A Fusion of Geomatics Technologies for Rapid Response, Small Region Agricultural Landscape Mapping in Ontario

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Abstract

Agricultural crops and land management activities, within small region project areas, can be mapped efficiently and rapidly using geomatics technologies deployed by the Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA). Over the past decade, the Ontario Agricultural Resource Inventory (AgRI; Sweeney et al., 2013) geospatial information resource development project has focused on testing and refining these approaches. Incrementally, a high-resolution, digital polygon framework of Ontario's agricultural and rural landscape features has been digitized from orthoimagery. At present this research layer covers over 3.6 million hectares (9 million acres) - some areas have multi-temporal coverages. Throughout the summer of 2015, mapping experiments evaluated and refined approaches to deploy a fusion of geomatics technologies for rapid response, small region agricultural landscape mapping. The goal was to build accurate "near seamless" cropping system map coverages for 100 km^2 project areas that represent field conditions for the 2015 cropping season. Twelve project study areas were selected throughout southwestern Ontario from locations where a version of the Ontario AgRI polygon framework had been manually digitized from 2010 orthoimagery. A time-limited, field-by-field mobile mapping campaign was conducted to collect ground-truth cropping system observations along public access roadways and trails throughout these areas. They were attributed immediately to farmland feature polygons "on-the-fly" using GPS-enabled rugged tablet computers. A small unmanned aerial vehicle (UAV), equipped with a gimbal-mounted video camera, was deployed strategically for "in-fill" observations, as needed, to complete the map area coverage.

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