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Ravens Hunting Rabbits:

Unmanned Aircraft Help Protect Pygmy Rabbits

By Stephanie Levy



Mounds of sagebrush dot the Idaho desert landscape. Out of these hills hop tiny pygmy rabbits, the smallest rabbits in North America, weighing only 1 pound as adults. Environmental groups have petitioned the government to classify these critters as threatened or endangered, so the U.S. Geological Survey is taking to the skies to track, and hopefully protect, these animals with the help of unmanned air vehicles.

“What the scientists at Boise State [University] wanted us to do was not actually look for the rabbits, but to look at their habitats, the landscape that they’re eating off of and burrowing into,” says Jeff Sloan, a cartographer at the USGS. “Out there, there are these big mounds, and I believe the rabbits create those, and on top of those are the types of vegetation, the sagebrush that’s commonly out there. The little airplane eventually will map the habitat they’re living in.”

The USGS took on this project with Boise State University, the University of Idaho, Washington State University and the Bureau of Land Management. Together, the team received a fleet of 17 AeroVironment Raven unmanned aircraft as surplus from the U.S. Army. The vehicles weigh about 4.5 pounds and have a wingspan of about 3.5 feet; they have a battery life that lets them fly autonomously for 90 minutes. The Army originally used these UAS to track and spot enemy movements in theater in Iraq and Afghanistan.

“There is a natural color electro-optical camera, and then there’s an infrared that’s useful for reading temperatures,” Sloan adds.

The use of UAS for this project allows the team to track pygmy rabbit habitats that would otherwise be difficult for humans to get to. Dr. Jennifer Forbey, a biology professor at Boise State University who is working on the project, says the UAS can assess habitat cover and density with its camera and can evaluate thermal gradients with its infrared capabilities.

“... Researchers started flying over the habitat and then assessing those images after the fact, you can actually cover much more terrain, I would say 10 times the amount of coverage if not greater than that,” Forbey says.

The habitat of the pygmy rabbit has become fragmented by development, agriculture and other changes, so the data collected by the Ravens will help make land use decisions to conserve the land.

While researchers started flying the planes at the end of June, Sloan says it has been a long process of working with the Federal Aviation Administration to actually get the UAS in the air. The process of getting approval to fly the planes took six to eight months, and USGS and Boise State are subject to additional regulations.

“We have to have a class-two medical; we have to be trained to fly these planes specifically,” Sloan says. “So we’re getting trained by the way that the Army guys were trained. Then there’s a really lengthy process of paperwork. We have to get an OK from the range control that we’re flying. We also have to get approval to use the spectrum that’s being used, the radio frequencies to fly them and also to receive the video back from the UAV.”

Once a Raven is in the air, pilots can only fly it during daylight hours and must keep the vehicle at an altitude of less than 400 feet. However, Sloan says this height restriction doesn’t impact the team’s ability to survey the habitats of pygmy rabbits.

“We’re seeing the mounds from that altitude,” Sloan says.



The USGS team launches a Raven in search of pygmy rabbit habitats. All photos courtesy USGS.

The USGS has had some prior experience working with the FAA to use unmanned aircraft for environmental research. The agency was the first to use UAS to track wildlife when it used Ravens to monitor sandhill cranes at a national wildlife refuge in Colorado's San Luis Valley (see *Unmanned Systems*, June 2011). For that endeavor, scientists were able to conduct more accurate population counts of sandhill cranes than ever before. The pygmy rabbit project marks the second time the USGS has used its UAS.

"We're kind of the only show on the civilian side right now," Sloan says. "We certainly have a jump on it, and a lot of it is due to the military being able to surplus this [UAS]. They see a ton of potential."

The feeling is mutual. Sloan says the USGS is looking at new ways to use unmanned systems as part of tracking projects for other animals. Researchers are especially interested in observing the landscape habits of mammals like moose, walrus and manatees.

"It's a wide range, but biologists are going nuts over all of it," Sloan says. "One of the big ones is radio tracking. A lot of animals have radio powers or types of tags, and we're looking to develop something that would pick them up and triangulate where the animals are located. Currently they just go out with the radio antennae from the ground and try to figure out where they're at, if they're lucky. With this, we could just launch our little 4-pound plane, and it will cover a huge area."

Stephanie Levy is associate editor of Unmanned Systems.

For More Information:

<http://uas.usgs.gov>



A team member holds a pygmy rabbit, a threatened species in Idaho.

+1 781 541 7650 | intersense.com | sales@intersense.com



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