

Highlighting a New Era of UAS Remote Sensing Using GPS Controlled Small to Medium Format Digital Cameras

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ABSTRACT:

Unmanned aerial systems (UASs) have made dramatic technical advances in the past decade. Emerging UAS systems are expected to revolutionize the quantity and quality of geo-spatial data available to decision-makers while significantly reducing the cost of acquiring such data sets. In the U.S., the role of UASs is expected to dramatically expand for a wide variety of applications within the next few years, including wildfire assessment and response, monitoring threatened and endangered species, documenting climate change and ecosystem adaptations, and measuring and forecasting agriculture production. In anticipation of these UAS trends, we have tested commercial off-the-shelf (COTS) technology integrating Aviatrix GPS trigger control of multiple Canon D5MII DSLRs to provide ultra-high resolution, multi-spectral orthos, digital surface models (DSMs), and digital terrain models (DTMs) over areas of desert land in Riverside County, CA. Generated products include a 15-cm resolution multispectral ortho-mosaic, DSM, and DTM data sets which were used to extract information about vegetation, surface hydrologic features, and surface soils that indicate the structures and functions of environments. They are applicable to natural resource assessment and monitoring in advance of multiple utility-scale solar energy development projects that are anticipated in the near future. And they highlight a new era of UAS remote sensing using integrated COTS technology for GPS controlled small and medium format digital cameras.