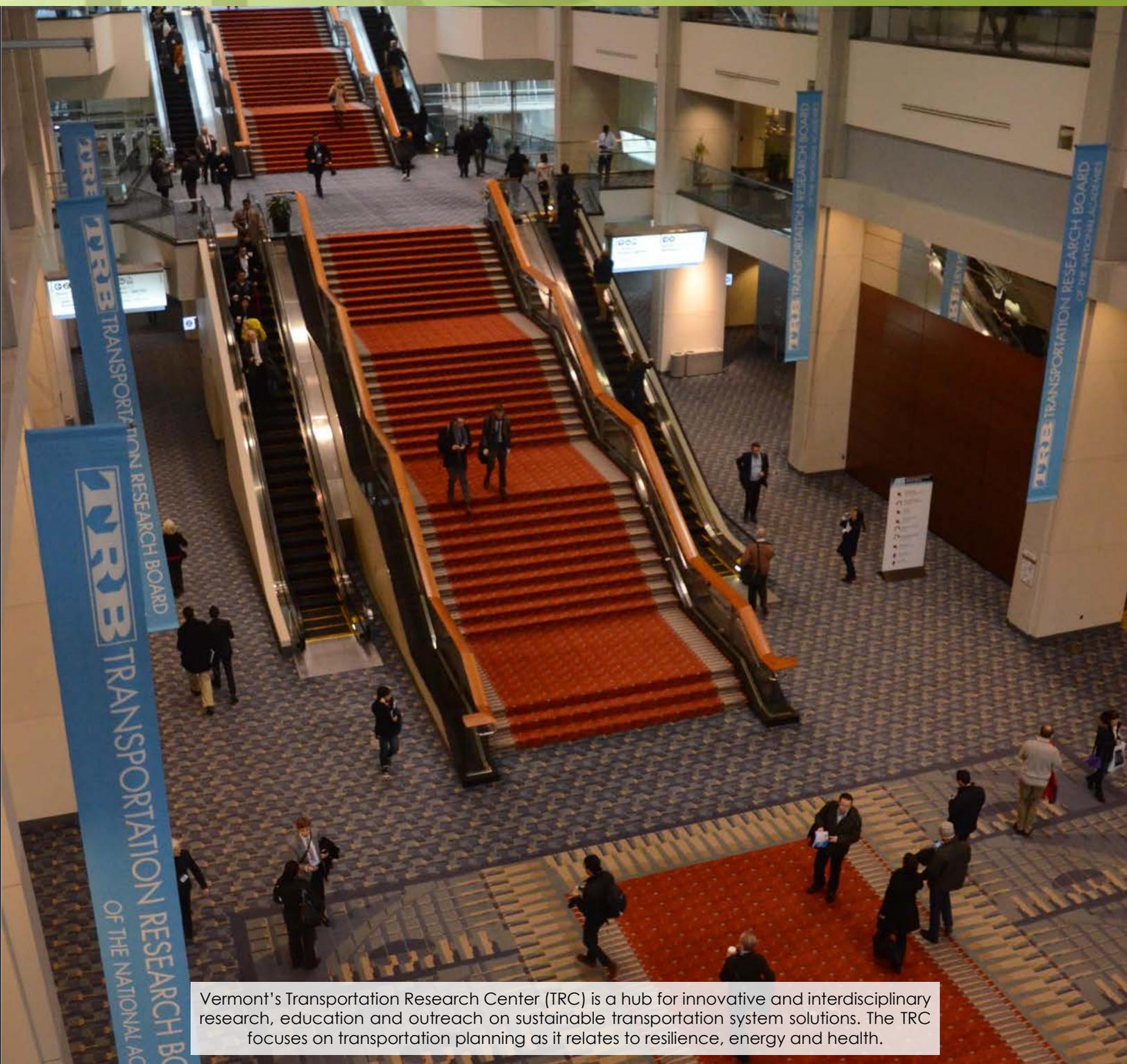


University of Vermont Transportation Research Center



Vermont's Transportation Research Center (TRC) is a hub for innovative and interdisciplinary research, education and outreach on sustainable transportation system solutions. The TRC focuses on transportation planning as it relates to resilience, energy and health.

