

Eurotech Helps Stony Brook University Track Student Transport

Eurotech has provided an automatic passenger counter and edge controller to Stony Brook University for their Smart Transit system. Powered by Eurotech technology, SBU Smart Transit is a Global Positioning system that tracks real-time bus and shuttle location and passenger occupancy campus-wide. Students can access the information via the Web or phone to quickly make travel plans based on current data.



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CHALLENGE

Last year the Stony Brook University Transportation & Parking Student Advisory Committee made the suggestion that students would benefit from a real-time tracking system for transit buses and shuttles. They investigated commercial GPS tracking solutions, but they do not integrate student participation and were prohibitively expensive.

As a result, University administrators reached out to the research scientists at the University's Center of Excellence in Wireless and Information Technology (CEWIT) and issued the challenge to develop an in-house solution with the same benefits commercial solutions could offer, for less cost. CEWIT was ready for the challenge, created in 2003 as a next-generation research and education facility aimed at becoming an expert in critical technologies of the information age.

Assistant Computer Science Professor and affiliated CEWIT faculty member, Jennifer Wong, is a specialist in architecture and embedded systems. Wong became the project manager and worked with a group of Stony Brook technology students to develop the new bus tracking system in 2012.

"The most important of the project was to give the students a hands-on learning experience," said Wong. "Our goal was to be innovative but also create a system that could be commercialized in the future."

Wong and her students set out to build a bus tracking system based on the Stony Brook University Transportation & Parking Student Advisory Committee's specifications.

SOLUTION

Before Jennifer Wong got involved with the project, Stony Brook had run a pilot program with a mini PC solution on the vehicles. Within a month, many issues developed with the installed equipment. "Ruggedness became a very important factor in the solution," said Wong.

Stony Brook University's transit tracking and information solution needed to easily grow with the campus, since the University will inevitably add students and buses/vehicles in the future. The platform had to be flexible and not locked down to one particular integrated wireless card since the University may change providers at any given point and different departments on campus use different technologies. Wong also wanted the project to be based on an open platform that would allow students to develop their own projects on the hardware.



Figure 1: Optical passenger counters count passengers entering or leaving buses with high accuracy.

In addition, Stony Brook wanted to count ridership on each vehicle as part of the project. The transit service, including the procurement of vehicles, is funded by students and services are available to the community; however, the University wanted better counts of how many individuals were using the service and how full buses were getting.

In researching passenger counters, Wong found the Eurotech solution. It was camera driven rather than single sensor driver, which offered more accuracy.

The passenger counter also introduced Wong to the Eurotech Helios, a programmable edge controller that would provide a foundation for the project that met all of the requirements. "The Helios allows for GPS, flexibility for changing providers by changing out a USB card, and it is an open platform so we can write our own software to work on top of it," said Wong.

Wong and her team of students set out to implement the Eurotech passenger counter and Helios system at Stony Brook.

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Students got a lot of hands-on interaction with the hardware during set up and installation.

RESULTS

The final project, called [SBU Smart Transit](#), was launched as a Global Positioning System (GPS) that tracks real-time SBU Transit bus and shuttle locations and passenger occupancy campus wide.

Stony Brook has 5 shuttles with a Helios and passenger counter at the front door, and 25 standard buses with front and back door passenger counters and a single Helios. During the implementation Wong worked closely with Eurotech to fix any small issues that came up. She chose a customized Helios build and she and the student were able to set up GPS to send coordinates easily and plug in USB cards.

The system is up and running and Wong says it is providing a lot of valuable data to the University. "Students can login to our system via their phone or computer, and they can see how many people are on the vehicle they are planning to take," said Wong. "Sometimes our buses get full during busy times, so the project allows students to make educated decisions about how to get from point A to point B."

The system also allows students to select their route, see stops and vehicles, find estimated arrival times, and determine what kind of vehicle is coming (gas, biodiesel or vegetable oil-based buses are in use). Vehicles transmit every 2 seconds, and the project website updates every 5 seconds. Students can access the information through the main website, a mobile website and an Android and iPhone application; all of which were designed by Wong's students. The project also has a back-end management system that allows transportation management to monitor the transit system.

"The system is working beautifully, and the GPS and passenger counting reports well," said Wong. "With the help of my students on this project, we are up and running and ready to tell the school about this new service that is available."



Figure 2: The SBU Smart Transit Information System allows students to see which buses are running along with arrival times and passenger counts.

the system interacts with drivers and integrate Audio announcements into the Helios architecture. "We designed it to be interactive with drivers but they don't have the time or means to interact with the system. Our next goal is to have the Android tablet be an information platform for the driver to detect bus bunching and alert the drivers of any campus emergency."

The entire Stony Brook University Transit fleet is now equipped and the Android and iPhone applications are growing in popularity. Wong and her team plan to continue to spread the word so more students and community can benefit from this useful tool as they travel through the campus.

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