

# gizmo

THE TETRA SOCIETY OF NORTH AMERICA: CUSTOM ASSISTIVE DEVICES

## iPods to Androids Stay Connected with Tetra

**TORONTO:** Thanks to Tetra, a student can operate his Android cell phone via his powerchair sip 'n' puff controls.

As a result, 32-year-old quadriplegic Eric Wan can make and take calls, handle text messages, listen to music and even surf the web – all using his wheelchair-mounted mouth-operated sip 'n' puff interface.

Wan originally approached the University of Toronto Tetra Club with a request to operate an iPod on the go. Volunteer Zongyi Yang, a 20-year-old, third-year engineering science student, tapped into the powerchair control box, connecting four unused wires in the system to a microchip. A custom communication protocol allowed it to drive the iPod.

Initially, the iPod was mounted on the arm-rest, but an update had it stashed out of view – a series of bleeps helping Wan navigate the system. But the project entered a whole new phase when he asked to switch the iPod for his new Android phone.

Volunteer Jorge Silva completed the ambitious project through his “day job” – research student coordinator for the Inclusive Design Research Centre, based at the Ontario College of Art and Design. Zongyi worked with Silva, while Wan, a 32-year-old University of Toronto masters student, worked on the programming.

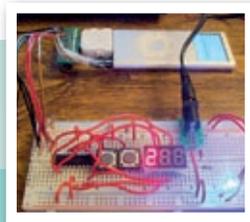
Silva said that people with high-level disabilities are given the most suitable wheelchair controls – joystick, head switches or sip 'n' puff inputs – but these can be used to operate other things. “The interface is already solved,” he said. “We were trying to fit a new function to the interface.”

Every powerchair has a control box, which interprets signals from the operator. Both the iPod and Android phone projects tapped

into this – the former plugged into a cable, the latter by Bluetooth signal. The Android phone is more complex and offers even more input options than an iPod, but Wan scrolls through his options in the same way.

Silva said the iPod and phone projects have a wider significance as they demonstrate how a power wheelchair control system can be used to drive a variety of portable devices.

This project, slated to be featured on Google’s own blog, is something of a swansong for Silva, who is stepping down from Tetra after two very productive years. A full-time job and a three-month-old baby at home don’t leave him any free time.



**SILVA SURFER:** TETRA’S JORGE SILVA, WITH (ABOVE LEFT) THE PROTOTYPE OF THE IPOD DRIVER INTERFACE (AND RIGHT) THE ANDROID PHONE.

## GROUNDBREAKING IDEAS MAKE GARDENING ACCESSIBLE

**NANAIMO:** It’s time to dish the dirt – Tetra volunteers are looking at a range of backyard tools in a whole new light.

Master composter Elaine Jansen of the City of Campbell River asked the Nanaimo Tetra chapter to redesign everyday tools to ensure there really are no boundaries at an “accessible to all” community garden. These must be usable by people with limited grip strength, and not cause wheelchair users fear of tipping or arm or back strain.

Coordinator Martyn Kinsella-Jones explained that the chapter is producing some groundbreaking ideas, looking at grip, balance and leverage issues, as a person in a wheelchair cannot easily push downwards, lift or pull.

“We were looking for ways people can hold garden tools, and saw how fancy crutches have a bracket on them. We came up with a circular plastic handle that fits over your arm – you put your hand through a clip, and at the end there’s a handle you put your fingers around. It holds onto your arm very steady.”

“We are also looking at a push pruner, which translates the forward momentum through 90 degrees into a sliding motion. When you push, a slider moves forwards, which is translated into a sideways cutting action.”

“We had rethought the way a trowel might be designed. Rather than a forward digging motion, there can be a down-and-pull motion to create a small hole. It’s just a question of the shape of the blade.”





PALATE HOLDER: TETRA CLIENT KATIE GERKE AT WORK IN HER STUDIO WITH BILL CASWELL'S PALATE HOLDER.

## EMPLOYMENT & LEISURE

# Tetra Today Helps You at Work, Rest and Play

## Mouth painter can now reach a rainbow of colours

**CALGARY:** Volunteer Bill Caswell transformed trash into treasure when he made a tray that enables a mouth painter to reach a complete palette of colours.

The professional looking finished product was “made entirely from junk” he found in his workshop – welded and spray painted over a twelve-hour process.

Client Katie Gerke, an artist who has multiple sclerosis, had previously been using a wooden drink holder to support her paint palate. This was “positioned with much improvisation,” says Caswell, being “laborious to set up, and wobbly in use.”

He manufactured a metal palette holder – quite a simple project, as he sees it – but one which makes a world of difference.

“It’s basically a big circular dish she can put different paints in,” he said. “She needs these in proximity to her mouth.

“I made a stand out of 5/8 inch steel plate so it would have a heavy base and be very stable. All other components were fabricated from medium-gauge sheet steel.

