RESONON

Map of estimated leafy spurge coverage

Case Study

Using Hyperspectral Imaging to Identify Invasive Weeds on Rangeland

In Montana alone, leafy spurge is estimated to impact the state's economy by $18 million per year. A group of student researchers at Montana State University were looking for an economical way to identify the location of leafy spurge to begin the process of eradication. This research involved determining the optimum time for detecting the plant (June) and how to determine the boundaries of the infested site in a pasture or rangeland. The team used Resonon's hyperspectral imager to capture information from 35 different test sites over a period of seven weeks to train their random forest model.

Challenge

Accurately identify and locate areas of leafy spurge, a noxious perennial weed, over large areas of rangeland in a timely and cost-effective manner.

Since appearing in the United States in the 1800s, leafy spurge has invaded large pastures, grasslands, prairies, and rangeland. It's particularly harmful for cattle ranchers because its presence can negatively impact livestock carrying capacity. Managing invasive weeds starts with locating them, which is difficult across acres of pasture.

Solution

Resonon's hyperspectral imagers provide the instrumentation and methodology for distinguishing between noxious weeds and the grass and shrubs surrounding them. They are portable enough to mount on drones and provide accurate image and location data over large swaths of land

Equipment Used

Because this research site was difficult to access using motor vehicles, the team chose Resonon's Field System with the Pika II hyperspectral imager for their research. This camera is ideal for fieldwork because it offers high resolution in a portable, cost effective, easy-to-use system. The research team noted that the data quality coming from the Pika II was comparable to more expensive systems.

Results

The students were able to identify leafy spurge with 95% accuracy, distinguishing it from other plants such as grasses and sagebrush. The initial study was performed at ground level, but it's now the foundation for an ariel methodology. A Pika camera mounted on a drone can cover a considerably large amount of terrain in a reasonable amount of time.

$18M
Annual impact of leafy spurge

35
Test sites used to train algorithm

95%
Accuracy in identification

Managing invasive weeds starts with locating them, which is difficult across acres of pasture. Hyperspectral imaging made this possible.

Customers look to Resonon for deeper insight when traditional vision tools don't work. Their hyperspectral imaging cameras provide intense clarity to the focused study of a single research subject or a scaled monitoring of thousands of products in a manufacturing line. By analyzing spectral data from these cameras, users overcome knowledge gaps, gain insights, or identify potential failure points to move forward successfully.

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