Spring 2015 Newsletter



The TRC goes to TRB

Transportation Research Center staff and students make their annual pilgrimage to Washington DC

In January the Transportation Research Center (TRC) joined thousands of their colleagues at the 94th Annual Meeting of the Transportation Research Board. The conference is the largest gathering of transportation researchers in the country and offers a unique opportunity for researchers in the public and private sectors to interact and share what they have been working on. Twelve TRC faculty, staff members and graduate students attended the conference, and participated in side meetings with federal agencies and Congressional staffers.

“This was my first time at TRB and the first research conference I have ever attended” said Graduate Research Assistant Paola Aizpuru. “It provided an amazing opportunity to meet fellow transportation researchers and see where the transportation sector is heading”



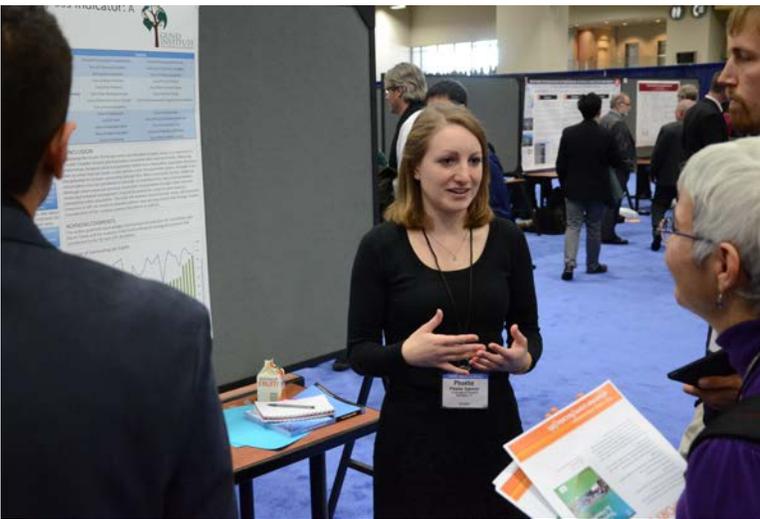
Each year TRC researchers submit papers to the Transportation Research Board for the opportunity to present new research ideas and results. You can see all of our presentations on our website by [clicking here](#). This is particularly exciting for our dedicated group for graduate scholars. Their presentation topics ranged from enhancing visitor experience at National Parks through transportation options, to crash-based safety analysis, to transportation and accessibility to health services in rural areas.

In addition to the standard TRB sessions

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and committees, many staff used this as an opportunity to meet with their counterparts in federal agencies. The annual trip to the conference often provides the only opportunity to get people from various research organizations into the same location. Beyond the professional meetings it also offers a chance to meet up with former researchers and staff members, and colleagues from across the country.

For the first time the annual conference was held in a single venue in the heart of Metro D.C. The Walter E. Washington Convention Center allowed attendees to avoid the hassle of catching shuttle busses and trying to navigate a conference across three separate convention centers. The central location made it much easier to attend a large number of sessions in a day as well as provide easier access to poster sessions. The single location for poster sessions was a huge improvement to previous years where you may be running to and from multiple rooms in multiple locations. The TRC's researchers agreed that this offered much more networking opportunities as well as better access to research which was from shared fields.



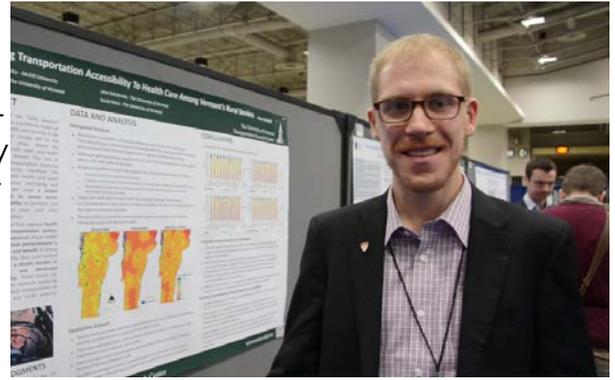
In addition to formal TRB sessions, Associate Director Glenn McRae attended a meeting at FHWA with his colleagues from the network of regional transportation workforce centers to meet with key leaders from professional associations (e.g., AASHTO, ARBTA, APTA, ITS America, ASCE, APWA, AGC, ITE). The purpose of the meetings were to advance a comprehensive approach to forging new partnerships to meet future workforce needs in the Industry. This was followed by a TRB session (840) with the Committee on Transportation Education and Training as an open forum for input and guidance to the work of the new Centers.

