WHIRLWIND Wheelchair

WHAT'S INSIDE

Rati Ionatamishvili, Executive Secretary of the Tbilisi, Georgia Disability Council and a disability rights adviser to the Mayor of Tbilisi, on a visit to the Kazbegi Monastery in the Caucasus Mountains

WHIRLWIND Wheelchair

www.whirlwindwheelchair.org

Dear Friends and Supporters,

As 2015 draws to a close and we anticipate the start of a new year, Whirlwind continues to develop innovative wheelchair designs, support current programs, and explore new places on the planet to provide the best of wheelchairs to people who live in the worst of conditions.

Some of the topics covered in this year's newsletter include our efforts to revisit and improve a 40-year-old wheelchair design that uses standard bicycle hubs and wheels, which are both cheap and widely available throughout the developing world. We are also designing a durable, low-cost motor-in-hub power add-on for the RoughRider© (and other wheelchairs) with our partners in the Republic of Georgia. 2015 marks the introduction of our first mass-producible children's wheelchair, the WhizKid™. It combines a fully-adjustable wheelchair seating insert, designed by Canadian nonprofit Diversability Development Organization (DDO), with the RoughRider to create the perfect mobility solution for disabled kids (and adults) with postural support needs. We're also developing the OmniRider™—a chair that will combine the RoughRider's features with the improved indoor ease-of-movement and lighter frame that wheelchair riders have asked for.

Our partnerships are also evolving. We have expanded our large-volume manufacturing base to include a factory near Shanghai, China. 100 wheelchairs from this factory are now being tested in Kampur, India. Following these tests, we plan to partner with the Artificial Limbs Manufacturing Corporation (ALIMCO) to manufacture wheelchairs for use in India. RoughRiders continue to be manufactured by our longtime partners and friends at Kien Tuong in Ho Chi Minh City (Saigon). Kien Tuong is also the sole manufacturer of a hand-powered cargo tricycle Whirlwind designed and from which disabled riders can conduct commerce and generate income.

The two Wheelchair Provision and Assembly Centers (WPACs) we set up in Sierra Leone and Nigeria under a United States Agency for International Development (USAID) grant continue to operate. As planned, each center has sold enough wheelchairs and generated enough profit to purchase its second container of new chairs. These facts bode well for the long-term sustainability of this business model.

And finally, we are now an independent 501(c)(3) nonprofit. All in all, 2015 has been an eventful year. But, without your support, none of these accomplishments would be possible. So, please send a check or make a donation online at **www.whirlwindwheelchair.org/donate** to help us continue our important work. *As you help Whirlwind you help change the world.*

Sincerely,

Marc Krizack, Executive Director

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Introducing the WhizKid™

Whirlwind has teamed up with Diversability Development Organization (DDO) of Toronto, Canada to develop the WhizKid™ wheelchair. The WhizKid combines DDO's award-winning seating design with Whirlwind's acclaimed RoughRider, offering children (and adults) a fully-adjustable supportive seating system on a stable, rough-terrain base that can easily handle whatever Mother Nature throws at it. We expect to start selling the WhizKid in developing countries in early 2016.

Whirlwind first began to design kids' chairs in the 1990s. Each of the two most promising prototypes had problems. One was fully adjustable, but turned out to be too heavy. The other prototype was an 80% scaled-down version of the RoughRider. It was appealing, but largely appropriate for kids who could actively push themselves. We chose not to bring this smaller scale RoughRider to market because research showed that the overwhelming majority of kids who need wheelchairs in the developing world also need special supportive seating. The WhizKid is a good solution and only the first of what we hope will be many joint projects with DDO. **http://diversable.org/**

1. **Adjustable Seat Width**
   Seat unit widths available in small, medium, large, and extra large
2. **Adjustable Seat Depth**
3. **Adjustable Backrest Height**
4. **Adjustable Seat-to-Back and Tilt Angles**
5. **Adjustable Supports**
   Adjustable height, width, and depth lateral trunk supports, abductor, lateral pelvic support, and headrest
6. **Padded Adjustable Straps**
   for shoulders, chest, lap, and feet
7. **Quick Release System**
   from the wheelchair frame for ease of transportation
8. **Fully Customizable Cushions**
   Seat and backrest cushions with removable stretchy covers
9. **Removable Tray**
10. **Optional Parts Available**
    for further customization
11. **Readily Adaptable**
    Seat unit can be fitted to any wheelchair
12. **For All Ages**
    Seat unit can be used by children and adults

Seat Unit Widths	SMALL: 12" (30 cm)	MEDIUM: 14" (35 cm)	LARGE: 16" (40 cm)	EXTRA LARGE: 18" (45 cm)
Seat Depth	Adjustable		**Backrest Height**	Adjustable
Seat-to Back Angle	Adjustable		**Tilt Angle**	Adjustable

(Em)Powering RoughRiders in Tbilisi, Georgia

In September, I spent three weeks in Tbilisi, Georgia following up on Whirlwind's joint project with the Coalition for Independent Living (CIL) to develop a power add-on kit for the RoughRider® and other wheelchairs.

