Michigan Tech capabilities statement for the Border Security Technology Consortium

Michigan Technological University ("Michigan Tech), together with its research center the Michigan Tech Research Institute (MTRI), have been developing, demonstrating, and implementation high-resolution applications of unmanned aerial systems (UAS) since 2011 to help solve data collection and condition assessment needs of multiple agencies. A particular focus has been on using UAS to assess the condition of transportation infrastructure and meeting the needs of cost-effective asset management. This has involved developing a UAS-enabled system for automated assessment of unpaved road condition (http://www.mtri.org/unpaved), demonstrating applications of UAS for the Michigan Department of Transportation (http://www.mtri.org/mdot_uav.html), mapping environmental features (http://www.mtri.org/ewmlci.html), and now for evaluating roads and railways in Texas.

These projects have enabled capabilities that are directly applicable to border security technology. Rapid, automated development of high-resolution three-dimensional imagery products, combined with co-registered thermal data provide the ability to locate and highlight image anomalies that can indicate border security risks. Infrastructure condition assessment enables evaluation of the serviceability of border infrastructure with tools that are safer and more efficient that traditional manual methods. Environmental mapping with UAS-enabled multispectral cameras and hyperspectral radiometers enable the targeting of specific features of interest to border security.

The Michigan Tech team combines 3D photogrammetry, thermal imaging, and LiDAR from a variety of small UAS platforms to collect needed data that are processed & analyzed into decision support products. Platforms are focused on reusable, relatively low-cost, heavier-lift systems that can mount a wide variety of sensors to meet specialized project and sponsor needs. Development of algorithms for detection and classification of features of interest has been a recent focus and area of rapid development. Access to northern border areas and priorities is enhanced through collaboration with the team. The Michigan Tech team includes experts from a wide variety of areas, including software development, image analysis, signal processing, civil engineering, cost assessment, environmental analysis, decision support, and national security concerns.

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