Faculty member Lisa Aultman-Hall participated in a Capitol Hill briefing on the future of sustainable transportation with colleagues for the National Center for Sustainable Transportation. They discussed key challenges and trends shaping transportation in the future and pathways forward to better align economic, environmental, and societal goals in the transportation sector.

All of the TRC's TRB presentations can be found at <http://www.uvm.edu/trc/trb2015/>

Catching Up: Geoff Battista

Last year Geoff Battista was a Graduate Research Assistant the TRC studying how transportation availability can impact healthcare in the state of Vermont. After graduating from UVM with his Masters Degree, Geoff has moved a couple hours north to McGill University in Montreal where he is pursuing his PhD. Geoff has pushed his research of health equity as it relates to transportation and expanded it to social equity in transportation planning.



Geoff Battista at the 94th Annual Meeting of the Transportation Research Board

What kind of research are you conducting now?

My research examines how stakeholders conceive and operationalize "social equity" in active transportation planning. North American transportation plans tend to bring up social equity as a vague aspiration without defined goals and performance measures. I will explore the words and deeds of major players - politicians, community groups, and planners - to uncover how social equity themes shape active transportation decisions outside their polished documents. My data will include a soon-to-be-released survey and walking interviews recorded using GoPro equipment, the latter of which will be analyzed in a qualitative geographic information system alongside socio-demographic and built environment data. & I also have a handful of side projects, such as a paper about the gendered implications of public transportation that I will be presenting at the Association of American Geographers Annual Meeting this April in Chicago.

What does a day look like as a PhD student at McGill?

I've finished my courses, so I've been spending the majority of my time working on my proposal: writing, meeting with stakeholders, exploring the neighbourhood, etc. I am also TA-ing a course on master planned cities. Procrastination-wise, I admire Mont Royal from my office window or hop across the street for Tim Horton's coffee.

How did the TRC help you in this next step in your academic career?

The Center was a nexus for all things academic: classes, institutional street smarts, and financial support. I appreciated the lectures and brown bag lunches, as well as the opportunity to attend conferences and meet the leaders in my discipline.

How did researching transportation help you?

It's a practical and employable topic. I'm also more conscious of transportation preferences and costs when I look for housing. I wish more people were - our built environment would be more efficient!

What do you want to do with your PhD?

I want a job where it's socially acceptable to wear a jacket with elbow patches.

What do you like about living in Montreal?

There's always something to do. Open-air markets, coffee shops, museums.

What do you miss about Vermont?

Burlington has more bars than coffee shops. I don't miss the hippie lifestyle.

Catching Up: Tim Pede

Tim Pede explored the relationship between building and transportation energy use in cities as a UVM graduate student and a Graduate Research Assistant at the Transportation Research Center. After graduating with his Master's Degree from the Rubenstein School of Environment and Natural Resources, Tim started a PhD program at the State University of New York College of Environment Science and Engineering. We caught up with Tim to see how his studies are going.

What kind of research are you conducting now?

Well you don't really specialize your research until your second year. Right now I am looking into changes in surface temperature using MODIS imagery. I am also looking into changes in surface data such as land use, land cover, and energy use using the National Land Cover Database data. My focus is really understanding the impact of development on energy use. I really want to try to explore as much as I can until I have to find a specialty.

What does a day look like as a PhD student at SUNY ESF?

