

## Exemplary Projects from UMass Lowell's Assistive Technology Design Fair 2005

Last year, 130 students from 8 schools participated in ATDF and 27% of the participants were girls! Here are a few of the many outstanding projects presented:

### DRACUT HIGH SCHOOL: Modified Keyboard for Boy with Cerebral Palsy

2 design teams/ 14 students



This team from Dracut designed a modified keyboard for a 5-year old Dracut boy who has cerebral palsy. Their client, Jared, has difficulty with fine motor skills; he struggles to use a computer because he hits more than one key at a time, and he strikes the key too slowly which results in multiple characters. These students were able to find a colorful adaptive keyboard for Jared with built-in software to solve the problem of typing multiple characters. They fitted this keyboard with a plastic cover with holes over each letter, so Jared could use a stylus to type one letter at a time successfully. The young engineers who designed this project were Cassandra Paolillo, Erich Benedix, Ashley Conway, Nichole Rondeau, Kelly Tousignant, Wenisa Tran, under the guidance of Physics Teacher Alan Chuckran and Technology Teacher Mike McElhinney. This was the first year Dracut has participated in ATDF.

## GREATER LAWRENCE TECHNICAL HIGH SCHOOL: Modified Walker with Headlights for a Blind Elderly Woman

1 design teams/ 6 students



This team worked with a blind elderly woman to develop a way for her to use her walker to get around at night or in low light. Their client, Eileen, can see shadows of objects, and the contrast between light and dark areas, which is enough to allow her to get around, as long as there is enough light. These students were able to solve her problem by mounting a pair of small headlights onto her walker. These lights, and the battery to power them, needed to be small, lightweight, and very easy to use. They also could not prevent the walker from being folded for transport. The headlights also had to be very bright and adjustable, and positioned at the optimum angle. Being students at a technical high school, they were able to use CAD to draw out the parts needed to mount the lights, and they machined their own parts. The students who designed and built this project were: James LaPlante, Will Cordero, Elias Rodriguez, Samantha Gutierrez, Robert Bruner and Joseph Zahareais, and they worked under the guidance of Physics Teacher Matt Flood. This was their first year entering ATDF.

## TYNGSBOROUGH HIGH SCHOOL: Easy-to-Use VCR for Special Needs Students

4 design teams/ 16 students



These students worked with children in a special education class at their local elementary school. Many of these students have trouble operating the VCR in their classroom. The buttons are too small, and the children are often confused about their operation, and also the correct way to insert tapes. This design team, consisting of Andrew Clark, Mitchell Kendall, Timothy Langlois and Joe Polin, working with their Engineering Teacher Don Rhine, was able to design a VCR that the children would be able to operate more independently. They modified a VCR by wiring 4 large, colorful pushbuttons to replace existing buttons, and they added simple picture symbols to represent the function of each switch. In addition, they designed stickers for VCR tapes that have a picture of a hand on them, and show the kids how to hold the tape when inserting it. Tyngsborough has been involved with ATDF for 3 years.



## FITCHBURG HIGH SCHOOL: Cane Locator for a Blind Student

2 design teams/ 8 students



This team worked with Bee, a blind middle school student from Fitchburg. Throughout the day, Bee has a tendency to place his walking cane down in a particular area and then forget where it is. Their challenge was to create a remote locator device that will allow the cane to be easily found when it gets misplaced. Their design needed to be small and lightweight in order to attach it to the cane, and it also had to be attractive. In addition the remote signal needed to extend a reasonable distance, and even locate the cane in another nearby room. Designers Nichole Carriere, Stefan Sicard, Meghan Dinneen, and Sheng Yang, working with Physics Teacher Kevin Whittemore, built an ultrasonic remote control transmitter and receiver (from a catalog kit) that would activate a buzzer located on the cane. These students chose to use an ultrasonic transmitter because the waves are able to travel through walls and reach the transmitter from any angle, as opposed to infrared signals, which need to be directly aligned with the receiver. This was the first year Fitchburg participated in ATDF.

## HANOVER HIGH SCHOOL: Communication Box

4 design teams/ 15 students



One of the Hanover Teams worked with a special needs boy to improve his ability to communicate his needs to other. Their client, Jimmy, is confined to a wheelchair, cannot talk, and can only move his fingers on one hand. Jimmy had been using a simple communication board with the alphabet on it. When he needs to talk, he points to the letters to spell out what he needs, but the letters are too small and he lacks fine motor skills, so there is often confusion in what he spells. To improve Jimmy's situation, Joe DeRenne, Ryan Crowley, Steven Nee working with Engineering Teacher Ralph Arabian, built a custom communication box using simple, inexpensive voice recorders. Many talking boxes and communication boards are commercially available, however, they are quite expensive. Their design featured 5 voice recorders that were easily activated by oversized push buttons. Their communication box could store 5 messages so that Jimmy was able to communicate his most common needs to his nurses. The recorders were housed in a nice case that was mounted on Jimmy's wheelchair, and they could be easily accessed in order to change the batteries or record new messages. This too was Hanover's first year participating in ATDF.

## WESTFORD ACADEMY: All-Season Wheelchair

7 design teams/ 33 students



This Westford team worked with Carl, a 21-year old special needs student attending their high school. He has cerebral palsy and he is wheelchair-bound, and not capable of propelling himself. In the winter, the people who push Carl's wheelchair have a hard time pushing him through snow, so these students wanted to design and build some kind of wheelchair attachment that would make it easier for people to push Carl's wheelchair through snow. Tim Campbell, Chris Kelly, Paul Berard and John Randal, working under the direction of Technology & Engineering Teacher Dave Amos, devised a pair of lightweight ski attachments that could be stored in a pocket on the wheelchair, and could be quickly and easily mounted on the front wheels. This is the second year that Westford Academy has entered teams in ATDF.