

REHAB CASE STUDY

The Cat's Meow:

A Wheelchair User's Journey with Blind Spot Sensors

WRITTEN BY: Pooja Viswanathan, Ph.D., founder and CEO, Braze Mobility Inc.

THIS ARTICLE IS SPONSORED BY BRAZE MOBILITY

Innovation rooted in lived experience

In Complex Rehabilitation Technology, innovation isn't just about launching new features, sensors or smart systems. True innovation is measured by how much more freely people can move, how confidently they can live and how well their needs are understood.

This case study explores how a team of clinicians, engineers, caregivers and advocates worked together to help Marine veteran Phil Ratzlaff navigate safely and independently with blind spot sensor technology. His journey illustrates the potential for all wheelchair users to benefit from intuitive, user-centered advancements that enhance mobility while respecting autonomy.

It's also a reminder that the most impactful solutions in CRT emerge from listening — to pain points, goals and personal experiences — rather than simply pushing technology forward.

Meet Phil Ratzlaff

Ratzlaff served in the U.S. Marine Corps from 1970 to 1974. Though decades have passed since his time in uniform, he still carries the discipline and

resilience of a life dedicated to service. His sense of humor is equally unmistakable. He often introduces himself as “a Marine with no legs, ALS, traumatic brain injury, a tracheostomy, legally blind ... otherwise in good shape.”

For years, Ratzlaff used a manual wheelchair for mobility. Transitioning to a power chair increased his independence, but as his vision declined, navigating safely became increasingly difficult even at home.

“I was dragging the couch across the living room without knowing it,” he said. “I needed caregivers to help me, even inside my own home.”

Then came a turning point.

“I ran into a child's stroller,” he recalled. “Thankfully, the child wasn't in it, but it scared me.”

With his vision deteriorating, Ratzlaff worried: Could he maintain his independence, or would he lose the ability to safely operate his wheelchair?

Searching for a solution

Determined to find an answer, Ratzlaff researched proximity sensors and obstacle detection systems. He also consulted his therapists at the Minneapolis



Closeup of the Braze Sentina mounted in the front of Phil Ratzlaff's power wheelchair.



Braze Controller offering auditory and visual (LED) feedback from the Braze Blind Spot Sensors.

VA Spinal Cord Injury and Disorder Center.

In 2018, his search led him to Braze Mobility, a Toronto-based company specializing in blind spot sensors for wheelchairs. These devices, which I developed following years of research into mobility challenges, provide real-time

feedback via lights, sounds and vibrations, allowing users to detect obstacles while retaining full control of their wheelchair.

“This is exactly the kind of system I've been thinking of!” Ratzlaff said upon learning about the technology.

CONTINUED ON PAGE 38



Braze Sentina mounted to the rear of Phil Ratzlaff's power wheelchair.



Phil Ratzlaff with Braze Sentina mounted on his power wheelchair base.

Tailoring technology to real life

The VA's assistive technology team acted quickly. His wheelchair configuration was customized through collaboration among his therapists (including physical therapists Ryan Bouslog and Chris Schieffer, and ATP/SLP Beau Bedore), equipment supplier Numotion, our team at Braze Mobility and Ratzlaff himself.¹

The setup included:

- A rear-mounted sensor with 180-degree horizontal coverage called **Braze Sentina™**
- Front-mounted peripheral sensors with 45-degree coverage called **Braze Echo Heads™**

- **Vibration modules** on both armrests and backrest
- **Braze Controller™** mounted near his joystick, offering visual (LED) and auditory feedback.
- **BrazeConnect™ app** on his tablet to customize LED brightness and colors, and feedback modes

During clinical trials, Ratzlaff successfully navigated therapy gyms and open hallways using vibratory and visual feedback.

When the front peripheral sensors didn't provide sufficient coverage, an additional front-mounted Sentina unit was installed — creating the new Sentina 360 configuration, which he was the first to use.

"The Sentina in both the front and rear has been the cat's meow for me," Ratzlaff said. "It's everything I had hoped for and expected."

The impact: safety, confidence, and quality of life

Using the Braze system, Ratzlaff regained confidence and independence. He now navigates his home, stores and community spaces with reduced anxiety and less reliance on caregivers. He even traveled out of state alone for the first time, using his power wheelchair in conjunction with a white cane.

"If there's a box or someone in the way, the system lets me know," he said. "I can stop,

analyze the situation and decide what to do, or turn around. I don't have to worry about hurting someone."