I spend a lot of time working with students. For instance, last semester I was a Teaching Assistant for a surveying course and a spatial statistics class. It's challenging because the students are all in different degree programs and I am learning some of the material at the same time they are. My time at the TRC helped me to gain the skills to work with students from so many backgrounds. I had the chance to conduct multidisciplinary work with faculty, staff, and students on a regular basis.

How else did the TRC help you in this next step in your academic career?

Again, the multidisciplinary research was really beneficial. As a GRA I was focused on doing research and conducting literature reviews. I also learned a lot during the process of writing a journal article which is something I will be expected to do a lot more as I continue in my program.

How did researching transportation help you?

My transportation research really helped me build my skills in GIS and statistics. I use those skills a lot in my current work. Transportation has a big impact on energy use which is an area I want to continue to focus on.

What do you want to do with your PhD?

I really enjoy teaching and working with students and eventually would like to become a professor. I want to keep doing research.

What do you miss about Vermont?

Skiing and hiking. Syracuse is nice but it's flat. I miss the mountains. I also miss the bus system. I don't have access to the same level of transit that I did in Burlington and Syracuse is a lot bigger.



Tim Pede presenting at the 2014 GIS-T Conference in Burlington, VT

Long Distance and Intercity Travel – Who, what, where, and when?

Lisa Aultman-Hall, University of Vermont

For many decades, the majority of research on travel patterns has focused on daily activity patterns within people's home region. Long distance and intercity travel, including most tourism, leisure and much business travel, were rarely modeled by university researchers or public planning agencies. Airlines, hotel chains and other tourism operators conducted data collection and research within their business focus area.



Figure 1

The limited data we have indicates there were 1.3 billion long-distance trips in the United States in 2001, a 155% increase from 1977. In 1995, the date of the last dedicated national survey, long-distance trips were estimated to account for 25% of all person-miles of travel. Long distance travel is important for economic development, for funding ways to reduce carbon emissions in the transportation sector, and for infrastructure planning including intercity rail interstate.

Together with colleagues at Auburn University and the Resource Systems Group Inc. the UVM TRC conducted the Longitudinal Study of Overnight Travel (LSOT) between February 2013 and February 2014. A monthly year-long survey was burdensome for participants, but a total of 628 of the initial 1,220 participants completed the panel that collected data on overnight trip planning, trip tour attributes and geocoded overnight stops using an interactive map. A shorter survey could not have collected data on the full range of long distance travel patterns that repeat over years, not days.

229 Vermonters completed the LSOT. Their travel stops during the one-year period are shown in Figure 1. Participants spent on average approximately 40 days traveling to make on average 10 trips per year. The UVM TRC is focusing now on studying the spatial patterns in trips and the combination trips for both work and leisure. Auburn University is focused on factors that influence the choice between flying and driving. The LSOT team is very interested in questions related to travel and social equity, quality of life, and environmental impacts. Without data on long distance trips these topics could not previously be studied.

The TRC Welcomes New Outreach Professional

Abby Mattera has joined the TRC as our new Clean Cities Coordinator and Outreach Professional . Abby has worked in the transportation demand management field for 7 years, with an additional 2 years working on sustainable community development. She has experience building comprehensive state-wide programs, drafting bike and pedestrian improvement plans, and conducting training on best practices for creating livable communities. Prior to joining the Transportation Research Center, Abby designed and launched the Vermont Safe Routes to School Resource Center, successfully engaging 85 schools, or 33%, of the state's middle and elementary schools. Abby has extensive experience building coalitions, growing ini-



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tiatives, and creating long-term sustainable programs. Her work has also included writing community design guidelines, consulting on green building developments, and assisting with form-based code projects. She holds a Masters of Science in Urban Policy Studies, is a Certified Planner (AICP), a LEED Accredited Professional, and a Certified Instructor for the Safe Routes to School National Course.

In her role at the TRC, Abby will work to build capacity among stakeholders across the Northeast to address current and emerging needs of a 21st century transportation sector workforce, and manages a state coalition and portfolio of activities to decrease the use of fossil fuels in transportation as part of the national Clean Cities initiative.