The electric RoughRider, modified in Georgia, has two battery-powered, motorized hubs and a joystick-controller.

I arrived in Georgia using an Indonesian-made manual Whirlwind RoughRider because my first-generation Georgian-made electric Whirlwind wheelchair had not worked for several months due to low-quality plastic and soft metal gears failing in the Chinese-built hub motors. CIL had recently tried to solve this problem by ordering better quality metal gears custom-built in Turkey, replacing the bad parts whenever a hub motor failed. A more satisfactory solution seemed to be a different type of motor.

CIL made me a new electric RoughRider using different motors, which they had recently received from China. Levan Talakhadze, CIL's wheelchair designer, attached the motors ~40 cm behind the last axle position and provided 3° of camber for each wheel. These adjustments made the wheelchair completely stable going up very steep inclines even with my 6'2" body height. I used this new electric wheelchair for two days and then returned it to Levan so that he could adjust it for greater comfort. Two days later, the electric wheelchair was returned and I tried it out. It fit me perfectly and looked beautiful. With a top speed equal to a fast walk, it is foldable, weighs ~32 kg (70 lbs), and is easy to lift into the trunk of a car after its quick-release wheels and motors have been removed. When the lithium battery needs recharging, the cord can be plugged into any wall socket. If the battery dies, the rider can reach behind, flip a lever on each motor, and then manually push the wheelchair.

On September 5, I was taken on a cultural visit to the Kazbegi Monastery in the Caucasus Mountains. After a 30-minute, four-wheel drive up a dirt road, we arrived at the Gergeti Trinity Church, just below 16,500-foot Mt. Kazbek. I wanted to test my new electric RoughRider's ability to climb a steep dirt pathway to the monastery. Even though the path had ruts and loose gravel, I was able to travel to the top without any assistance. I was very surprised because twice I thought that the incline was too steep for the motors, but they kept slowly pushing the wheelchair to the end of the pathway. I was able to enjoy a once-in-a-lifetime, panoramic view of the Caucasus Mountains independently. See the brief video of this at **http://tinyurl.com/powerRoughRider**

While in Tbilisi, I traveled through the Old City, which was near our hotel. The road through the Old City is cobblestones and I was very pleased that the electric RoughRider moved easily over its irregular surface (though it was a very bumpy ride). I also tried traveling up very steep, paved, hillside roads and going directly off the end of sidewalks onto roads. The electric wheelchair had no problem with stability at any time and obviously did not need anti-tip wheels, which continues to amaze me.

On my way back to the U.S., I stopped in Amsterdam for two days to tour the canals. The chair was just fine traveling around the streets and canals until the last day when the left motor started making loud grinding noises. I was able to complete my journey home with both motors working, but was very disappointed that the new motors only worked for a few weeks. The problem seems to be caused by low-quality gears in the Chinese-built motors, the same problem we had with the first motors we bought from China. To solve this problem we will need better quality gear parts. Ultimately, we will need to find an affordable, durable electric motor that can be attached to the RoughRider. A simpler controller that does not require a special diagnostic tool to adjust it is also needed. Once these two problems have been solved, this low-cost, foldable, electric RoughRider will open up outdoor travel and exploration to many persons with disabilities. –Bruce Curtis

Bruce Curtis (at left, ascending the path to the Kazbegi Monastery in the Caucasus Mountains in Georgia) is Chair of Whirlwind's Board of Directors. He went to Georgia in September 2015 as a consultant to the Georgian Coalition for Independent Living. While there he was one of a group of legal experts who trained two new teams to provide legal education services and prepare court cases to fight discrimination against persons with disabilities in Georgia.

The Whirlwind-Huckstep: A Lifelong Chair?

The greatest shortcoming of our work at Whirlwind has been that our chairs, despite being among the best in the field, have not met the long-term needs of the majority of our users: disabled people in deep poverty who are trying to live independently. Even when some have been fortunate enough to get a chair for free or at a very low price, the cost of certain unavoidable repairs remains prohibitive.

