

# MobiliT Rover Converts Wheelchairs To All-Terrain Vehicles

University of South Florida



Sometimes the best inventions are inspired by the closest pain. In a senior projects class at the University of South Florida (USF) in 2005, Travis Watkins listened to his professor suggest potential devices for individuals struggling with disabilities. Watkins was one of many mechanical engineering students required to design a device that showcased their education. The professor's menu of projects was intended to guide them to build devices with direct and immediate real life applications.

"I had someone else in mind," says Watkins. "If I was going to build something for a disabled person, it wasn't going to be for some stranger. It was going to be for my father."

## **Inventing for the Individual**

Watkins' father had once been very physically active. He enjoyed tennis, boating, rock climbing, skiing and exploring among other highly physical activities. "He wasn't one to sit around and go down the common path or follow the

person in front of him,” says Watkins. “He was a trailblazer and flaunted his freedom and independence in the face of those who forgot that anything is possible.”

That came to an end when Lou Gehrig’s disease (amyotrophic lateral sclerosis) weakened and then destroyed the motor neurons that operated his father’s muscles.

“I thought about how now he couldn’t go anywhere that wasn’t paved and smooth due to the poor capabilities of his top-of-the-line wheelchair,” explains Watkins. “I thought how difficult this must be for him, to be confined to a road that someone else paved going somewhere where nothing exciting or really interesting is likely to take place.”

Watkins says images of machines, power transmission methods, capabilities and limitations started flashing through his head. “I instantly analyzed and either accepted or rejected each idea,” he says. “I thought of hundreds of different ways of giving my father his freedom back but only one that could feasibly work.”

### **Designing a Destination Vehicle**

With that one idea in his head, Watkins joined fellow students Robert Burn and John Hopkins to form a research team. Burn and Hopkins left Watkins to design his dream machine while they worked on the research documentation and verifications. Soon, they had a working prototype.

“*The resulting rover device is an attachment for an electric wheelchair. A disabled person simply drives his or her electric wheelchair on top of the rover via an integrated ramp. Once positioned on top of the rover, the electric wheelchair automatically and securely locks into place.*”

Once secured, each of the wheelchair’s drive wheels is positioned on top of and in between two rollers. When the electric wheelchair’s wheel rotates, it turns the rollers. These rollers turn a shaft with a sprocket attached at the end. In addition, the rover has huge extreme off-road capable wheels on axles with sprockets.

A chain links the roller sprocket to the wheel sprocket so that when the wheelchair operator activates the wheelchair, the wheelchair wheels turn the rollers. Those turn the sprocket, which rotates the chain, which turns the extreme off-road wheels.

“Basically, when the wheelchair is locked in place on the rover, the wheelchair’s controls now control the entire rover,” explains Watkins. “One of my main requirements was to use the wheelchair controls to control everything. The rover is so easy to use. Just drive your wheelchair up on it, it automatically locks into place, and you drive the rover away ready to take on any obstacle in your way and go wherever you please, even places you can’t get by foot!”

He called it the ATEWA — All Terrain Electric Wheelchair Attachment. It was later nicknamed the “Tank” for its ability to overcome numerous terrain obstacles. It is now known as the MabiliT Rover.

### **Carrying the Idea to Market**

By any name, the device thrilled disabled users but fell short in attracting commercial interest.

“We require our students to focus their senior design projects on solving real world problems,” says Stephen Sundarrao, associate director of USF’s Center for Rehab Engineering and an instructor in its Department of Mechanical Engineering. “We thought this particular project would appeal to commercial companies, but they were oddly noncommittal.”

Determined to see this invention get to the people who needed it, Valerie McDevitt, assistant vice president of patents and licensing at USF, urged faculty to create a company to commercialize the product.

“It took a fair bit of instigating on our part,” says McDevitt. “But this was one instance where we saw a real benefit to starting a spin-up company, not only because of the rover design, but because there was a considerable pipeline of good ideas coming from this group.”

Using cash provided by angel investors, the faculty started Rehab Ideas in late 2007. “We selected five of the senior projects initially, and one of them was the rover,” explains Sundarrao.

By 2008, Rehab Ideas was selling products. “We worked with Dixie Chopper in Indiana on distribution and manufacturing,” says Sundarrao. “And we have the backing of GE Capital to finance floor plans with dealers.”

Watkins’ father was the first to own a MobiliT Rover, but he isn’t the first to feel the freedom it brings.

“It was the most amazing thing to witness the first person who bought it,” beams McDevitt. “It was a young person who promptly drove all over the lawn laughing. His caregiver and best friend even jumped up and rode on the back.

“It was a touching and exhilarating moment to witness, and it brought home why these projects matter.”

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