Protecting Vermont's Roads from the Air

The impact of Tropical Storm Irene on Vermont was felt everywhere a road followed along a river or stream. Roads washed out, bridges failed and fell into turbulent waters, and state and town highway departments scrambled to restore roadways to permit responders to get in and help. The response by the highway departments was beyond impressive and in very short order, roads were again passable and the state began its recovery. It has now been nearly 4 years since the storm impacted the state, and Vermont appears to be fully recovered. However, the next Irene could be around the corner and the UVM Transportation Research Center (TRC) and Spatial Analysis Lab (SAL) are working together to see if we may be in for something worse the next time.



Team members monitor the progress of the aircraft as it flies over Arrowhead Lake.

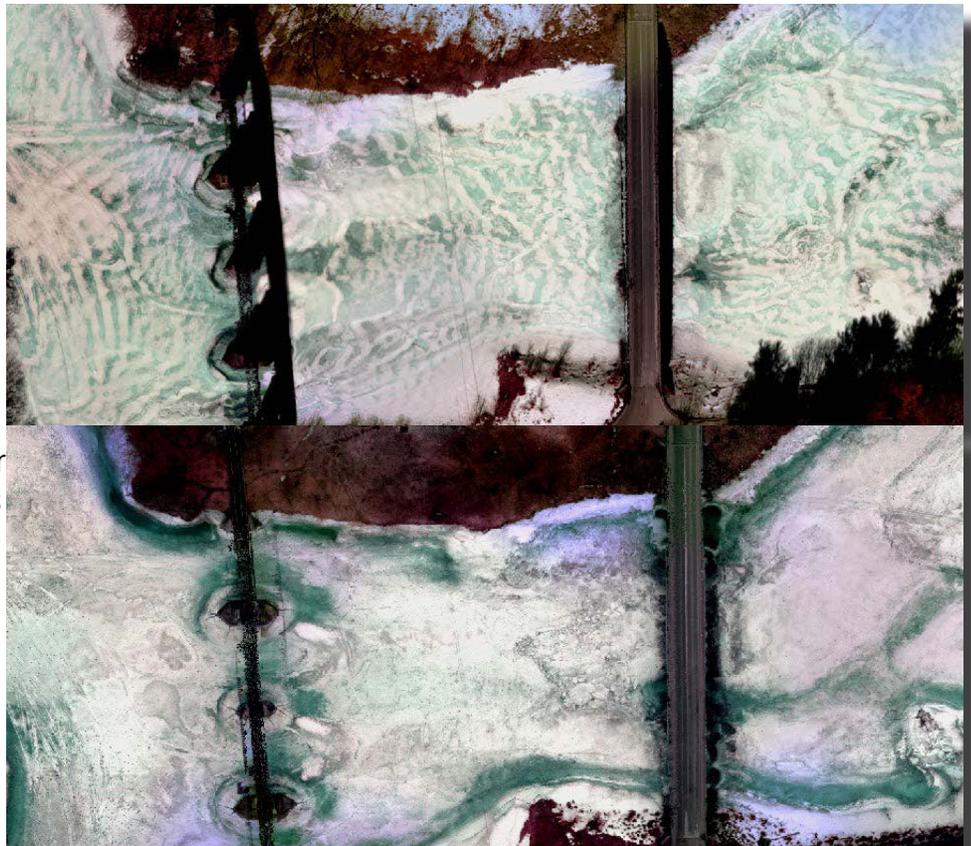
On a bitterly cold and breezy day in December, a team of researchers and staff from the TRC and SAL traveled to Plainfield, Vermont to meet with Steph Magnan from Vermont's Agency of Transportation and Staci Pomeroy from the Vermont Agency of Natural Resources. The group had met in Plainfield to fly Great Brook, a stream that can quickly turn into a raging river during intense rainstorms. They are revisiting the area because the two agencies and the two research teams think that we may be in big trouble should an Irene-like event hit the Plainfield area. "Just driving along the road we could see what we were looking for" said Sean MacFaden, a member of the research team. "There is a lot of large debris in the water. Trees and material that will get swept downstream at the next big event". The debris is cause for alarm because it could clog culverts or build up around bridges during flooding.