“A small turnbuckle can be used for fine tray-level adjustment. I painted this red so she can easily direct her caregivers. I also made a paintbrush holder, but there wasn’t space and it was interfering with her painting. However, she discovered that she can balance her brushes on the edge of the tray.”

Caswell said there were a number of ways he could have made the project; it could have been constructed from wood, but he finds metalwork easier. He also wanted to make it durable so it wouldn’t get broken.

Another recent project of Caswell’s involved motorizing a 13-year-old girl’s bed so the level could be conveniently raised by caregivers. “She will only really sleep on a mattress on the floor. The project lifts the bed around 30 inches,” he said.”

**HALIFAX:** A dedicated Tetra volunteer is steadily working on a stream of projects that boost people’s sense of identity and wellbeing by enabling leisure and employment opportunities for people with disabilities.

Long-term volunteer Bob Hirtle is an affable and modest individual, but he takes quiet pride in seeing the difference Tetra projects make in a person’s life. His only concern is that more people haven’t heard of the Tetra Society.

A recent project of Hirtle’s is a gardening cart for a man who steadfastly refuses to give in to his disability.

“He’s an avid gardener and he’s not the type to give in to the fact he has a disability.”

The client is an 82-year-old former lawyer with limited use of his legs and one arm due to multiple sclerosis. He grows a variety of vegetables on his extensive backyard, keeping his table stocked with fresh, healthy produce.

Until recently he had been able to inch around his land on a three-wheeled scooter, from which he could work his backyard while seated. As he could no longer get around this way he came to Tetra with a question: Could the non-profit attach runners to his cart so it would not be so prone to tip in soft earth, while he hauled himself forward on a rope attached to the far end of his garden?

While this may sound awkward, to Hirtle it speaks volumes about the client’s strength of character. “He’s an avid gardener and he’s not the type to give in to the fact that he has a disability. He said that hauling himself across his garden is how he keeps in shape. I admire him for that.”

The client has a wire running at the furthest point of his backyard; a rope attached to this trails across the garden, which Hirtle estimates is 40 ft. by 50 ft. and planted in rows two-and-a-half feet apart to allow easy access. The client can work on a 5 ft. area at a time, so he only needs to haul himself forward in 5 ft. stages.

When he has completed one row, his wife helps him return to the start of the next. However, he is able to work for hours with complete independence.

“It’s working out quite well,” said Hirtle. “I had to create two or three versions until I got one that would do the job without him falling off. Of course, he said ‘I fall off the damn thing four or five times a day, anyway.’ His main concern was that his feet would not get tangled in the runner. He has to be able to put his foot on the ground to keep balanced.”

It follows on from previous projects that enable people with disabilities to get work in separate retail positions.

The first was for a 25-year-old woman working at Dollar Store who, because she uses a wheelchair, struggled to reach the cash register. Hirtle raised the floor behind the counter by 10 inches and built a ramp.

“Her father and mother came over to see the project, shaking my hand and thanking me,” he said.

The other was for a 45-year-old man who was employed at a Winners store, who likewise needed to reach the cash register. The challenge was the lack of space for a ramp, which management worried may cause a tripping hazard for the visually impaired.

“Once he’s in place, the ramp slides under the elevated portion,” said Hirtle. “The client is on an area 10 inches higher than floor level.”

Again, he’s aware of how much difference this project has made.

“Being able to work brings these two individuals a great deal of personal satisfaction. Given the choice, I think everyone would like to work and contribute to their own support. It maintains their dignity and sense of self.”

Hirtle is currently working on two projects that enable wheelchair users to access tables. The first is for a man whose new powerchair is taller than the previous model and doesn’t fit under his desk. Hirtle is making blocks to go under the table legs.

The second project is for a client who uses a drafting table, to which Tetra has previously fitted a motor that allows him to easily adjust the table height. He needs to raise it further.

**BABY STORY:** PROUD MOM ANITA KAISER CARING FOR BABY OLIVIA IN HER ROLL-UNDER CRIB.



## Demand for accessible crib is growing all the time

**PEEL:** Tetra volunteers are finding a growing demand for wheelchair accessible cribs.

Ontario development coordinator Glenn Barnes said the Peel chapter receives a new request for a roll-under crib every couple months, having supplied “eight or 10 over the last two to three years.”

Traditional crib designs are inaccessible for parents with a disability. They have a high side which can only be raised and lowered by lifting from above – and even then, at their lowest, are too high a barrier for anyone attempting to reach a crying baby from a wheelchair.

What a wheelchair-using parent needs is a crib with doors that slide open, and leg room that enables them to roll under. It’s impossible to go out and buy one, which is where Tetra comes in.

Anita Kaiser, a C6-C7 quadriplegic following a 1996 spinal cord injury, said the crib provided by Tetra’s Peel chapter was probably the most useful item of adaptive equipment following the birth of her daughter Olivia.

The chapter also provided an adaptive change table to allow Anita to better care for baby.

