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Use of Drones in Airfield Pavement Distress Detection: A Possibility and a Future

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Abstract

The current practice for airport pavement inspections relies on time-consuming visual surveys and manual interpretation of reports and sketches prepared by inspectors in the field. Recently, the use of small Unmanned Aircraft Systems (sUAS) aka drones has attracted attention as an option for performing cost-effective and efficient pavement inspections. In this study, the research team deployed several sUAS at different altitudes at six airports in Michigan, Illinois, Iowa, and New Jersey from December 2020 to November 2021. Red/Green/Blue (RGB) optical orthophotos, Digital Elevation Models (DEMs), and hillshades from DEMs collected using several sUAS at different altitudes were analyzed for their usefulness in airfield distress detection. The results showed that RGB optical data could detect as many as 13 portland cement concrete pavement distresses out of 14 available in this study and 6 out of 9 asphalt concrete pavement distresses available on the test sites. Similarly, DEMs were found to be useful for confirming the location of distresses with elevation change, such as faulting in PCC pavement and shoving in AC pavement. This research also concluded that sUAS-based PCI inspection not only detects and rates a number of airfield pavement distress but also provides PCI values close to the foot-on-ground traditional PCI inspection value.