When chairs have needed tires, bearings, new upholstery, even frame welding, users have often found ways to get them fixed. But when the large drive wheels finally fail (with bent rims, rusted spokes, and worn-out hubs), the cost of replacement can be far too much to bear. The cost of a wheelchair drive wheel, with its special heavy-duty hubs and axles, can be triple the cost of a bicycle wheel. And worse yet, if there is no wheelchair shop nearby with each of the special parts, the users have no way to replace the wheels. The chairs end up rusting and discarded, their riders rendered immobile.

50 years ago, a small group of skilled mechanics in Kampala, Uganda showed that it was possible to build a wheelchair using normal bike wheels, so that the chair could be cheaply repaired after many years of use. No special parts were needed, just what was waiting in the local bicycle shops throughout the developing world. These mechanics named the chair the Huckstep, after the Australian surgeon who brought them together. Huckstep chairs are still made today, and their riders—some with chairs up to 30 years old—have found ways to repair or replace every part, including the large drive wheels.

The Huckstep is not without its trade-offs. Its large front drive wheels, which are modeled after hospital chairs of 100 years ago, block the sides of the seat, making it very hard for most riders to transfer into the chair. Popping wheelies to climb obstacles is impossible, though the chair rolls well over rough but level paths. The Huckstep's large bike wheels also add three inches to the chair's width, limiting the choice of outhouses. This is because the thin axles of the Huckstep's bike wheels must be supported at both ends by bicycle forks and these forks must extend outward to clear the handrims.

Sharifa Mutimba in her Huckstep, 1995.

Ralf Hotchkiss in his modified RoughRider.

Despite these shortcomings, wheelchair riders throughout East Africa keep using the Huckstep because they know they can afford to keep it running, perhaps for a lifetime. But some have made it clear that they would prefer a modern chair, like the Whirlwind RoughRider®, if they could fix it as cheaply as they do the Huckstep.

Sharifa Mutimba, co-founder of the Whirlwind shop in Kampala, gave me her own Huckstep in 1995 and insisted that the Whirlwind could be made "just as good." After studying the Huckstep—and occasionally riding it—for 20 years, I am ready to give building a new chair, a Whirlwind with Huckstep wheels, a serious try.

I have experimented with six generations of new forks for the RoughRider's rear wheels, and have ridden the best of these for the past two months. While the new forks add little width to the chair, they do add weight and are not yet strong enough for heavy riders. With major changes to the chair's frame the forks should work better.

The challenge of making the new Huckstep/Whirlwind strong enough, yet still light, narrow, and simple, has proven to be far more difficult than expected. If the project succeeds, however, it will be more than worth the trouble. If it works well, this innovation will open up lifetime mobility to the many, many wheelchair riders who could never afford to keep a wheelchair running before. –Ralf Hotchkiss

Whirlwind's founder, Ralf Hotchkiss, received a MacArthur Award for his pioneering work in designing wheelchairs that could be built and used in developing countries using locally available materials.

Bringing the RoughRider to India

Whirlwind and the Artificial Limbs Manufacturing Corporation of India (ALIMCO) are exploring a collaboration to manufacture RoughRider wheelchairs in India. In August, Whirlwind shipped 100 RoughRiders from a Chinese factory to ALIMCO. These wheelchairs will be given to wheelchair users who will provide ALIMCO with feedback on quality and usability. ALIMCO will use the data it collects from the user trials to determine whether to move forward with local production and to convince the government to allocate more funding for wheelchair purchases.

India is making a concerted effort to develop what it calls "business tie-ups" with foreign companies in an effort to attract capital, modernize its industry, and become competitive on the world market. It is anticipated that ALIMCO's quality will improve when it competes in the open market.

A nonprofit corporation owned by the government of India, ALIMCO sells most of the wheelchairs they currently produce back to the Indian government.

RoughRider production in India will make it possible to bypass the current customs problems associated with importing and will make the RoughRider available to millions of people in need on the Indian subcontinent.