“My big goal when I was pregnant was to be as independent as possible when caring for her,” said Anita, who lives in Richmond Hill. “I knew it would not be possible to do the latches of a standard crib, or raise the door up and down. It’s difficult to roll my chair up to a crib – I needed something different.

“I’d heard about Tetra so asked for an adaptive crib. It worked out great! Especially when I was home alone, I could let it function as a playpen.

“It was also a place where I could interact and play with Olivia. When she was at

the next stage, getting mobile, she could sit and practice rolling and moving, and I could interact with her. She couldn’t do that on the floor when I was by myself.”

She said an adaptive crib was an essential item for any parent with a spinal cord injury or related functional impairment.

Olivia is now two-and-a-half years old and has outgrown the crib, which mom returned to Glenn. And which Glenn recently sent out to another mom, living in Etobicoke.

“It was a bit of a rush,” said Barnes. “A real last minute request. The client, who is paraplegic, was being discharged from rehab the same time the baby was coming home from hospital.

“It’s the same crib Anita used, but we’d refurbished it. We checked it over and changed a few parts, and we always insist that the client gets a new mattress.”

It was lent in early October, with the request that it be returned when no longer needed.

Glenn actually has two cribs available for use at any time, both with sliding doors that, when closed, are as secure as a standard crib. Over the previous eight years these have seen use throughout the Greater Toronto area from Kingston to Mississauga and all points north.



BABY OLIVIA ON HER ADAPTIVE CHANGE TABLE, CREATED BY TETRA PEEL VOLUNTEERS.



## Access for all ages thanks to another Tetra triumph

**ST JOHN’S:** A deceptively simple solution enabled a lady who had been paralysed on one side by a stroke to use a walker one-handed.

The client, Patricia Power, who is in her late 50s, approached the St John’s, NL, Tetra chapter for help. Although she could get about using a cane, she was only able to travel short distances. Her daughter obtained the walker so that her mother could maintain her independence.

The problem was keeping in a straight line when pushing using only her right arm and operating the brakes, which had two handles, said chapter coordinator Leonard Lye.

A professor at Memorial University, Lye put the challenge to his first-year engineering students.

“They talked to her and found out what her needs were,” he said. “It was a really good learning experience. They learned about disability and got first-hand knowledge of someone who needs an engineering solution – a lot of these assignments are made up. This one was not.

“It took a while to come up with a solution – but when we did, it was very simple. It’s so simple it was unbelievable.”

Lye attached two bars across the top of the walker. The top bar is for pushing the unit, which enables the client to push the centre of the walker so it keeps in a straight line. The second bar is attached to the brakes, and allows her to control these.

These strollers also feature a seat, allowing the user to take rests as required. However the bars put in place to control the stroller blocked access to the seat.

Lye’s solution to this problem was more elegant simplicity: he had the seat back removed and turned around. The seat now faces in a different direction, to all intents being on the front of the unit now, but is perfectly accessible by the client.

“It gives her independence,” said Lye. “She lives in her own home and can use it in the home or garden, or when taking walks with her daughter and her dog.”

## PAYING TRIBUTE TO COORDINATOR BY MAINTAINING HIS VISION

**CINCINNATI:** Dedicated volunteers will continue offering assistive devices to people with disabilities following the death of their popular coordinator.

Bill Wood, who formed the Cincinnati, OH, chapter died of cancer in early September. He is remembered as a true gentleman – always courteous, calm and considerate.

He formed a 501-c3 nonprofit, May We Help, in 2006 because he saw the need to offer custom assistive devices for people with disabilities. The group has since operated as Tetra's chapter in Cincinnati.

In four years he built it up to a thriving organization with its own dedicated workshop, and – in tribute to Bill – the volunteers he recruited are continuing to develop the project, appointing new coordinator Christopher Kubik.

“Bill brought me in around one month before he passed,” said Kubik. “I’m inheriting all this from him. Bill and I spoke about the template – we took all that from the Tetra handbook.

“My role is networking. Finding people that can support us, people that need things and people that can build them. I’m not supposed to build things but I cannot help it sometimes.”

He said the group was formed by three Bills – Bill Wood along with mechanical volunteer Bill Sand and general fabrication volunteer Bill Deimling. Bill Wood had asked Demling to print some 3-D plastic parts for an adaptive device he was making, and Sand happened to visit. Over pizza, Bill Wood inspired the creation of May We Help.

The group also involves longterm volunteers Dave Barr, whose specialty is electronic design and anything computer-related, and metal mill volunteer Randy Whedon.

Together they have produced a slew of projects over the years, including an innovative page turner for a young girl with cerebral palsy, a paintbrush holder for a mouth painter, a wheel-in shower chair to give a seven-year-old boy independence washing, a racing game modification, an artist's arm support and a harmonica holder for a blues musician.

“I only knew Bill one month but he was like a father to me,” said Kubik. “He just loved people. There were no conditions – he had full trust and faith in people. He was a very giving person.”

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