UAVs applied to wildlife studies

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ABSTRACT

UAVs represent new opportunities for wildlife studies. Their spatio-temporal flexibility opens new windows of data acquisition. Wildlife areas of research such as animal census, behavior studies, animal ecology, or habitat characterization will benefit from this new technology in the near future. UAVs allow to transpose existing (satellite, aerial) remote sensing tools and applications but also to acquire innovating data impossible to access before. This presentation will provide an overview of UAV-based remote sensing applied to wildlife studies. Opportunities and challenges of this technology regarding different areas of wildlife research will be presented. As an example, detailed results from a research project on wildlife census will be described. This project aimed to develop and evaluate an image processing approach for detecting and counting simultaneously several large mammal species in a controlled environment. The approach selected in this research project is based on a multicriteria object-based image analysis on visible and thermal infrared images at very high resolution acquired by UAV. This project aimed to detect White-tailed deer (Odocoileus virginianus), American bison (Bison bison), fallow deer (Dama dama), gray wolves (Canis lupus), and elks (Cervus canadensis) located in separate enclosures. Results showed that the approach was able to simultaneously and distinctly detected the targeted species. Results showed no confusion for interspecies detection in the case of visually dissimilar species. This approach has not only demonstrated its ability to detect multiple species, but also its adaptability to specifically target species of interest for the wildlife manager and to ignore those that are not targeted. However, the effectiveness of this approach has not been tested to detect taxonomically related species (e.g., gray wolf and coyote) or physically similar species (e.g., red deer (Cervus elaphus)). This project demonstrated the potential benefits of using UAV-based imagery to detect and count wildlife.