Beyond functionality, the system has restored Ratzlaff's sense of safety and control — something many wheelchair users lose due to vision impairment, fatigue or complex environments.

Videos of Ratzlaff's experience can be found here: <https://brazemobility.com/testimonials/>

A peer-reviewed study published in *Disability and Rehabilitation: Assistive Technology* found that power wheelchair users detected obstacles more accurately and quickly, with lower cognitive task loads, when using the Braze Blind Spot Sensor System compared to without one.²

These benefits extend beyond veterans. We've worked with children and older adults, rural and urban users, individuals with vision impairments, cognitive challenges and more. Whether navigating tight living spaces, classrooms or sidewalks, our users report greater peace of mind and fewer accidents.

Innovation through collaboration

Ratzlaff's success was made possible by a community that believed in his vision. His team, including family members, therapists, vendors and engineers — all contributed to customizing and refining the solution.

REHAB CASE STUDY



Phil Ratzlaff, U.S. Marine veteran, served from 1970-1974.



Phil Ratzlaff uses the BrazeConnect app on his tablet.

At Braze, we prioritize co-creation. We recognize that wheelchair users are experts in their own experiences, and we listen to their feedback when developing new technology. Ratzlaff's insights led to product improvements that now benefit others, illustrating how CRT should evolve through direct user input and iterative design.

While his system was provided through the VA, Braze technology has also been funded through Medicaid and private insurance across the U.S. With strong letters of medical necessity demonstrating improved spatial awareness and enhanced independence, many

payers recognize the value of blind spot sensors.

Lessons for CRT: human-centered innovation

Ratzlaff's story underscores that CRT is not just about developing smarter hardware; it's about designing solutions that address real-world challenges. Whether through wearables, neurofeedback, robotics or sensor technologies, innovation must focus on user needs rather than engineering assumptions. Accessibility and affordability must also be prioritized, ensuring that those who need these solutions can obtain them.

Ratzlaff didn't ask for unnecessary features. He asked for safety, peace of mind and the ability to keep doing pottery in his home studio. His journey reminds us that the simplest goals are often the most profound and the most worth innovating for.

Conclusion: From one user to many

Ratzlaff began his search with one question: Is there something out there that can help me stay independent as I lose my vision?

The answer was yes. But his experience highlights a larger truth: Thousands of veterans and civilians, adults and children, manual and power chair users face similar challenges.

By listening, collaborating, and designing with purpose, we can create technologies that do more than transport users from point A to point B. We can help them move through life with confidence, autonomy, and dignity.

And that is what CRT, at its best, is all about.

REFERENCES

1. Bouslog, R., Schieffer, C., & Bedore, B. (2019). Veteran Highlight...The Cat's Meow: Braze Mobility System for Veteran with Legal Blindness. Department of Veterans Affairs Assistive Technology: PM&R Assistive Technology Programs, 8(1), 10-11. <https://www.polytrauma.va.gov/news-and-resources/ATNewsletterSpring2019.pdf>
2. Pellichero, A., Best, K. L., Routhier, F., Viswanathan, P., Wang, R. H., & Miller, W. C. (2023). Blind spot sensor systems for power wheelchairs: obstacle detection accuracy, cognitive task load, and perceived usefulness among older adults. *Disability and Rehabilitation. Assistive technology*, 18(7), 1084-1092. <https://doi.org/10.1080/17483107.2021.1983654>



CONTACT THE AUTHOR

Pooja may be reached at
POOJA.V@BRAZEMOBILITY.COM

Prior to founding Braze Mobility, Pooja Viswanathan completed doctoral and postdoctoral research on the development of "smart" wheelchairs designed to prevent collisions through autonomous interventions and provide wayfinding assistance via adaptive prompts. Dr. Viswanathan has received awards from organizations including Google and worked at Honda Research Institute in Silicon Valley on computer vision and robotics technology.

Dr. Viswanathan has published several peer-reviewed papers and book chapters (www.brazemobility.com/publications) and organized international workshops on "smart" wheelchairs. She was named to the WXN Top 100 Most Powerful Women list and recognized as a BMO Entrepreneur in 2021. In 2022, she was featured on Robohub's international list of 50 Women in Robotics You Need to Know.

Dr. Viswanathan is currently CEO of Braze Mobility and a professor at Western University in Canada.