At various locations across the state, a large amount of the debris from Irene and other storms has remained in the state's waterways. Crews did their best to restore waterways and roads with future disasters in mind but the debris was pulled downstream and distributed throughout the length of entire rivers. It would be a very long and arduous process to send people out to survey large tracts of rivers and streams, particularly those that remain unstable and dangerous following recent storms. This is where the researchers come in. The SAL and TRC joined forces to create an Unmanned Aerial Systems (UAS) team that uses a small aircraft designed to capture remotely-sensed imagery. The foam aircraft weighs only about

2 pounds but can cover a large area very quickly and produce highly accurate maps and three dimensional images to help assess the conditions of the water ways. This method is far less time consuming and significantly safer than the alternative of sending people out along river banks and to identify problem areas. The aircraft can quickly and repeatedly check streams and identify issues with extreme accuracy. After storms, the aircraft can again fly and see if debris has moved or if there are other issues that may need to be dealt with.

The aircraft at the center of this operation is an UAS called the eBee and is made by Sensefly. "Once people see the aircraft they realize that it's actually kind of disappointing. It's really just an advanced flying piece of foam and not the rugged military type of hardware most people have in their minds" says Jarlath O'neil-Dunne, director of the Spatial Analysis Lab and leader of the UAS team. This flying piece of foam is one of the safest UAS available and is designed to survive the occasional rough landing or botched take off. The safety features built into this platform are one of the main reasons it was selected. "The eBee is designed to be as safe as possible. Our mission is to capture damage from disasters and we want to do that as safely as possible." said O'Neil-Dunne. Safety is always the priority on a mission. The team practices constantly in various environments to be proficient in flight operations and be prepared for any contingencies that may arise. The goal of this program is to have a team that can deploy to disasters and assist federal, state, and local authorities in assessing damage to transportation infrastructure.

The Bridges and Culverts project is a program funded by Vermont Agency of Natural Resources and the Agency of Transportation. The team is also funded by a US DOT research grant that is focused on assisting agencies in decision-making during and after disaster events using remotely-sensed data. The UAS team hopes to grow the program and offer its services to a wider audience and is in the process of getting additional aircraft and sensors. You can find out more about the team and the research projects by visiting their [website](#).



The top image shows ice conditions on March 19, 2015 and the lower image shows the differences in ice conditions when the lake was flown on April 2, 2015. The lower image shows how water was beginning to form on the ice. The darker water captures more heat and further degrades the ice it is on making it weaker and assisting with the annual breakup of the ice pack.



UVM Bus Fleet Shines Bright as a Northern Star

The Vermont Clean Cities Coalition was very pleased to present University of Vermont Transportation Services the Northern Stars of New England award. UVM Transportation Services manages the campus's bus fleet and was selected for their efforts in cutting carbon emissions, reducing the use of petroleum, and promoting and utilizing alternative fuels to power their vehicles. Jim Barr, Director of UVM Transportation and Parking Services accepted the award and was recognized for his unrelenting drive to reduce UVM's carbon footprint. The ceremony took place on Church Street in Burlington in front of City Hall with representatives from the Burlington Sustainability Partnership which includes the City of Burlington, UVM, UVM Medical Center, Lake Champlain Regional Chamber of Commerce, Champlain College, Burlington Business Association and Chittenden County Regional Planning Commission. Chris Saunders, a staff member in Senator Leahy's office, also spoke on behalf of the Senator highlighting the Senator's efforts to curb climate change and help build a sustainable transportation system.

The Northern Stars of New England program was funded through a U.S. Department of Energy grant that identified barriers to the proliferation of alternative fuels and how to remove them. There are nearly one hundred Clean Cities Coalitions around the country whose purpose is to help reduce the use of petroleum, cut emissions, and promote alternative fuel options. The Northern Stars program was developed by the five Northern New England Clean Cities Coalitions and is just one of the ways that these coalitions promote the use of alternative fuels in fleets.

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