University of Wisconsin-Eau Claire

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Geography students use geospatial technology to get a bird's-eye view of campus, surrounding communities

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EAU CLAIRE — "Five, four, three, two, one — launch," announced the collective voices of Dr. Joe Hupy, associate professor of geography and anthropology at the University of Wisconsin-Eau Claire, and students in his geospatial field methods class as they released an eight-foot diameter balloon, weighing almost three pounds into the air from the campus mall on a sunny April morning.

The high-altitude balloon launch is a continuation of a mapping project started in early April, in which the class took aerial images of campus using balloons that were tethered to the ground. They collected more than 5,000 images using a Panasonic Lumix eight-megapixel camera on continuous-shot mode placed in a rig hooked up to the balloon, and used those images to create a mosaic of campus.

"For this project, the balloon is not tethered so students can see the difference between high-altitude and low-altitude information gathering," Hupy said. "The balloon will reach 100,000 feet and burst, allowing the video camera to parachute back down to the ground. This truly was a team project. Each student filled a unique role and Martin Goettl, our geospatial technology facilitator in the geography and anthropology department, was a massive help to all of us."

As Hupy began filling the giant balloon with helium, students in the class gathered to lend a hand with the process. Teamwork was a critical step in successfully getting the camera packed into the rig and getting the rig secured to the balloon. The contraption included a waterproof case for the camera with hand-warmers packed around it to prevent freezing at high altitudes and a GPS tracker to allow for recovery of the unit.

Drew Peterson, a senior geography major from Stevens Point who also is working toward a certificate in geospatial technology, said holding the balloon while it was being inflated was a somewhat surprising experience.

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"It was interesting to see how an object that didn't have much shape could expand greatly over the course of several minutes," Peterson said. "Seeing just how enormous the balloon was going to get definitely increased my anticipation over how the project would turn out. I was surprised to feel how much pull the balloon had once it was fully inflated. It was definitely going to reach higher altitudes than I had expected."

Peterson said the high-altitude balloon launch project gave the class the valuable opportunity to use their technical skills in the field.

"Balloon mapping hasn't become widely used in the mainstream geography community yet and we're already on the forefront of it at UW-Eau Claire," Peterson said. "It is very unique that as undergraduate students we can be a part of the small percentage of people who are using this technique. The opportunity to be hands on with our education gives us the chance to develop our technical skills and that's what employers look for when they hire employees."

Peterson will graduate in May and is applying for jobs at engineering firms in Wisconsin. He said so far potential employers have been impressed with the level of technical work being done in this class.

Senior biology major Stacy Camren, from Glen Flora, said the most significant part of this project and the class overall has been the opportunity to take the concepts learned in the classroom and put them into action in the field.

"We have had to learn how to be adaptable and make adjustments during challenges in the field," Camren said. "With our first rig during the tethered-balloon mapping project, our attempt yielded many photos that were not of the ground, which was our target matter. They were of the sky, the horizon and even a great shot of Davies Center. We needed to adjust the stability of the camera to compensate for the wind blowing the rig around."

Camren said he collaborated with Hupy to make adjustments to how the camera mounted to the rig and came up with a design that allowed the rig to rotate into the wind, reducing and nearly eliminating the spin.

Camren also will graduate in May and is looking for a job in the biology field that also incorporates geospatial technology.

The balloon mapping technique also made a big impact on Beatriz Viseu, a senior exchange student from Brazil who is majoring in geography. She said for her the most significant

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part of the project was the idea that balloon mapping provides a low-cost way to obtain aerial imagery.

"This class is incredible because it is all hands-on learning," Viseu said. "I want to work in city planning in a GIS area related to imagery. I would love to bring this technique back to lower income communities in Brazil to help with agricultural planning and development."

Viseu added that having the opportunity to use technical skills in the field ensures that students are really learning and helps them to develop important problem-solving skills.

"You can't really know how things are going to work unless you're out there in the field doing them," Viseu said.

Hupy said the whole point of the geospatial field methods class is to give students the chance to use and develop critical thinking and troubleshooting skills that are important for their future careers in the industry or in graduate school.

"It's not just about what they need to know for the test," Hupy said. "We're teaching life skills as well as technical skills here at UW-Eau Claire. Even if an attempt at a project fails, there is still a learning opportunity as you try to figure out why it failed and refine your work."

The learning opportunities during the high-altitude balloon launch project didn't stop after the balloon was released. The next step was the recovery mission, which included an almost two-hour drive to Spencer, negotiation with a landowner to access his property, a mile-long hike into the muddy woods and a 50-foot-high tree-climbing experience.

"The hike into the woods was muddy and wet and we were all soaked and covered in mud by the time we got to the balloon," Hupy said. "Then I saw it high up in a massive tree and realized I should have brought my climbing gear, which was in the truck. I walked back and got my gear and realized I didn't have webbing to use my ascenders, but I did have my rope and harness. I used the rope to get to the first limb and then free climbed the rest of the way up to the limb holding the balloon."

Hupy said he used a small saw to cut through the limb, which was about eight inches in diameter.

"It took me about an hour to saw through the limb," Hupy said. "In all, I was up in the tree for about an hour and 30 minutes. The whole recovery process took about seven hours. I was pretty exhausted by the time we returned."

For more information on the high-altitude balloon launch, contact Dr. Joe Hupy at hupyjp@uwec.edu or 715-836-2316, or visit http://people.uwec.edu/hupyjp/webdocs/geog336_Reports_spr13.htm to view the students' blogs.

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