriate action is taken to handle them. All these endless benefits are accrued from the application of UAV in vegetation monitoring.

Studies conducted by Ivosevic, Yong-Gu & Ohseok elaborates on how the change in technology has revolutionized research in the monitoring of animal species. In particular, the importance of the Unmanned Aerial Vehicle in entomology. monitoring the population of butterflies, their densities and general comparison between the traditional and modern

technologies. Findings from the study reveal that UAV has made it possible to access areas where human beings were not able to in the past thus maintaining the natural habit of species. The sensors and cameras record and transmit data to handles without interfering with their natural habitat which often influences their behaviors.

Kaneko and Seich research elaborates on how UAV is making it easy for mapping vegetation in different areas thus changing the face of studies on ecology. Aerial photographs of vegetation maps retrieved from the cameras and sensors aid in decision making on environmental management. The research further notes how the mapping has helped in tackling emergencies such as floods and erosion. Findings from aerial photographs show community distribution of various species of trees which is very crucial in planning and environmental management.

Koh and Serge studies bring to our understanding the importance of UAVs, and how the new technology is transforming research in ecology. Elaborations on accuracy reliability, efficiency, and effectiveness are quite evident from their research. The study further explains the affordability of using UAVs compared to traditional methods of monitoring which took days and delivered unreliable data on conservation. Findings show that UAV can deliver information on land use, human activities, and biodiversity surveys.