

# Goddard's Cable-Compliant Joint Technology Gets Patients Up and Walking with SAM



Enduro Medical Technology used NASA Goddard Space Flight Center's cable-compliant joint (CCJ) technology and compliant walker to develop the Secure Ambulation Module (SAM). SAM is a revolutionary rehabilitative walker enabling patients to stand and ambulate without the aid of a physical therapist. The walker is currently being used to help patients at Walter Reed Army Medical Center and Kindred Hospital in Greensboro, NC. Enduro has also built and tested a prototype of a youth version of the walker (SAM-Y) and plans to develop an equine prototype for use in horse rehabilitation.

[www.nasa.gov](http://www.nasa.gov)

## Benefits of Technology Transfer

- *Reduced patient and therapist injury:* SAM provides security that reduces patient injuries from falls and reduces back injuries to therapists.
- *Earlier rehabilitation:* Since they do not need to support their own weight, many patients can begin ambulatory rehabilitation earlier in their treatment.
- *Longer and specialized sessions:* SAM enables patients to have longer therapy sessions or more specialized treatment.
- *Cost and resource savings:* SAM enables therapists to serve multiple patients simultaneously, reducing costs for medical facilities.
- *Reduced number of deaths and shorter rehab time following equine surgeries:* SAM may help reduce the number of deaths following medical procedures and the need to euthanize animals following a leg fracture by enabling the horse to stand in a safe, controlled environment.

tech transfer success

## On the Record

“I think there’s a change in confidence and almost like a change in hope for someone who hasn’t been able to walk for a long time and—with the assistance of SAM—is actually able to get up and ambulate and propel themselves on their own.” - *Anne Moore, Licensed Physical Therapist Assistant, Walter Reed Army Medical Center*

“We saw using this cable compliant mechanism as a way to really improve and revolutionize how physical therapy is done for patients.” — *Ken Messier, President, Enduro Medical Technology*

## About Enduro Medical Technology

Headquartered in South Windsor, CT, Enduro Medical Technology was founded in 2002 as a small company focused on designing and manufacturing custom wheelchairs. In 2003, the company narrowed its focus to concentrate fully on SAM and other CCJ technology-based rehabilitative devices.

## Technology Origins

In the 1980s, NASA required a technology that would facilitate mechanical isolation of sounding rocket assemblies as well as provide compliance for robots to grip or join objects. As part of this robotics research, the late James Kerley developed the cable-compliant joint (CCJ) technology, which provided customizable structural connections and selective, subtle cushioning, twisting, and alignment in six directions, allowing contact surfaces to be joined together.

## Finding a New Use

While the CCJ technology answered NASA’s requirements, it was readily clear that the subtle movement the technology facilitated could easily be extended to other applications. In the 1990s, researchers at Goddard integrated the CCJ technology into a patented walker that supported the pelvis and provided compliance that imitated hip joint movement. Suffering from arthritis, Kerley realized that pain management could be achieved by using the walker to alleviate weight on the legs to facilitate greater mobility.

Goddard licensed the technology to Enduro, giving birth to the SAM walker for humans. After establishing the device’s use and benefits for human rehabilitation, Enduro engineers began to engage in discussions with doctors at nationally renowned veterinary hospitals. Interest among this community was high and convinced Enduro that the CCJ-based technology could also be incorporated into a rehabilitative device designed specifically for horses.

## The Transfer Process

In 2003, Enduro Medical Technology learned of the compliant walker through industry peers who were using a prototype of Goddard’s technology. Realizing the market potential of the device, Enduro contacted Goddard and then worked with the Innovative Partnerships Program (IPP) Office to license the technologies. The company then completed the project by modifying the cable-compliant system into an advanced walker with a flexible harness that embraces the lower torso. Doing so enabled the device to support a patient without the aid of a physical therapist. In February 2007, Enduro secured a new field-of-use license from Goddard to develop SAM-Equine.

## Looking Ahead

While SAM is showing remarkable results for patients at Walter Reed and Kindred Hospital, Enduro continues to invest in further development and exploration of CCJ technology-based devices. A “Sit-To-Stand” unit, also based on CCJ technology, is being used to help patients stand on their own. The company also has released and tested a prototype of SAM-Y and is working to insert the youth version into the marketplace. In addition, ongoing efforts to secure funding will enable the building of a prototype of SAM-Equine, and the company currently plans to work on the equine industry requirements with the University of Georgia’s School of Veterinary Medicine.

## For More Information

If you would like additional information about Goddard’s technology transfer opportunities, please contact:

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