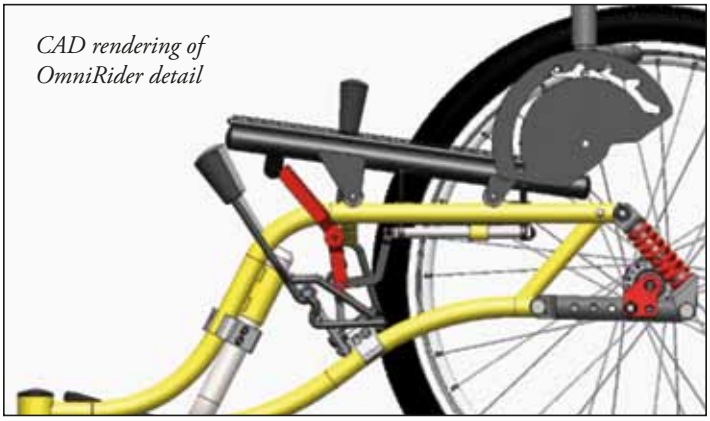
Nuts & Bolts

RoughRiders Available in the US & Canada

There is no better deal than a RoughRider for $875 plus S&H in the US and Canada. We do not go through dealers, so to purchase online, go to **http://tinyurl.com/buy-RoughRider** or pay by check. We do not yet accept insurance. Our friends at Global Mobility USA (GMUSA) handle our shipping within the US and Canada. 150 RoughRiders arrived at the GMUSA warehouse near Los Angeles November 4 and are available for sale. Each chair comes with high-quality, machined aluminum rear hubs, anti-tip bars, and quick-release axles as standard equipment. Profits from the sale of RoughRiders go to support Whirlwind's nonprofit work.

The RoughRider's ability to traverse irregular terrain allows Gail Hoofnagle to enjoy the great outdoors.

PHOTO BY MICHAEL S. SCARAMELLA, ESQ.



CAD rendering of OmniRider detail

Work Started on the OmniRider™

Whirlwind has begun design work on a chair we call the OmniRider. The concept is to take the best features of the RoughRider—such as wide front casters, a long wheelbase, multiple rear-axle positions—and make the chair eight to ten pounds lighter. An optional feature will allow the seat to slide forward five inches, enabling the rider to get closer to tables, toilets, bathtubs, stoves, etc. This feature will make the chair even more maneuverable indoors. At current funding levels, it will probably take us another two years to complete the design. With sufficient additional funding now we could shorten that to 16 months. The OmniRider will not replace the RoughRider.

Whirlwind Expands Production Capacity

Whirlwind now has a second large-scale manufacturer of the RoughRider. INTCO, located near Shanghai, began manufacturing RoughRiders in February 2015. With INTCO added to Kien Tuong, our manufacturing partner in Vietnam, Whirlwind has dramatically increased its production capacity and reduced costs without sacrificing quality.

Whirlwind Announces Board of Directors

Whirlwind Wheelchair's Board of Directors (left to right) Chair Bruce Curtis, Joan Costello, Shelley Bergum, Jane Maxwell, Judi Rogers. Absent: Marc Krizack and Alexandra Enders.

Whirlwind Wheelchair has become an independent nonprofit corporation for the first time since our inception 35 years ago. Starting in 1980, Whirlwind operated as a project of founder Ralf Hotchkiss. In 1989, Whirlwind became a program at San Francisco State University, under the fiscal sponsorship of the University's foundation. In July 2014, Whirlwind left the University and became a sponsored program of People United for a Better Life in Oakland (PUEBLO). In June 2015, Whirlwind registered with the State of California and in October we received our federal tax-exempt status.

Whirlwind's bylaws require that a majority of our board of directors and its chair be persons with disabilities. We believe that the way to best understand the community we seek to reach is to be from, and led by, that community. In keeping with this belief, we're pleased to announce that the new chairperson of Whirlwind's board of directors is Bruce Curtis. Mr. Curtis—a disability rights activist who uses a wheelchair—has worked with international nongovernmental organizations (NGOs) and organizations of persons with disabilities in over 20 countries. From 1992 through 2014, Mr. Curtis served as the International Programs Manager for the World Institute on Disability (WID), working in Russia and other post-Soviet countries. In recent years, Mr. Curtis managed a USAID-funded, five-year project in the Republic of Georgia in partnership with Whirlwind and others. This partnership set up a small factory there to build RoughRiders. Also while there, he helped a local NGO develop an effective advocacy campaign to promote barrier-free environments. His article about his most recent trip to Georgia is on page 4.

As we head off on our own, Whirlwind would like to thank PUEBLO for its fiscal sponsorship and support. We are grateful for the assistance and accountability they provided as we transformed into an independent nonprofit.

In Memoriam: Frank Barham 1956–2015

2015 saw the tragic death of musician, wheelchair rider, and Whirlwind supporter Frank Barham, who was killed in May during his 302-mile ADA 25th Anniversary roll from Atlanta to Savannah, Georgia. He was raising funds to buy wheelchairs for people in need in the US. Leaders like Frank don't come along often. His untimely death is a great loss for everyone who knew him personally, for the Atlanta music and arts community, and for the hundreds, if not thousands of people in Georgia and across the country who would have received a good wheelchair through his tireless efforts. To read the full memorial to Frank, visit **http://tinyurl.com/Frank-Barham**

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All donations received or postmarked in 2015 are deductible in 2015.

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